BULACAN STATE UNIVERSITY
GRADUATE STUDIES

Handbook In Thesis and Dissertation WRITING

PRELIMINARY SECTION

Basically, the thesis or dissertation may consist of any or all of the following elements and appear in this order: Title page, copyright page (optional), approval sheet, abstract, acknowledgement, dedication (optional), table of contents, list of tables (if any), list of figures (if any), and list of plates (if any).

All the preliminaries or front matter of the thesis or dissertation are counted as pages and are given lower case roman numerals at the top of the page. The centered heading format is used for the topical headings of the preliminaries. All topical headings are capitalized and centered on the page. Single spacing is used in between ending line.

1. TITLE PAGE

The *title page of a thesis or dissertation* is the first page and it includes the following information: the *title of topic*, the *full name of the author*, *the submission statement* such as the relationship of the research work to the degree sought, *the name of the institution* where the research work is submitted and the date of presentation.

The title of the thesis or dissertation should be brief and concise as well as descriptive and comprehensive. It should be typed in capital letter, single spaced and centered between the right and left margins of the page. Where the title requires more than one line, the words of title are divided into lines so that each successive line becomes shorter that the one above and centered below in an inverted pyramid.

All other entries in the title page follow the format and typing direction shown in the Figure 1.

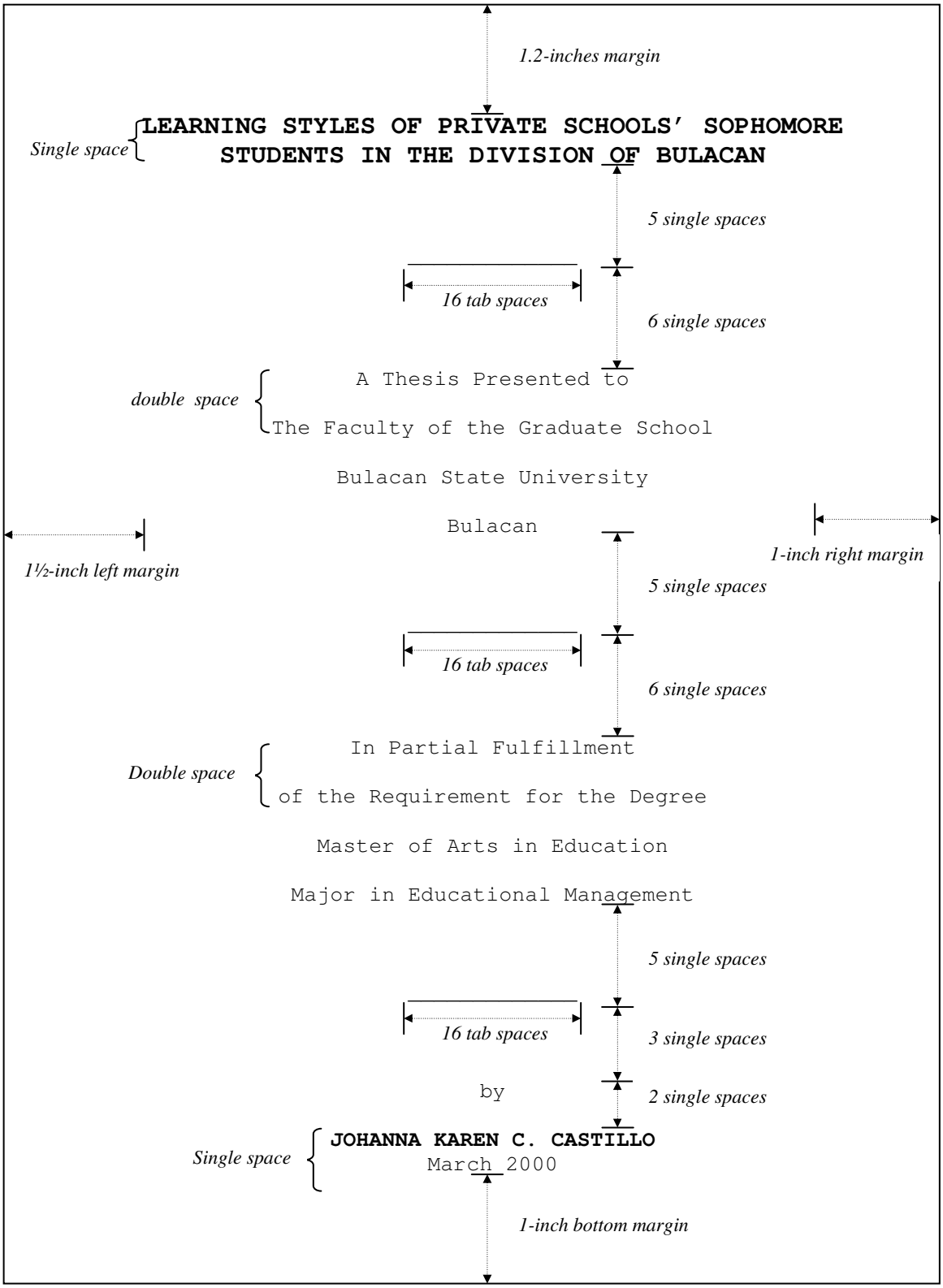


Figure 1. Title Page Format

2. COPYRIGHT PAGE

This page appears on a separate page, following the title page. It serves notice that the author or writer of the thesis or dissertation owns the copyright and should be protected by the law against the unauthorized use and publication of thesis or dissertation by other individuals, organizations or publishers.

The copyright page is optional in the thesis or dissertation. This is because whether or not you put a copyright notice or not on the thesis or dissertation, others legally protect one in ensuring ownership and preventing its publication without meeting certain legal requirements under the copyright law.

A copyright notice includes the year when the copyright was secured, the name of the author or writer, and the reservation of the right. It appears in a page as indicated: center the notice and position in the last line one (1) inch from the bottom of the page; circle a lower case c "©" next to the year; type the legal full name of the author or writer. Type "ALL RIGHTS RESERVED" in capital letters. Use double space in between lines (See Figure 2).

3. APPROVAL SHEET

The approval sheet usually follows the copyright page (if any) and precedes the abstract page. It is contained in a page and provides the following information: acceptance of the thesis or dissertation for the degree applied for by the thesis or dissertation adviser and by the Thesis or Dissertation Committee and, the approval by the Dean of the College/Institution/Graduate School concerned, and the date of acceptance and approval of the thesis or dissertation as a partial fulfillment of the requirement for the degree applied for (See Figure 3).

Figure 2. Copyright Page Format

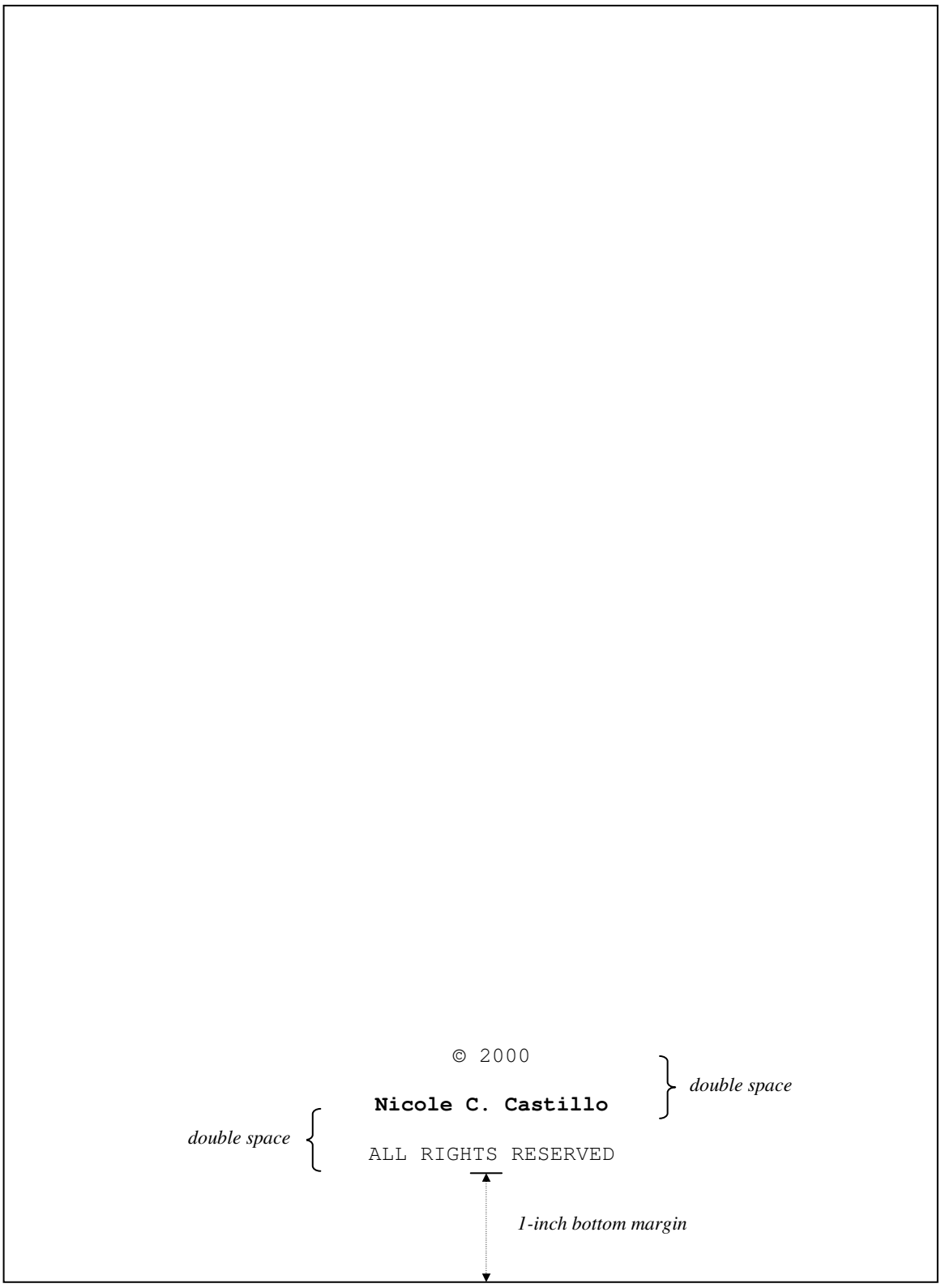
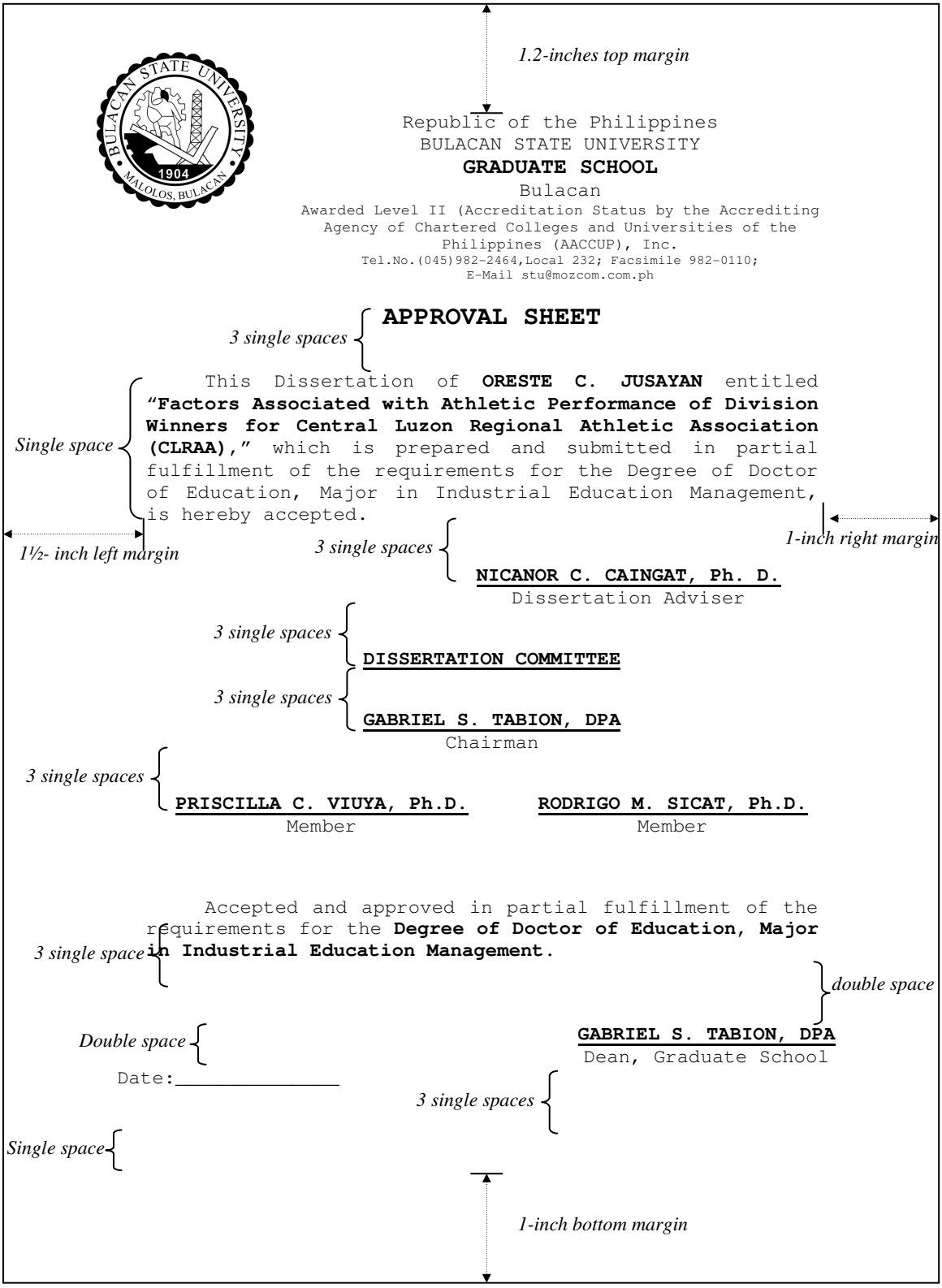


Figure 3. Approval Sheet Format



4. ABSTRACT

The brief descriptive summary of the thesis or dissertation is invariably needed. This is called the Abstract. It includes the title of the study, the author, institution, degree sought and its major, a statement of the problem or issue, a brief description of the research method and design, major findings and their importance, the conclusions arrived at and the recommendations, for the contents of the abstract maximum of 350 words is recommended.

For typing and printing instructions see Figure 4.

5. ACKNOWLEDGEMENT

This page includes expression of gratitude and appreciation to the unusual assistance, guidance and direction received by the author or writer of the thesis or dissertation from numerous institutions and/or individuals in the conduct of the study.

If used, acknowledgement should be simple, selective and free from flattery and excessive recognition. Only persons, institutions and organizations, which extended unusual but important assistance, which led to the successful completion of the thesis or dissertation should be given appropriate acknowledgement.

For typing and printing instructions please refer to the illustrative example in Figure 5.

6. DEDICATION

The dedication is contained and centered in one page and is devoted to ideas, things or persons whom the writer derived inspiration, purpose and achievement.

Figure 4. Abstract Format

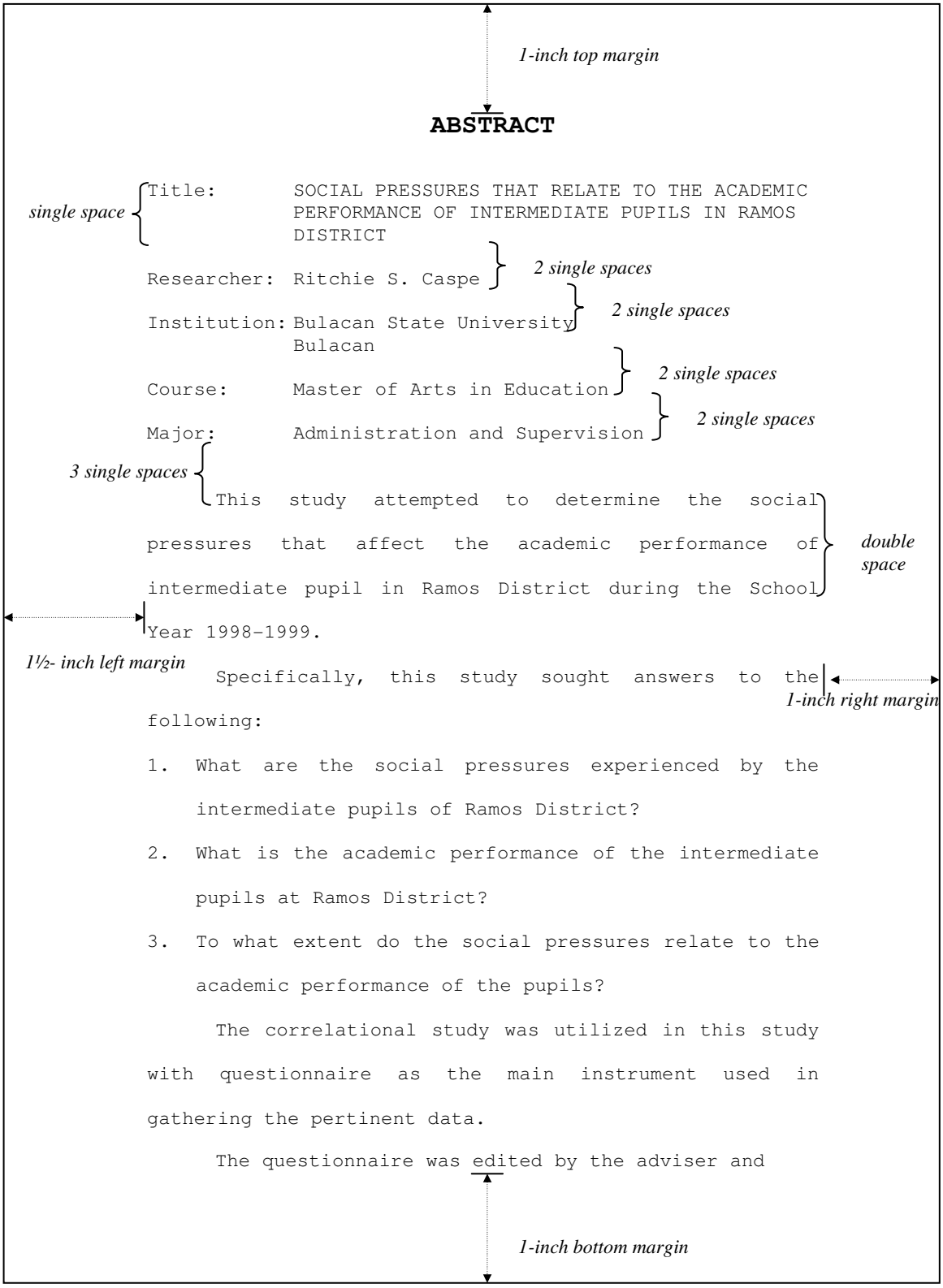


Figure 5. Acknowledgement Format

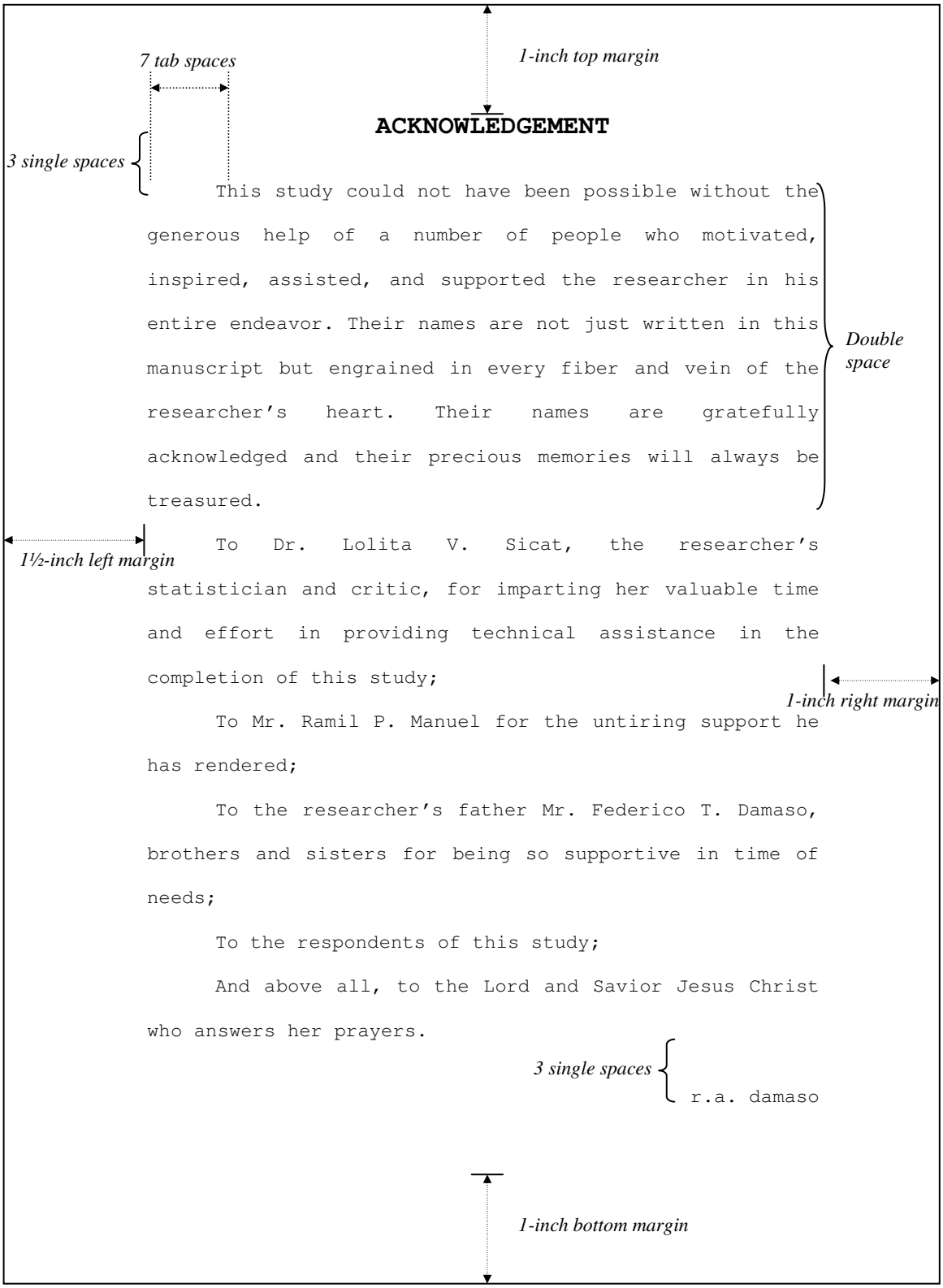
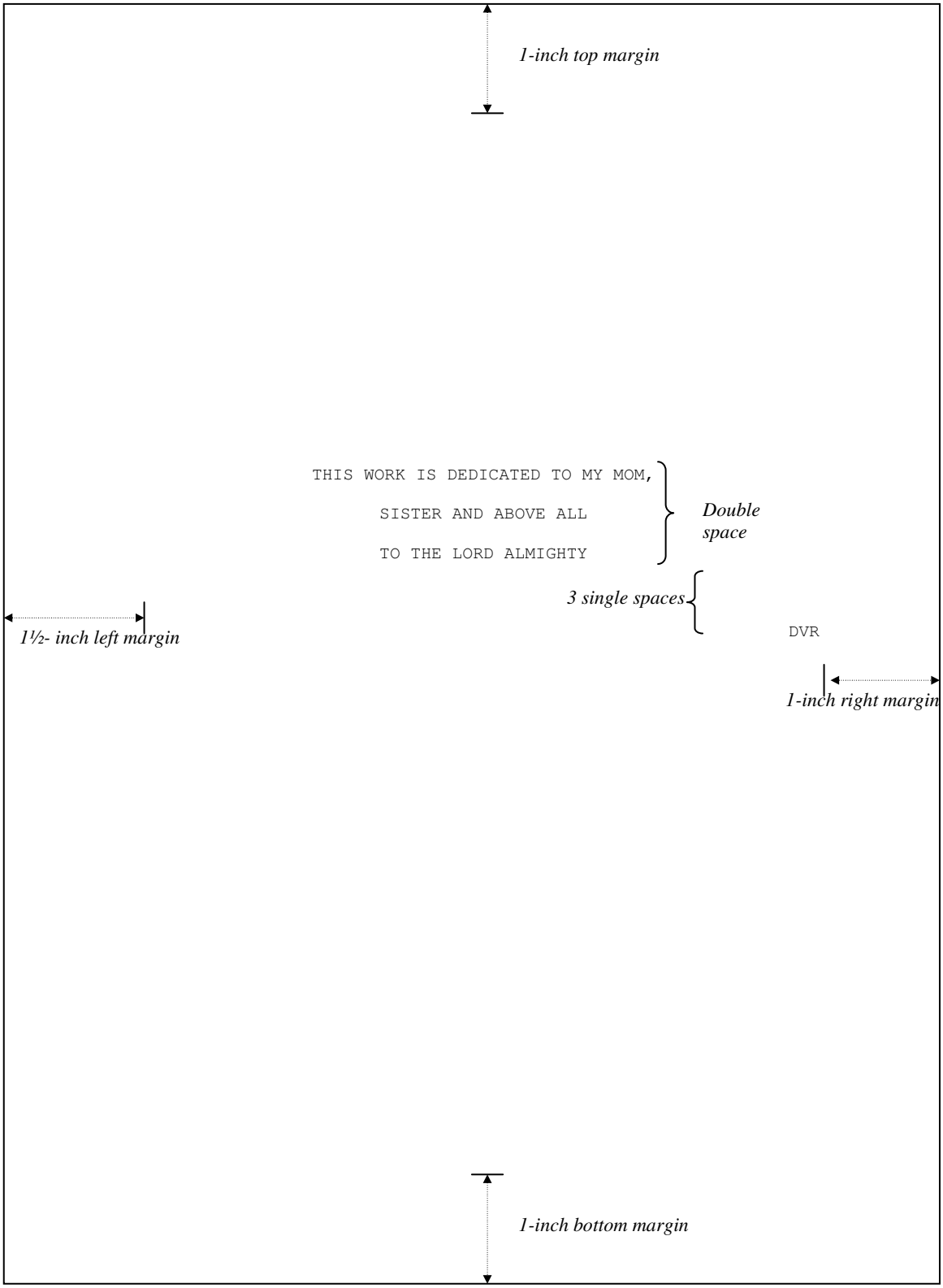


Figure 6. Dedication Format



7. TABLE OF CONTENTS

The table of contents shows the major divisions of the thesis or dissertation, the preliminary section or front matter, the text or main body and the reference section, with their respective numbers, titles, chapter and references.

A good table of contents indicates coherence among major divisions of the thesis or dissertation; and observes the proper use of capitalization, punctuation, margin and the like and presents the major divisions of the thesis or dissertation in clear and logical manner. The numbering of preliminaries, text or body, and the reference's section and the wording, capitalization and punctuation of heading, titles should be exactly the same as they are in the text.

For typing and printing instruction see Figure 7.

8. LIST OF TABLES

The list of tables should follow the table of contents. It provides the following information, namely: 1) the table number, 2) the full titles of each table and 3) the corresponding page number of each table. The table number, full title and page number should exactly be as they appear in the text.

Tables should be numbered correspondingly in Arabic numerals throughout the page. The full title of the table calls for capitalization of the letter of the words and all nouns, pronouns, adjectives, adverbs and verbs.

For typing and printing instruction see Figure 8.

9. LIST OF FIGURES

Figures are statistical data presented in graphical form. They include graphs, charts, drawings, diagrams, maps, photographs, blueprints, computer print outs, etc. A separate page is made for the list of figures proceeding right after the list of tables, the full titles of figures would be exactly as they appear in the text, and presented with corresponding number in Arabic form with corresponding page location. (See Figure 9)

Figure 7. Table of Contents Format

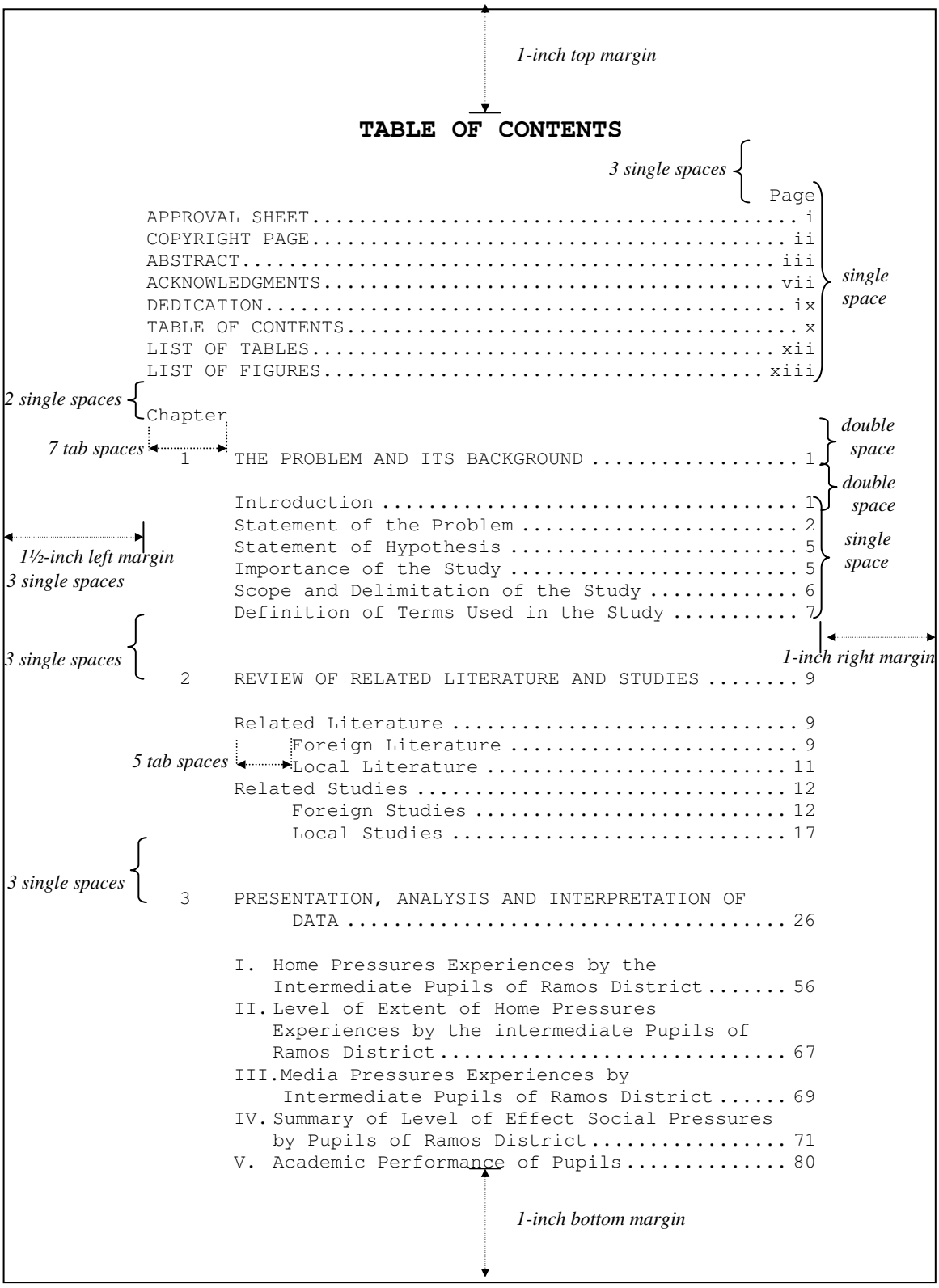


Figure 8. List of Tables Format

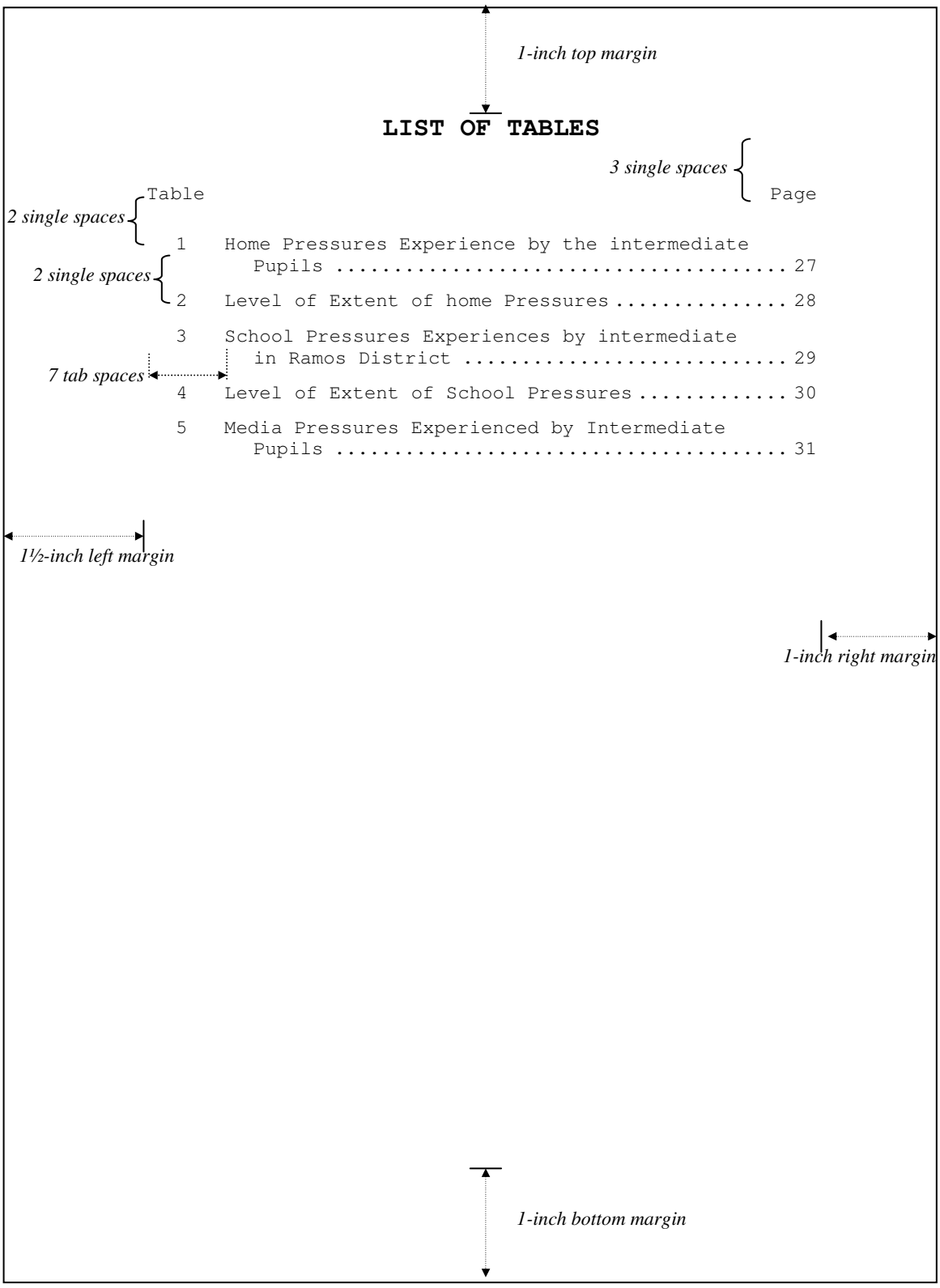
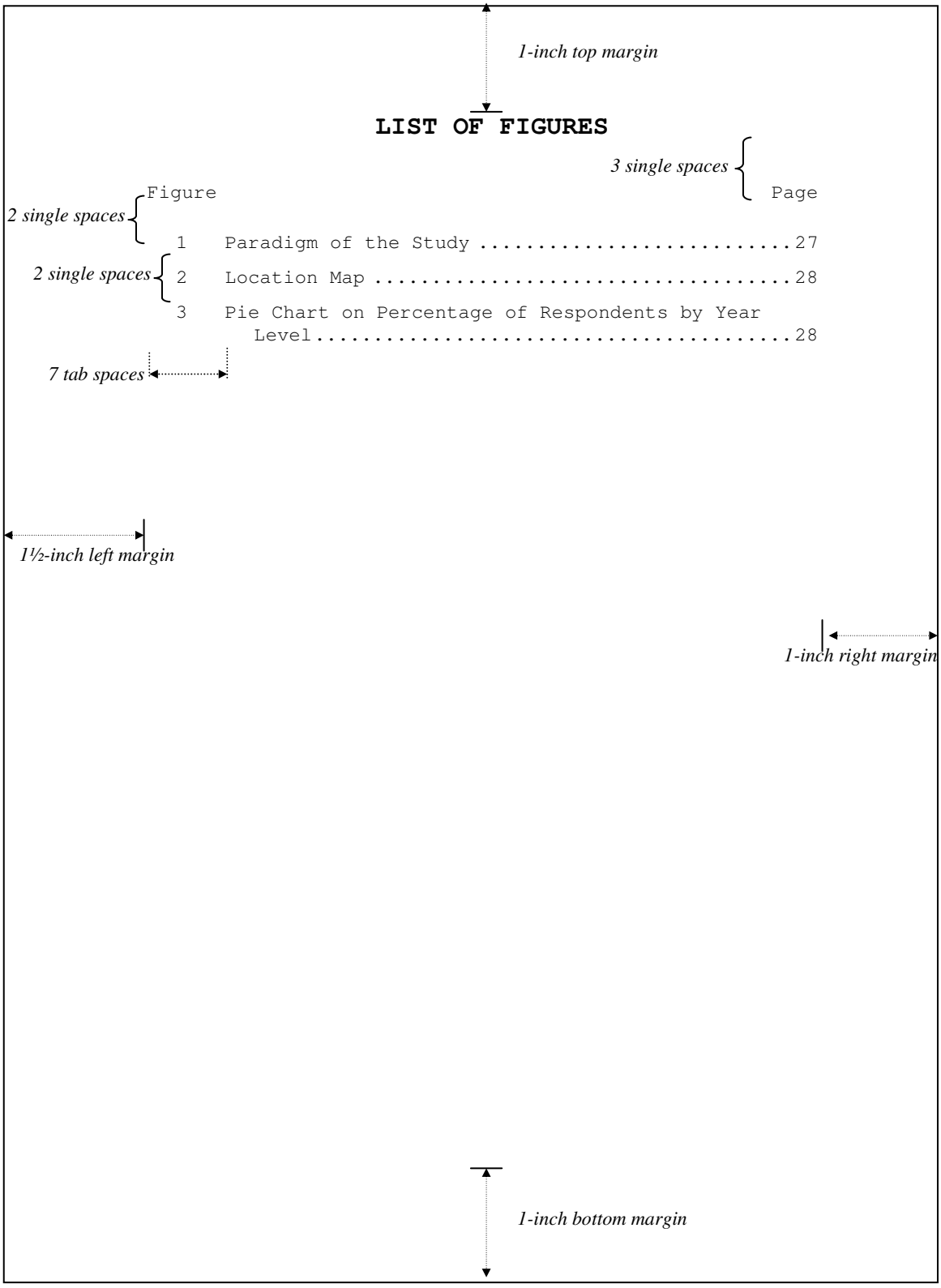


Figure 9. List of Figures Format



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Chapter 1:
THE PROBLEM AND ITS BACKGROUND

The opening chapter of this book emphasized the need for research not only to solve problems and difficulties but also to expand the frontier of knowledge and to improve the quality of social life. This chapter deals with the guideline in writing the problem and its background, which starts with the introduction.

1. INTRODUCTION

In the introduction, it is important to give the reader a clear notion of the general scope of the problem investigated. The reader should be given enough idea about similar problems from other country (mega level), in our country (macro level) and the particular place where the research is conducted (micro level). The writer should underscore the difficulties caused by the problem and the importance of investigating it. Hence, this part of the study, the introduction, is primarily designed to meet this felt need to the reader. The presentation of the investigation should very naturally lead to the objectives of the study.

2. OBJECTIVES OF THE STUDY (OPTIONAL)

Objectives are the desired or expected ends to be achieved through the research activity that are not influenced by the judgment or personal bias. They describe the aims or goals, which expected to be achieved at the end of the research process.

The objectives of the study may be classified into general and specific. The general objective is a broad statement of purpose, which uses the abstract of concepts. The specific objective is an activity necessary to attain the general objective.

Good objectives of the study have an acronym of S-M-A-R-T-E-R that will be useful in remembering as follows:

1. They should be stated in simple language;
2. They use measurable concepts;
3. They are attainable;
4. They are result-oriented;
5. They are time-bounded;
6. They generate enthusiasm;
7. They make use of the local resources.

The objectives of the study should not only flow from the identified study but should lead also to the statement of the problem.

3. STATEMENT OF THE PROBLEM

The problem studied must be shown as one, which arose from a situation of need or of unresolved difficulties. The reader must be made to recognize this need. The statement of the problem has the following characteristics:

1. The problem should be stated precisely, accurately, and clearly.
2. It can be stated either in the declaration or interrogation form.
3. It can be either one main statement/question, or a series of statements/questions, or a combination of these forms.
4. The problem should be defined in terms of the data that can be obtained (p.a).

The statement of the problem may be classified into two categories, the major and specific. The major problem is a broad statement of the problem that uses abstract immeasurable concepts. The specific problem is a detailed statement of purpose, which uses attainable and measurable concepts, the formulation of which should be based on, and logically flows from the major problem. Some studies may only have specific problems while others may include both categories.

4. HYPOTHESIS

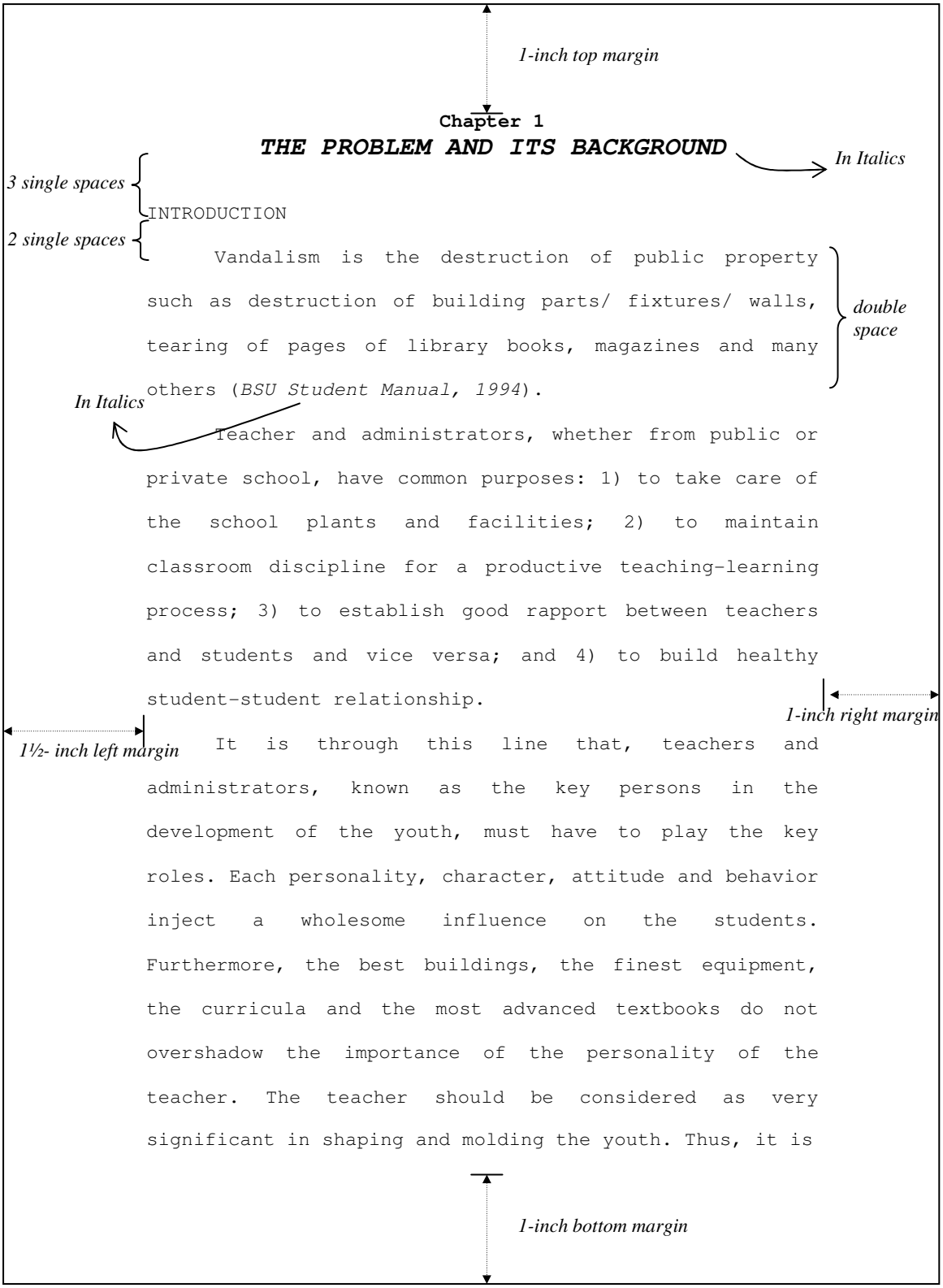
Hypothesis. Hypothesis is a suggested answer to the problem. It may be defined as an expectation about events based on generalizations of the assumed relationship between variables (Aquino, 1992) or difference between groups. Other authors defined it as an educated or intelligent guess or prediction about the existence, attribute or relationship between variables (characteristics or phenomena) or difference between groups covered by a study. It is described as educated or intelligent guess since it has been formulated on the basis of well thought objectives, which require critical reviews of literature and studies about the subject matter.

The use of the "null" hypothesis has become more common in research whether psychological, social, or education. The reason for the use of the "null" hypothesis is that it is easier to disprove. In using a "null" hypothesis, one assumes that no significant 'relationship or difference exists' after which the researcher seeks to ascertain the improbability of such "null" hypothesis. Only a "null" hypothesis can be subjected to statistical testing (Best, 1981 p. 7)."

Assumptions. Assumptions are statements of facts related to the research problems that are presumed to be true on the basis of observations and experience although not actually verified. They are stated so as to provide foundation from which the study will proceed, and an additional basis for validation of variables of interest. As the term suggests, assumptions do not require testing or confirmation.

Not all investigations, however, have a section on assumptions. This is so because, in some studies, assumptions are integrated in the introductory portion or at the background of the problem being investigated.

Figure 10. Body Format



5. IMPORTANCE OF THE STUDY

Estolas, et. al. (1995, p. 178) emphasized the importance of the study as the part of the research which justifies the launching of the research project. It is in this section where the researcher expresses his persuasion about the value of the study so as to get the approval of the screening and approving committee. The importance of the study should contain the following:

1. Contribution to the accumulation of knowledge or to filling up a knowledge gap;
2. Contribution to building, validating or refining theories;
3. Finding a solution to a problem of a specific group or improving certain conditions;
4. Contribution to improve education, income, health, inter-relations, and the like.

6. SCOPE AND DELIMITATION OF THE STUDY

Scope and delimitations comprise one important section of a research paper.

Scope. The scope defines the coverage or boundaries of the study in terms of the area or locality and subjects, population covered the duration or period of the study. The nature of variables treated, their number, and treatments they received, and instruments or research design should be so stated.

Delimitation. Delimitations are those conditions beyond the control of the researcher that may place restriction on the conclusions of the study and their application to other situations. Administrative policies that preclude using more than one class in an experiment, a data-gathering instrument that has not been validated, or the inability to randomly select and assign subjects to experimental and control groups are examples of limitations.

Stating the study limitations not only provides extra credence to the study but also provides the reader caution not to expect beyond what the study can and promises to deliver.

7. DEFINITION OF TERMS USED IN THE STUDY

Many terms are subject to a variety of interpretations. The definition of terms serves two essential functions. First, it establishes the rules and procedures the investigator will use to measure variables. Second, it provides unambiguous meaning to terms that otherwise can be interpreted in different ways.

There are two major types of definition of terms used in the study- the conceptual and the operational. The conceptual definition is the dictionary, which is the reference book of everyday language. The operational definition is the meaning of the concept or term as used in a particular study.

The clearer definition includes conceptual and operational or working definition; e.g., middle class is conceptually defined as a category of persons within a society. Operationally, it is a group of persons whose average annual income is P10,000-P24,000, and a minimum educational attainment of high school level.

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Chapter 2:
REVIEW OF RELATED LITERATURE AND STUDIES

The review of related literature and related studies is an essential step in the research process. Before, during and after formulating the research problem, the researcher faces the task of reviewing the literature and studies that relates to the research area. By familiarizing to the body of knowledge and theory on the topic, the investigator would better able to integrate the research project into existing theory and build on the works of predecessors. The purpose of review of literature is to define the boundaries of knowledge. The felt need on problem stems directly from the review of literature. Previous related and relevant studies form the foundation on which the new investigation will be build.

The early stage of a literature review can be discouraging. Locating even one relevant source may prove a painstaking and fruitless process. But with your initial trips to the library, the archives or private collections of documents may prove overwhelming as sources unfold and everything seems relevant. As you go in your research you will gradually discover some helpful leads, the location of articles and manuscripts and author's previous clues to additional materials make the detective work easier and even more enjoyable.

More often, the search for primary, secondary and tertiary sources with their corresponding authors can be authentically verified.

For all researchers, however, the review of literature involves critical and thorough search of possible information that relates to the research problem. The researchers must locate, read, analyze, evaluate, organize and report all the relevant sources to provide a solid justification for his or her research. The literature review and studies provide a purpose for one's research question or hypothesis and demonstrates the relationship between past work and the present investigation.

Major functions of related literature (L.R. Gay, 1976)

1. It provides the conceptual/theoretical framework for the study.
2. It provides information about past researches related to the intended study.
3. It gives the investigation a feeling of confidence since the review of literature will have on hand all constructs (concepts) related to the investigation.
4. It gives the researcher information about research methods, the population, and sampling consideration, the instrument and statistical computations in previous research.
5. It provides findings, conclusions and recommendations of past investigations that may relate to the present study.

RELATED LITERATURE AND STUDIES

Research literature and related studies refer to sources of readings that are significant contributions to the research process.

The research literature consists of the articles, and books written by previous authorities giving theories, ideas, opinions and experiences of what is good and bad, the desirable and undesirable within the research problem; while related studies refer to published reports on researches, and unpublished manuscripts such as theses or dissertations of actual research studies done previously on the topic.

The related literature and studies would act as benchmark to formulate the theoretical scheme of the intended research paper. The theoretical framework shall be the tentative explanation of the phenomenon, which the research is to investigate. In short, the theoretical or conceptual framework consists of the researcher's own position on the problem after the thorough scrutiny of various theories to the problem undertaken.

GUIDES TO USE IN THE REVIEW OF RELATED LITERATURE

Good and Scates (1972) provide several classifications as guides in conducting the review of literature. Libraries and other sources of information classify the guides accordingly, namely:

1.) Comprehensive or general guides;
2.) Periodicals and serials;
3.) Books and monographs;
4.) Graduate theses/dissertations;
5.) Special educational areas and problems;
6.) Continuing or serial bibliographies and summaries in limited areas of education;
7.) Extensive individual bibliographies and summaries in limited areas of education; and
8.) Bibliographical, institutional and statistical directories and handbooks.

Several learned institutions, either socio–civic, political, economic, educational, religious organizations; professional associations issue publications such as journals, newsletters, directories, yearbooks, proceedings and other published materials that are classified by compilers, libraries and reading centers. These are sources of data and information needed for specific research problem.

REVIEWING PREVIOUS RESEARCH

Having arrived precisely on the definition of the problem–question, we are ready to review the literature. The goal is to find out what is known about the problem. At this process, the library researcher should be familiar with pertinent previous studies and the main sources of data.

The review of literature provides others with evidence that the researcher has a background. The first place to start with is the bibliographies. How do we compile a bibliography? Here are some steps.

First, at the beginning of the investigation, instructors, advisers and knowledgeable informed persons may help in the very beginning of the investigation, the bibliographical resources available in the libraries must be explored because they are the chief sources of information of your research problem.

Second, in the libraries the researcher must look at the card catalogue where the references are classified for ease. Bibliographies of various sorts are grouped together in one area: references, books, magazines and journals.

Third, watch for bibliographical references of previous studies compiled by the investigators. This will lead you to similar works that had been done to make your working reference–list in searching for materials for your research paper.

Make sure that you also prepare your preface reference cards in handling your bibliographical references classified as to books, magazines, journals and other sources of data.

Prepare individual cards that would contain the following:
a) Author or editor's name and initial
b) Title of the work; (Book, dictionaries, etc.)
c) Call number in the library, if ascertained.

Another card would be intended for magazines, journals, newspaper, clippings and related studies where citations, research finding, conclusions and recommendations could be found. The contents would be:
a) Author's name and initials
b) Title of the article
c) Name of periodical from which the article appeared
d) Volume number and date of the publication
e) Call number in the library

The researcher, to attain accuracy and consistency in obtaining relevant information and data of the problem, must carefully note other references from government documents, publications, bulletins, and other special sources of data.

PITFALLS IN REVIEWING LITERATURE

Several cautions are presented at this point to forewarn the investigator of some common pitfalls in reviewing literature.

1. Beware of skimpy literature review

Some researchers, in their eagerness to get to the investigation, provide a skimpy review. They find that reading existing information seems boring when

compared to the thoughts of collecting original information, making personal observations, or deceiving independent conclusions. Remember that a thorough and careful review of literature is the only way to increase solid justification for a research project.

2. Beware of getting bogged down in the literature

Frequently in search for relevant information, we discover the most fascinating, tangential or irrelevant information. Sometimes we are lured into reading the materials that very well may make us more knowledgeable on the discipline, but does little to advance the progress of the present research. This is experienced when you discover interesting but irrelevant sources. Frequently the fascination of reading the entire journal issues when only one article in it is relevant to the research project. This causes a delay or postponement on the work at hand. Make serious judgments corresponding to your problems and concentrate on your research problems and guidelines.

3. Beware of spending too much time in an effort to exhaust the review of literature

Our obsession in finding, reading, copying or reporting every detail of relevant information may also support your timetable. A review of literature need not include every detail of every source. Such practice is time–consuming; it leads to the accumulation of useless paper, and starts a path to plagiarism. Summarize work in your own words. Make initial comments, take down citations, and copy only what will serve the purpose of your inquiry. Lengthy detailed review does not increase readers understanding of the relationship between the past and present investigation. Brief and concise statements will suffice to summarize existing knowledge and reference to articles would create a smooth–flowing comprehensive review of literature.

SOURCES OF INFORMATION (PRIMARY, SECONDARY AND TERTIARY)

The evaluation of materials used in the study includes the sources of information. For convenience, they are generally classified into three (3) kinds: primary or first–hand, secondary or second–hand and tertiary or third–hand information.

Primary sources. They are materials gathered directly from the point of origin; the respondents and the place that are directly met by the researcher through the questionnaire, interview, observations, original, creative works, letters, diaries, reports of government and other agencies, doctoral dissertations and theses, newspapers and experimentation. These are usually taken directly by the investigator from those mentioned sources.

Secondary sources. Bear no direct physical relationship to the event. It covers reports of persons based on testimony of an actual witness, or a

participant in, as well as reports of events by another person. The writers of secondary sources are not present when the activities accounted happened.

Tertiary sources. These refer to compilations of secondary resource materials such as textbooks, manuals, journals with broad coverage, which are considered as reference tools and materials. These materials are previous findings written in other forms of information dissemination to would–be readers.

EVALUATION OF RESEARCH MATERIALS

In evaluating the materials to be gathered for the research, there are helpful list of pointers for the investigator to consider, namely;

1. Accuracy and dependability

Check the information and data gathered whether they are true, the particular factors of things are correct; there are no discrepancies and can be dependable than they are reliable. Accuracy and dependability are the most crucial factors in gathering the information in a research endeavor.

2. Timeliness

To be relevant in terms of data gathering as well as research problem identification, timeliness of a research should be considered as a factor. Similarly, the information and data should be up–to–date, usually within the ten–year period. Bear in mind that knowledge, theories, and ideas should be within the recent issues and trends. Clear presentation of new elements is fundamental in the formulation of a research problem, thus the latest data and information must be ascertained to eliminate ambiguity.

3. Suitability for specific requirement

The information provided by the title of books, manuscripts, articles and other related materials could identify the usefulness of the material for the research paper. Caution could be made by the researcher in making the summary of the contents taken from the abovementioned sources as well as the exact interpretation of the scope of the research problem.

4. Authority

Authors and editors of the related literature and studies are the recognized authorities of the subject area. The reliability and validity of the research paper rest fully on the acceptability of the authors and editors mentioned in the gathered information. Academic titles, given positions held and formerly held are indicative to gauge the authority of these writers.

5. Scope

The limit or inclusiveness of the work shall be spelled out and the contents of the book summarized shall only be focused on that specific area of research. The title of the research can give a good indication of the scope of the research – thus, books and materials used for the resolution of the problem must be controlled so as not to mislead the readers.

6. Treatments and Style

Books and manuscripts to be used should be those written in simple, straight–forward manner for easy understanding. It is expected that the research shall be scholarly written and its sources are research literature of high quality research papers. The success of the research depends upon how the writer treats the information and data, leaving no doubt as to the author's real intention of providing an excellent paper.

7. Publisher

Publishers that had earned the trust and confidence of the public such as their books and refereed journals are valid sources of information. Some publishers have gained recognition due to the experts, scholars and professional who have contributed to their published materials. These are the important sources of information when writing a research paper.

8. Illustrations, Table and Diagrams

The visual materials speak more than words. They are aid for readers to comprehend and analyze the textual material of the research endeavor.

9. Sequence or Arrangement

The contents of a good manuscript can readily be seen when appropriately arranged and sequenced. Chapters may provide orientations to the readers and discussions of substance of the work are properly organized from start to finish.

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Chapter 3:
METHODS OF STUDY AND SOURCES OF DATA

This chapter in a research reflects the procedures and processes undertaken by the researcher to finish the study. The chapter shows how a researcher answered the problems posited in the study: the research design, the manner the respondents or subjects of the study were selected, tools or basic instrumentation procedures as well as the statistical treatment used to process the data collected.

1. THE RESEARCH DESIGN

General Methodology: Qualitative vs. Quantitative Research

The distinctions between qualitative and quantitative researches lie on the description and presentation of data. Under quantitative research, the questions are how well, how much or how accurately are the characteristics of attributes described for a given set of data (Fraenkel & Wallen, 1994), while qualitative research relies mainly on narrative description.

The distinction between qualitative and quantitative research is also a difference in purpose (Wiersma, 1995). Qualitative research is conducted to explain in detail social occurrences and may employ methodologies and techniques that are not bonded by models that dictate set of procedures. On the other hand, in doing a qualitative research such as cultural behavior of a distinct ethnic group, a researcher may not necessarily be bounded by paradigms and statistical analysis. The natural setting, the casual way of life and day-to-day activities can be captured by naturalist paradigm. Specific example is ethnographic research design. The research emphasizes capturing the day-to-day activities of the respondents by living with them to freely observe and interview them. A socio-anthropology student conducted an example of this kind of research. The study covered the activities of an urban school principal for a period of one year. The researcher stayed with the principal during the period to fully describe how the principal extended instructional supervision and administration, the frequency they were extended, the social atmosphere, the relationship between the principal and the teachers and anecdotal records of incidences that occurred in the school. In this example, the researcher arrived at spontaneous methodologies and questions aside from those speculated before the actual research design.

On the other hand, quantitative research is conducted to establish relationship, or to determine causes and effects between or among variables. Quantitative research is interested in how often an activity takes place, its relationship to other variables, and the causes of success or failure in the activity. In accomplishing quantitative research, attention is focused on the randomness of the sample, precision of definition, reduction of data into scores, and too much reliance on statistical procedures.

Table 1 shows the difference between the two types of research.

Table 1
Differences Between Qualitative and Quantitative Research Design

QUANTITATIVE	QUALITATIVE
1. Hypotheses are defined at the beginning of the research activity	1. Hypotheses emerge as the research progresses
2. Definitions are clearly defined prior to the research	2. Definitions are captured during the research activity
3. Data are transformed to numerical scores	3. Narrative descriptions are preferred
4. The reliability and validity of research instruments are represented by equivalent statistical coefficients	4. Reliability of inference is assumed to be adequate. The validity is established by multi-level respondents by cross checking responses
5. Randomization of samples	5. Purposive samples (Expert informants)
6. Well defined procedures	6. Narrative literary description of procedures
7. Control of extraneous variables	7. Relies on logical analysis in controlling extraneous variables
8. Statistical summary of results	8. Narrative summary of results
9. Breaks down complex phenomena into specified parts Manipulates aspects, situations	9. Holistic description of complex phenomena

Source: Fraenkel Jack and Norman Wallen. (1984). *How to design and Evaluate Research in Education*. New York: McGraw-Hill Inc.

There are four basic research designs generally taught in research books. These are: *descriptive research design, correlational, Causal-comparative, experimental design and the quasi-experimental design* (Borg & Gall, 1992; Kerlinger, F., 1986).

The Descriptive Research. In a descriptive research, variables are studied, as they exist in their setting. No experimental variables are manipulated and the main concerns are to describe the status, profile, incidences or occurrences of the variables. The lack of control variables in descriptive designs makes the results unreliable for hypothesis testing and the results to vary from one setting to another.

However, thesis writers commonly resort to descriptive design because of the ease in gathering data. Once the instruments are formulated, data can be gathered by any of the following means: questionnaire, interview, or documentary analysis. An example of a thesis using descriptive design is shown on a study on demographic and personal characteristics i.e., age, sex, socio-economic status of the family, marriage status of parents, manner of discipline at home, ambition in life, expectations of the family on the child, etc.

The Causal-Comparative Research. Causal-comparative research attempts to determine the causes or differences that already exist between or among groups or individuals (Fraenkel and Wallen, 1993). The design compares two or more groups in

terms of a difference variable that cannot be manipulated, i.e., and high performing group versus low performing group (Performance in the difference variable). The research may observe that the two groups differ on some variables to determine the reasons for their difference. The difference between groups had existed because it was observable at the time the research was conducted; however, causative variables are explored to pinpoint which of them effect the difference. The statistical treatment employed to compare the two groups may positively identify significant variables such as: socio-economic status, educational attainment of parents, expectation at home, social pressure, peer influence, or teacher's motivation may explored. All hypotheses concerning the differences between or among groups are so stated after the statement of the problem. These hypotheses may be proven or disproved by the study.

Correlational Design. Correlational research explores the relationship between or among variables. The variables are studied without any attempt to control or manipulate them. Correlation research is also sometimes referred to as a form of descriptive research because it describes relationship between variables (Fraenkel and Wallen, 1993). The relationship described, however, differs from other designs because of the degree of relatedness established between or among variables.

In correlational studies, hypotheses concerning the relationship between or among the variables are so stated. Correlation coefficients may describe positive or negative relationship depending upon the outcome of the study. Positive correlation describes direct relationship; *x* increases as *y* increases or as variable one goes up; variable two goes up or vice versa. Negative correlation, on the other hand, is inverse relationship; *x* increases as *y* decreases, i.e. performance diminishes when one goes old.

Correlational design cannot be used to establish cause and effect. Researchers must be aware that the relationship between variables is expressed as two-way. Thus, a conclusion expressing the causation between the variables being related is not valid.

Suggested statistical treatments for correlational research designs are shown in table 2.

Table 2
Suggested Statistical Treatment for Correlating variables.

Levels of Measurement used for the variables	No. Of variables	Treatment
Nominal	Bivariate	Chi-square
Ordinal	Bivariate	Spearman Rho, Kendall Tau
Interval	Bivariate	Pearson's r
Nominal	Multivariate	Discriminant analysis
Interval	Multivariate	Multiple regression analysis

***The Experimental Design*.** Of all the research designs, experimental research is the design that can establish cause-and-effect relationship between the dependent and independent variable/s. By experiment, variables are manipulated and their effects upon other variables are observed (*Campbell and Stanley, 1963*). The variables being

manipulated are called experimental variables. Conditions that may possibly isolate cause-and-effect relationship are controlled to come up with valid research outcomes. In educational research, specific descriptions of how the experiment is designed and conducted are given. The design is also expressed in diagrammed symbols to show the arrangement of the variables and the conditions employed in the experiment.

Experimental design is a blueprint on how the variables in the study may be arranged in an experiment. True experimental designs listed by Campbell (1963) are as follows:

1.) Posttest Only Control Group Design

R	G_1		X	O_2
R	G_2			O_2

2.) Pretest-Posttest Control Group Design

R	G_1	O_1	X	O_2
R	G_2	O_1		O_2

3.) Solomon Four-Group Design

R	G_1	O_1	X	O_2
R	G_2	O_1		O_2
R	G_3		X	O_2
R	G_4			O_2

Legend:

R	=	*random selection*
G_1	=	*group*
X	=	*treatment*
O_1	=	*pretest*
O_2	=	*posttest*

The Posttest only control group design is composed of two groups. The subjects are randomly selected and assigned to the two groups prior to the experiment. The experimental group is given the treatment (x) while the control group receives the traditional treatment. After the experimental period, the two groups are compared on the treatment variable by the results of the posttest. Replication of the experimental group may be used to have more than two groups.

The Pretest/Posttest control group design. This design is also composed of two groups. Prior to the start of the experiment, the subjects are selected at random and assigned to the experimental and control groups. The Pretest is introduced in this design. The purpose of such is to compare the two groups in terms of the entry behavior or characteristics of the two groups. Another use of the pretest is to help in the determination of the gain scores, the difference between the pretest and posttest scores. The posttest scores may also be compared to differentiate the effect of the treatment (x) from the control condition.

Example:

Replication $_1$	:	R	G_1	O_1	X_1	O_1
Replication $_2$	:	R	G_2	O_2	X_2	O_2

.	.	.	.	.	.
.	.	.	.	.	.
.	.	.	.	.	.
Replication $_7$:	R	G_n	O_n	X_n	O_n
Control Group $_7$:	R	G_{n+1}	O_{n+1}	X_{n+1}	O_{n+1}

The structure shows the treatments and control groups. In this design, if the control group is removed it comes back to the pretest-posttest randomized group design.

The Solomon-four group design. This design is a combination of the first two designs in one. There are two experimental groups and two control groups. Only two groups are pretested but all the groups receive the posttest. Groups 1 and 3 receive the treatment (x) while group 2 and 3 are considered as control groups. This design is considered as the best experimental design because it is able to check most of the threats to internal validity. One experimental group (G_3) and one control group have no pretest. This checks the possible sensitization effect of the pretest to the posttest. The presence of pretest in one experimental and control groups checks the equality of the experimental and control groups in terms of entry characteristics. The comparison of all the posttest results shall provide data on the effect of the treatment variable and the possibility of sensitization effect by the pretest.

Two types of validity essential to the experimental design are internal and external validity (Campbell, 1963).

Internal validity is the extent at which the procedures employed in the experimental research warrant accurate results and interpretation, moreover, conclusive evidences. For example, to test a new teaching material among the first year high school students, a researcher chose at random first year students and assigned them to two groups; one group was assigned as experimental group and the other, the control group. The experimental group was given the new teaching material (a Computer Aided Instruction (CAI) software that teaches graphic arts) while the control group was taught using the traditional lecture by the graphic arts teachers. Both groups underwent a pre-test before the experimentation/actual teaching and classes were held simultaneously. After the lesson, the same post-test was given among students of the two groups. The pre-test comparison between the two groups may provide information as to their entry behavior. It is desirable that the two groups possess equal entry ability prior to the experimentation. Though the random distribution of students to the two groups assures this equality of the two groups, the pre-test results may further signify it. The post-test results are compared to differentiate performance between the two groups and signify the effects of the experimentation through the results of the comparison.

The procedure is controlled in terms of the subjects who compose the experimental and the control groups. Both classes are held simultaneously. However, to attain better internal validity, the control group must not know that their performance is being compared with the experimental group to avoid the John Henry Effect (when threatened, the control group may perform better than the experimental group), or the Hawthorn Effect (the experimental group's performance, being

knowledgeable of the experimentation, may show extraordinary performance which may be superficial).

External validity is the generalizability of the research results to outside or bigger population. For example a research conducted among rural high school students may be generalizable only to the same category of students not to all high school students.

Validation of a research is not perfectly attainable. However, researchers must try to achieve nearly perfect condition to get the desired usefulness of the research. In experimental research, attempts to increase the internal validity may decrease external validity (Wiersma, 1995) and vice versa. This happens when the researcher control many variables, the nature and characteristics of the sample may not be realistic to a bigger population.

Reliability of the research is the extent at which the procedures and findings of the experimental research may be replicated.

Sources of Invalidity for the Experimental Design

Sources of invalidity for the experimental design are factors, which may affect the internal and external validity of the research. In the process of isolating the experimental variable, these factors must be controlled because they might confound the effect of the experimental variables (Campbell & Stanley, 1964).

A. Internal Validity

History. There are specific events occurring between O_1 & O_2. History becomes more plausible rival explanation of change the longer the duration between O_1 & O_2.

Maturation. Refers to the biological processes that may occur as a function of time. Between the O_1 & O_2, a subject may become more mature, more anxious, tired or saturated. These processes may confound the effect of the variable x.

Testing. Subjects who took the pre-test may already know and remember the test, thus, taking the post test for the second time may not solely be accounted by the variable x. This is also called sensitization effect of the test.

Instrumentation. Changes in the calibration of the measuring instrument, or changes in the observers and scorers may produce variations or inconsistencies in obtained results which must be solely due to the variable x. Changes might account for the O_1 - O_2 difference.

Mortality. Loss of respondents from the control group. In the beginning of experimentation, the groups are assumed identical due to their random selection but with the loss of subject, the difference may be caused by selective drop out of subjects.

B. External Validity

Interaction. Interaction effects of testing. The pretest may provide hint to the subjects to react in a way that would effect the experimental treatment (Wiersma, 1995). The result may not purely be accountable from the experiment; thus, results may not be generalizable.

Interaction effect between selection biases and experimental treatment (Wiersma, 1995) may lead to conclusions that may not be generalizable over a bigger population.. The effect of selection factor interacting with the experiment may lead to conclusions that may not be true to the population. For example, in an experiment conducted among local or urban high school students may not be generalizable to the general population of high school students.

Reactive Effects of the Experimentation. If the experimental group knows about the experimentation, the process or experimental arrangement may be artificial. This is similar to the Hawthorn Effect (Wiersma, 1995). In the Hawthorn experiment, no matter what arrangement was given to the subjects, they continually performed better under negative or positive treatment because they knew the experiment. This lead to inconclusive evidence.

Multiple-Treatment Interference. When an experiment consists of a variety of treatment, results may not be isolated to any of the single treatments.

2. THE POPULATION OF THE STUDY

Identification of the Population. This specification of the population may seem simple but it seldom is. It is important for the researcher to anticipate decisions that are likely to come up during the actual sample selection (Albeck and Settle, 1985). Suppose a survey is to be conducted among State Colleges and Universities on Environment Policies. The population of the study would include the administrators and students. Should only the Deans and Students be included? Must the students cover the high school level? What about the canteen personnel, extension service, research and general services units? The respondents must be qualified to respond on the basis of two criteria (Albeck and Settle, 1985): they must possess the information; and they also need to have certain attributes to make the responses meaningful.

Unit of Analysis. The sample unit is the smallest entity of the population that will provide one response. Sample units are usually individual. However, there are cases when the sampling unit is not an individual, it may be an institution, organization, a household or a school.

The sample unit must neither be too narrow nor too broad. If it is too broad it may entail not only a single unit. For example, a survey on the Barangay council as a single unit may not be appropriate for a survey on the performance of the Barangay officials. It would be better to include the Barangay constituents because they hold different positions regarding the evaluation. On the other hand, if the unit of analysis were too narrow, results would be redundant. For example, a survey designed to look into the auditing procedures employed in State Colleges and Universities could

effectively use individual personnel at the sample units. Each would be reporting about the same institution, and all but one response would be redundant.

Identification of the sampling unit must take into consideration the primacy of information and comparability with existing data.

3. SAMPLING DESIGN

The purpose of sampling is simply to take a small portion of the population to represent the whole population. The major reason why sampling is done is economy. If the population is too big to manage in terms of cost, time and effort, the sampling is employed. A small segment of the population provides enough evidence about the characteristics of a population as a whole to draw conclusive evidences with confidence. Aside from economy, data can be collected and summarized more quickly than a census. Thus, a greater scope also is assumed in limited time, and when volume of work is reduced, the sample may produce more accurate results.

The sample must be selected properly or the research may introduce bias error in the result. The sample must be large enough to meet needs of the research but not too many to entail much cost. But how large is a sample to be adequate enough to merit reliable results? Borg and Gall (1992) recommend a minimum of 100 respondents for survey research; 30 per subgroup for a stratified population; or 30 per group in a laboratory experimental research. Some authorities provide sampling formulas to be followed to justify the number of respondents.

Sampling Design ensures greater probability that a segment of the population taken is a representative of the whole. If followed with precision, sampling error may be minimized.

Probability Versus Non Probability Sampling. Probability sampling provides equal chances to every single element of the population to be included in the sampling. Samples drawn by any of the probability sampling techniques have statistical properties that allow the researcher to make inferences about the population, report confidence intervals and statistical significance. On the other hand, non-probability sampling does not use probability in selecting the samples. The samples are selected on the basis of convenience, not necessarily by random selection.

Probability Sampling Designs.

Before a sampling design is employed, a sample frame or a list of all possible units of the population must be identified, there are three criteria to select a sample frame (Albeck and Settle, 1985): the frame should be all inclusive; it should be exclusive of the population under study; and the units identified in the frame should be exactly the same way as the sampling units.

1. ***Random Sampling***. The random sampling technique is often associated with the tambiolo selection or fish bowl technique. When the units in the sampling frame can be manageably written in small cards of the same size and color, the cards can be mixed in a container and drawn one at a time by a "blindfolded" drawer.

There are other techniques used in random selection. The computer can provide a list of random numbers that are arranged from lowest to highest. Another technique that can be used in place of a computer-generated list of random numbers is a table of random numbers. The table is used in the same way as the computer-generated list.

2. ***Systematic Sampling with a Random Start***. In this design, it is necessary that the researcher identify the total population (N) and the number of sample to be drawn from the population (n). To find the n^{th} interval, N is divided by n. Example, if the total population consists of 1,000 respondents and the required sample number is 100, the interval is 10, (1000/100). The start may be identified using a table of random number. For instance, if the starting number selected at random is 235, the next sample will proceed by adding/subtracting 10 continuously to/from 235. The person numbered 235 is the 1^{st} identified sample, the next is 345, 255, etc.

3. ***Stratified Sampling***. In a stratified sampling the population is divided first into strata, classification, or groups that are distinct from each other before a random selection happens. The sample strata are most often demographic characteristics that divide the population into sub-samples. An example of a stratified sampling is shown when a population is divided by levels of intelligence.

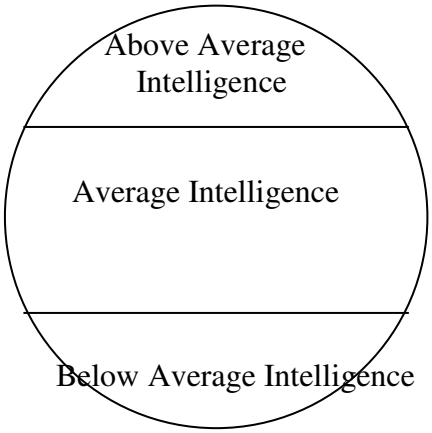

Figure 11. Stratification of a Population by Intelligence

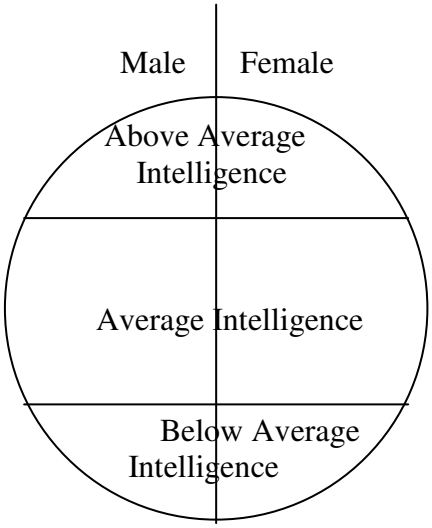

Figure 12. Stratification of a Population by Sex and Intelligence

Under the stratified sampling, each stratum has lesser differences from within compared to a population. This increases the degree of reliability of results that is a function of the variance of a population. Moreover, from within a stratum, the sample is homogenous in terms of the variable used for stratification.

A multi-stage-stratified sampling can also be designed. For example, before drawing a random selection, a population may be divided first into characteristics, sex and intelligence. The sample may be drawn at random from each of the six subgroups shown below.

4. ***Cluster Sampling***. This sampling design is often called geographic sampling. In cluster sampling, the population is divided into clusters and these clusters are drawn at random. For example, in a study covering the Elementary schools in the Province of Bulacan, it is best to divide the Province into Districts. The districts, which are treated as clusters, can be randomly selected. From the districts, schools can be picked out at random.

Cluster sampling could be designed as multi-staged. For instance, the first stage of the cluster sampling is to use the Districts as clusters. After selecting randomly the district participants to the study, the next clusters could be the schools per district. At this level, the school can be selected randomly. Lastly, classes could be drawn in the same way within each school and within each class, individual students could be identified.

NON-PROBABILITY SAMPLING DESIGNS.

1. ***Accidental or Incidental Sampling***. In this kind of sampling, the researcher does not have the option to select his respondents. In cases where the captive samples are minimal in number, the researcher is forced to take them all without any other choice. For instance at Bulacan State University a research involving the BS Chemistry students may involve only a small number of students. In this case, no sampling design is employed because a complete enumeration of the students is very much manageable.

2. ***The Quota Sampling***. Quota sampling happens when the sub-groups within the population are determined and the samples are drawn to have same number pre-identified in each subgroup of the population. The samples, therefore, are not selected at random. The same elements in the subgroups are reflected in the sample. For example on a study involving the Job Satisfaction of SSS Region Office employees, the researcher categorized the population into administrators, section heads, and rank and file employees. The number of administrators, section heads and rank and file employees are all taken in the study without any selection required because in each sub-group, very small number of respondents were observed, just enough to meet the quota.

3. ***Purposive Sampling***. The purpose of the study dictates a very minimal number of samples. Thus, the researcher could easily identify them and a complete enumeration of the sampling frame may still be too minimal. Purposive sampling can

be applied in this research: "Case Study of the withdrawn Behavior of Sexually Abused Children." Observe that the subjects are infrequent that a researcher could hardly identify them except in controversial or sensational cases. Thus, the purpose of the study limits the number of respondents to a rarely few victims.

The next example may clarify this sampling design:

An Ethnographic Study Of The School Environment Of Regular And Learning Disabled Students To Determine Factors Related To Potential Dropout.

In order to pursue the research, the specific schools involved must be identified. These schools will not be selected randomly but because of their characteristics and availability. The schools are selected because they are considered typical of schools with high and average dropout rates. This is an example of purposeful (also called purposive) sampling, which means that the units, in this case the two schools, are selected because of their characteristics relative to the phenomenon under study, rather than being selected randomly.

4. METHODS OF GATHERING DATA

There are three common methods of gathering data, namely: *direct or interview method, indirect or the questionnaire method and the registration or documentary analysis.* Less frequently employed methods are observation and experimentation methods.

The methodology to be used in a research is dictated by the nature of the research and the research design. A research may adopt one to three methods depending upon the nature, available time and resources available for the study.

The Direct or Interview Method. The direct or interview method gives the accurate, complete and reliable data. The face-to-face contact with the respondents enables the interviewer to detect whether the respondent is telling the truth. Moreover, vague questions could readily be clarified at once. However, the interview is subject to the interviewer's biases, in as much as the interviewee can influence intentionally or unintentionally the answers of the respondents.

The Indirect Method or Questionnaire. The questionnaire consists of all possible questions that answer the problems raised in the study. In a questionnaire, the respondents answer the questions by writing or by marking the answer sheet. The disadvantages of the interview are the advantages of the questionnaire: on the questionnaire, a large number of respondents can be covered at a time with lesser cost compared to the interview; however, unclear questions cannot be cleared at once, leaving the respondents no chance to verify items in a questionnaire.

A questionnaire may use supply type items or selection items. These items require short responses or answers. On the other hand, selection-type items may be expressed as multiple-choice, matching type or interpretative exercise. Examples of the supply type items take the form of self-checklists, scales, inventories, and tests.

The Registration Method or Documentary Analysis. This method uses information that is on file like laws, ordinances, decrees or lists from various offices. Documents such as birth, death and marriage certificates, memoranda, newsletters, letters etc. are also important sources of primary data.

5. INSTRUMENTATION

The process of collecting data by a tool that the researcher prepares is instrumentation. It involves the preparation of the instruments to be used to gather the data and the process by which they shall be conducted.

The process is so important that the life of the whole research depends upon it. If the study does not have valid and reliable instrument, a study may not be able to come up with the target information. Unreliable results lead to erroneous conclusions, thus, wastage of time, effort and resources.

Not all researchers need an instrument. Some researches that make use of documents, existing records on file may not need an instrument. On the contrary some researches may need one or more instruments or in some cases multi-level respondents to answer different sets of instruments.

Research instruments need to have the following characteristics: *validity* and *reliability*.

A.) Validity. The instrument exhibits validity when it measures what it is supposed to measure, and when the research instrument hits its target information and respondents it exhibits validity.

Instruments such as tests, achievement tests, diagnostics tests etc. must show *content validity*. Content validity can be assured by a table of specifications, which shows the distribution of items within the content scope of the test. An example of a table of specification is shown in Table 3.

Table 3
Excerpt from a Table of Specification in Mathematics

Content	Objective			
	Knowledge	Computation	Analysis	Comprehension
I. Sign Numbers	Test I – 1	Test II – 1	Test III – 1	Test III – 3
1.1. Addition	Test I – 2 Test I – 3	Test II – 2 Test II – 3	Test III – 2	Test III – 4
1.2. Subtraction	Test I – 4 Test I – 5	Test II – 4 Test II – 5		
1.3. Multiplication				
1.4. Division				

Aside from the table of specification, a test must come up with the *indices of difficulty* and *discrimination*. The *difficulty index* shows whether an item is acceptable or not relative to student's difficulty on the item. The *discrimination index* discriminates between the high group and low group of students the item of the test evaluated. It validates the performance of the high group and the low group. If the discrimination index is high, it means that the item confirms the good performance of the high group compared to the low group. Otherwise, the item is misleading.

Item analysis follows the given procedure:

1. Dry run the test and score the papers.
2. Arrange the papers from highest to lowest.
3. Get the upper and lower 27% of the papers. The upper 27% shall compose the upper group while the lower 27%, the lower group.
4. Tally the answers of the upper and lower group in each item.
5. Compute necessary statistics to analyze the items and the whole test.

Important information that an item analysis can provide is the effectiveness of the distracters in a multiple-choice test. Table 4 shows how distracters can be judged.

Table 4
Excerpt from a Response Analysis Table
N=100

Items	Grouping	Reponses				Total
		a	b	c	d	
1	Upper group	5	7	12*	0	27
	Lower group	10	6	11*	0	27
2	Upper group	0	2	15*	2	27
	Lower group	7	5	11*	4	27
3	Upper group	.	.	.	.	27
	Lower group	.	.	.	.	27
.	.	.	.	.	.	.
.	.	.	.	.	.	.
.	.	.	.	.	.	.

* correct response for items 2 & 1
d = ineffective distracter for item 1
a = good distracter for item 1
b = poor distracter for item 1

An analysis of the table shows that distracter *d* is an ineffective distracter because it was not attractive. This distracter must be revised. Distracter must be revised. Distracter "a" is more attractive to the low group the upper group. Distracter *a* exhibited a good indication of discrimination between upper and lower group. On the other hand, distracter *b* was more popular to the high group. This distracter could be so confusing or ambiguous. It must be revised.

After the analysis of the distracters, those distracters that need revision must be replaced. They must be tried again to determine their effectiveness.

It is highly recommended that a researcher prepares more items from which to select the final entries of the test. The results of the dry run may give the researcher the idea on which of the items should be included in the final run of the test. Items found unacceptable based on the difficulty and discrimination indices may be removed from the final test items.

From the table, the discrimination and difficulty indices could be also computed.

$$\text{Difficulty Index} = \frac{R_U + R_L}{N}$$

$$\text{Discrimination Index} = \frac{R_U - R_L}{½N}$$

Where:

R_U - number of correct responses in the upper group
R_L - number of correct responses in the lower group
N - Total number of students in the upper & lower group
$½N$ - N divided by 2

Example:

Based on table 4, c is the correct response, thus:

$$\text{Difficulty Index} = \frac{12 + 11}{54} = .43$$

$$\text{Discrimination Index} = \frac{12 - 11}{27} = .018$$

The relationship between the discrimination and difficulty indices of the item can be represented in a graph. The graph can be used to determine good items and those that should be revised.

Table 5
Item Difficulty by Discrimination Table

Difficulty	Discrimination									
	.1	.2	.3	.4	.5	.6	.7	.8	.9	1.0
Very Hard 29.5 and below										
Hard 19.60 – 44.50										
Optimum 44.50 – 74.50										
Easy 74.60 – 89.50										
Very Easy 89.6 and above										

After computing the difficulty and discrimination indices, items must be plotted in the cross tabulation shown in Table 5. Friendenberg, as quoted by Fraenkel and Wallen (1994) identifies the adequate *discrimination index* (D=.3) and above, while the *difficulty index* must be within the optimum region. After plotting the items, those that are found within the shaded region are good items, while those that are outside the area are to be studied, revised or modified.

B.) Reliability. The reliability of the test using the *Kuder-Richardson 20* can also be computed using the data from the *response analysis table* by getting the total number of correct responses in both the upper and lower group. Based on Table 5, there were 23 students who got the correct answer (*see difficulty index*). The *difficulty index* is equal to the *p*, which represents the proportion of correct responses over the total number of students in the upper and lower group. The *q* is 1 – *p*. Table 6 shows the tabulation.

The formula for KR_{20} is:

$$KR_{20} = \alpha_{tt} = \frac{k}{k-1}\left[1 - \frac{\sum pq}{\sigma_x^2}\right]$$

Where:

- k - Total number of items
- σ_x^2 - the variance of the total test
- p_i - proportion of those who got the item correctly
- q_i - 1 - p
- $\sum p_i q_i$ - the sum of the products of each items p and q

Table 6
Excerpt from the Computation of Reliability Coefficient using the KR_{20}

Item	*P*	Q	*p*Q
1	.43	.57	.2451
2	.48	.52	.2496
.	.	.	.
.	.	.	.
.	.	.	.
.	.	.	.
.	.	.	.
.	.	.	.
K	*P*k	*q*k	*p*k *q*k
			$\sum pq$ =

The formula can be used for any test that is scored as 0 or 1. It can also be used to get the *reliability coefficient of scales*. **KR_{20}** is a method of getting the reliability of a test or scale by internal consistency. It is the expected correlation between the item and the total test.

Example:

A class of 54 took a ten-item test in Physics. Each item is worth 1 point. The upper 27% and lower 27% of the students were taken, and they composed the upper and lower group, respectively. The response analysis table and the discriminations and difficulty indices, were computed as shown.

Item No.	Group	Response				Difficulty Index	Discrimination Index
		A	B	C	D		
1	Upper	0	0	0	15*	(15 + 0)/30	(15 - 10)/15
	Lower	2	2	1	10*	.83	.33
2	Upper	0	0	0	15*	.83	.33
	Lower	2	1	2	10*		
3	Upper	0	14*	1	0	.56	.36
	Lower	1	3*	3	8		
4	Upper	0	0	0	15*	.63	.73
	Lower	5	3	2	4*		
5	Upper	0	0	0	15	.83	.33
	Lower	1	2	2	10		
6	Upper	0	15*	0	0	.53	.93
	Lower	4	1*	4	6		
7	Upper	0	10*	5	0	.33	.6
	Lower	1	1*	10	3		
8	Upper	0	15*	0	0	.73	.46
	Lower	2	8*	2	3		
9	Upper	0	14*	0	1	.53	.8
	Lower	1	2*	9	3		
10	Upper	15*	0	0	0	.66	.66
	Lower	5*	7	1	2		

Computation of the *Reliability Coefficient by* KR_{20}.

Item	*p*	Q	*P*q
1	.83	.17	.1411
2	.83	.17	.1411
3	.56	.44	.2464
4	.63	.37	.2331
5	.83	.17	.1441
6	.53	.47	.2491
7	.33	.64	.2304
8	.73	.24	.1824
9	.53	.47	.2491
10	.66	.34	.2244
			Σpq = 2.0382

The scores of the upper and lower group on the test were recorded as follows: upper group; 10, 10, 10, 9, 9, 9, 9, 9, 8, 8, 8, 8, 8, 7, 7 and lower group; 5, 5, 4, 4, 4, 3, 3, 3, 3, 2, 2, 2, 1, 1, 1.

The variance of these scores is 9.80 using the calculator or the formula

$S^2 = \sqrt{\sum x^2}/N$. Where $\sum x^2 = \sum x^2 - (\sum x)^2/N$. Thus,

$$\alpha_{tt} = \frac{10}{9}\left[1 - \frac{2.0382}{9.8}\right]$$

$= .88$

Scales – such as attitude, personality expectation scales, etc. can be constructed and validated using the same procedures as in validating a test.

A researcher has to decide the format to be used. For example, a self-concept scale may be designed using a 5-point or Likert scale. The choice by scale will dictate the kind of statements that the researcher will have in the scale. Though the Likert scale is the most popular, other scales may adopt frequencies as in always-sometimes-never; true or false; yes or no; or semantic differential (7 point scale with negative and positive poles).

In this section, the method of validating and establishing the reliability of the Likert scale will be presented. A Likert scale is a 5-point scale consisting of extremely positive and negative ends. Example: Strongly Agree, Agree, Undecided, Disagree, Strongly Disagree; or Almost Always, Always, Occasional, Seldom, Never, etc.

In the Likert scale, a researcher prepares a large number of statements that measure the characteristic being researched. These statements are based on the indicator variables established in literatures. Positive and negative statements expressing the attitudes about the topic must be developed. The researcher comes out with a scale in its preliminary form. A table of specification may accompany the preliminary form to check whether the indicator variables are well presented in the scale. An example is shown in Table 7.

Table 7
Excerpt from a Table of Specification of an Attitude Scale towards Mathematics

Indicator Variables	Item Numbers	
	Positive	Negative
1. The subject content	1, 3	2, 4
2. Math teacher	5, 7	6, 8
3. Taking Mathematics Test	9, 11	10, 12, 13
4. Computation	14, 16, 18	15, 17
5. Problem solving	19, 21, 23, 25	20, 22, 24

A scale is scored and the score represents the positiveness or negativeness of the attitude: the higher the score the better attitude. For example, a Likert scale covering 20 items may have 100 points as the highest possible score and 20 as the lowest. The scores may be categorized as follows to approximate the attitudes:

Score	Description

81 – 100	Very positive attitude
61 – 80	Positive
41 – 60	Neutral
21 – 40	Negative attitude
1 – 20	Very negative attitude

The Likert scale can be validated by the results of a dry run. The scale must be fielded among subjects where a characteristic is similar to the target population of the study. After the dry run, the item analysis can be done to determine how valid each statement is in terms of discriminating between respondents with very positive attitude and negative attitude towards the topic.

The steps in the item analysis are followed except that each item in the scale is scored as follows:

Response	Points	
	Positive Statements	Negative Statements
Strongly Disagree	5	1
Disagree	4	2
Undecided	3	3
Agree	2	4
Strongly Agree	1	5

The tabulation is shown.

Table 8

Excerpt from the Validation of Teacher's Concepts On Teaching Scale

Item	Group	Response 5 SA	4 A	3 U	3 D	1 SD	S_i^2
A. Teaching Skills	Upper	16	12	0	1	0	
1. Identifies needs, interest & capacities of individuals, pupils.	Lower	8	13	1	5	2	
2. Analyzes & identifies specific learning tasks.	Upper	13	16	0	0	0	
	Lower	8	19	1	1	0	
3. Shows evidence of mastery of subject matter.	Upper	12	17	0	0	0	
	Lower	6	18	13	1	1	
4. Provides varied learning experiences for the development of communication, work, and interpretative and other basic skills.	Upper	4	11	2	11	1	
	Lower	3	13	2	6	5	
5. Selects, prepares and utilizes instructional materials aids effectively in achieving teaching tools.	Upper	8	7	6	7	1	
	Lower	2	14	1	11	1	
.	Upper	.	.	.	.	.	
.	Lower	.	.	.	.	.	

SA- strongly agree, A- agree, U- undecided, D- disagree, SD- Strongly disagree.

The reliability of the scale is computed in the same way as the KR_{21},

$$R = \left[\frac{k}{k-1}\right]\left[1 - \frac{\Sigma S_i^2}{S_x^2}\right]$$

where ΣS_i^2 is the sum of the variances per item as shown in the table. S_i^2 is taken by entering the index of SA as 5 with a frequency of 24, A as 4 with a frequency of 25, etc. To get S (σ_{xn}) (using a casio calculator), use mode SD, then enter 5 14 times in the data key; enter 4 25 times; 3 once; 2 6 times; and 1 2 times. Shift S, then square S, to get the S_i^2.

The sum of the S_i^2 at the bottom column will be used as the ΣS_i^2. k represents the number of items, while the S_x^2 shall represent the variance of the total score. The total scores are those taken to represent the overall attitude; they are the composite sum of the positive and negative items.

6. STATISTICAL TREATMENT

All the statistical treatments used in the study must be so specified in this section of Chapter III. It is also necessary for manually computed statistical treatment to specify the formulae used for computation. For data to be computed using computer software, the coding scheme for the data input is also included to facilitate easy understanding of text.

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Chapter 4:
PRESENTATION, ANALYSIS AND INTERPRETATION OF DATA

Before the data could be presented, a prior activity that should be accomplished is the encoding of data. The crude method applied for encoding data when computers have not conquered research is hand encoding or manual manipulation. Most common operations, such as tallying frequencies, are extremely dull and time consuming but can be carried out at great speed and accuracy at small cost by the computer. Computer encoding enables large set of data to be analyzed easily. The technology permits the statistical analysis of the data that would be practically impossible using manual procedures.

Computer softwares available for statistical purposes are user friendly. However, a researcher must have an adequate background in statistical analysis to understand how the treatments are processed and for what possible reasons.

Data presented in a research depend on the problem posed. One basic rule is to gather data relevant to the problem raised; then analyze the data and answer the questions asked thru the evidence deemed from the research. The research cycle shown in Fig. 3 best describes the process. The process involves raising the research problems, and procedures to the data gathering with single or multiple processes. Based on the data gathered, the analysis and interpretation of data bring out the answer to the problem in focus.

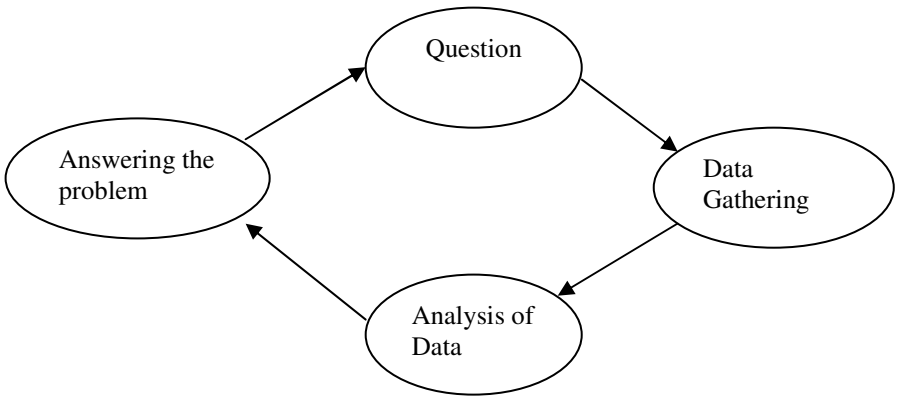

Figure 3. The Research Cycle

The research output may or may not satisfactorily answer the questions raised and some cases, may lead to other questions. From there, the researcher may come back to the data to gather more evidences to validate previous answers or possibly generate new ideas.

For descriptive problems that require finding out "what is," as the term implies, descriptive statistical analysis can be used to describe the data. The mean, median, mode and standard deviation are the main descriptive statistical treatment applicable. The mean or median is used to indicate the average while the standard deviation provides the variability of the data/scores in the sample. The reduction of the volume of data into descriptive statistics reduces the work of the researcher. However, the researcher must be aware not to over simplify the data, for this would bias the interpretation.

Inferential statistical analyses are used to make estimates about population parameters based on the data collected from the sample. It is important to use statistical analysis to derive conclusions about the population based on the samples drawn.

1. PRESENTATION AND ANALYSIS OF DESCRIPTIVE DATA.

In descriptive research, presentation and analysis of the data follow simple pattern as shown in the following illustration:

Illustration 1

Characteristic Profile			***F***	***%***
A.	Sex			
	Male		58	72.5
	Female		22	27.5
		Total	**80**	**100**
B.	Age			
	30-32		5	6.25
	27-29		43	53.75
	24-26		29	36.25
	21-23		3	3.75
		Total	**80**	**100**
C.	Civil Status			
	Married		54	67.5
	Single		26	32.5
		Total	**80**	**100**

Analysis of the data presented in the example may be stated as follows: as to sex, the respondents were mostly male (since the modal class is male). If this occurrence could be explained by the researcher on the basis of the research area being explored, it will make the interpretation even better.

The age profile can be described by using the mean age. This mean age could be the focus of the discussion. In some cases, the behavior of the curve should be

analyzed. In the presence of extreme values as in skewed distribution, the median may best represent the data; while if the data are concentrated in the center of the curve, the mean is most appropriate.

For nominal data as in gender and civil status, the modal class is the basis of discussion.

2. BIVARRIATE CORRELATION OUTPUT.

In establishing relationship between variables, the techniques mentioned in Chapter III will dictate the presentation of output. Illustration 2 shows an example of bivariate correlation using Pearson's r coefficient.

Illustration 2.

Subjects being related	***Pearson's r***	***Significance level***
Math Achievement vs. Math (NEAT)	0.77095	Very significant
Science Achievement vs. Science (NEAT)	0.79908	very significant
English Achievement vs. English (NEAT)	0.69801	very significant
HEKASI vs. HEKASI (NEAT)	0.58349	Very Significant

It is necessary to explore the statistical significance by using the critical value, however, it is much better to determine whether the computed person's r denote a high correlation between the variable concerned because statistical significance may only be negligible or too low to consider. Computer statistical outputs provide the probability of alpha which may indicate the percent of occurrence of the error to reject the null hypothesis when it is true.

The researcher may interpret these results on the basis of accepting or rejecting the hypothesis raised. The statistical conclusion may then be explained on the context of the variables in the study.

3. TEST OF DIFFERENCE.

Test of difference between groups happens in causal-comparative and experimental researches. In causal-comparative research, 2 comparison groups may be differentiated by using appropriate statistical treatment. Illustration 3 shows the comparison between the experimental and the control group in the pre-test.

Illustration 3.

Difference Between the Experimental & Control groups in the pre-test.

Statistics	Experimental Group	Control Group
Mean	7.6	7.4
SD	11.1	6.0
N	50	50

t – Value = 0.8972 (Probability of t = 0.4831)

To interpret this result, the researcher may center on the result of the t-test; that no significant difference exists between the two groups based on the probability of t (0.48317, 05). The result may be further strengthened by comparing the means which are almost equal.

4. COMPARING 3 OR MORE GROUPS

To compare 3 or more groups, the Analysis of Variance or ANOVA models are used such as differentiating performance based on age groups, differentiating job moral by rank, comparing 3 or more experimental treatment, etc.

ANOVA table's final result may be used in presenting the data.

Illustration 4.

Analysis of Variance for the Feed Conversion
of the three Groups of Broilers

Source of Variation	***Df***	***SS***	***MS***	***F***	***Prof of F***
Between Groups	2	0.0932	0.0466	2.84	0.0869
Within Groups	9	0.1479	0.0164		
Total	11	0.2411			

To evaluate this result, the probability of F dictates that the null hypothesis (which states no difference among group means) is accepted at 0.05 level. This leads to the conclusion that there is no significant difference among the three treatment groups in terms of feed conversion efficiency on the different treatments and replications which were fed with varying quantities of feed and supplements. To further strengthen the results, the mean feed conversion index by treatment group may be presented and further analyzed.

Two-Way ANOVA

To compare two or more groups by two criteria could be done by two-way Analysis of Variance. For example, Performance in mathematics may be compared by treatment (traditional, computer-aided, constructivist approach) and prior mathematical background; rectangular array may be presented first.

Illustration 5.

Performance in Analytic Geometry by treatment group
& Mathematical Background

Treatment Group	Mathematical Background			Total
	High	Average	Low	
t_1 = Traditional	18.60	15.20	17.20	51.00
t_2	20.00	21.70	19.00	60.70
t_3	14.50	17.10	15.00	46.60
t_4	19.20	19.60	13.90	52.70
	72.30	17.10	65.10	211.00

In this problem the researcher would like to compare the effects of different teaching methods with the interaction of mathematical background to math performance in Analytic Geometry. By manipulating the teaching approach (i.e. traditional, constructivism, computer-aided and small group discussion) given to 4 groups of students, the researcher may be able to compare and find the best approach. However, the other concern is to determine the interaction of the mathematical background to the teaching approach.

The illustration shows the mean performance in analytic geometry described by the intersection of the row & column, i.e. 18.6 is the mean performance of students with high mathematical background under the traditional teaching approach.

1. Hypothesis on the differences among treatments (rows).

Null Hypothesis: $\overline{X}_{t1} = \overline{X}_{t2} = \overline{X}_{t3} = \overline{X}_{t4} = 0$

Alternative Hypothesis: $\overline{X}_{t1} \neq \overline{X}_{t2} \neq \overline{X}_{t3} \neq \overline{X}_{t4} \neq 0$

2. Hypothesis on the Differences among Mathematical Background (Column)

Null Hypothesis: $\overline{X}_{H} = \overline{X}_{A} = \overline{X}_{L} = 0$

Alternative Hypothesis: $\overline{X}_{H} \neq \overline{X}_{A} \neq \overline{X}_{L} \neq 0$

The null hypothesis states that no difference exists among the performances of the high, average, and low mathematical background groups in Analytic Geometry.

3. Hypotheses on the Interaction between Teaching Approach and Mathematical Background

Null Hypothesis: $\overline{X}\beta_{11} = \overline{X}\beta_{12} = \overline{X}\beta_{13} = \overline{X}\beta_{14} \ldots\ldots\ldots \overline{X}\beta_{ij} = 0$

Alternative Hypothesis: At least one of the $\overline{X}ß_{ij}$ is not equal to 0

The null hypothesis states that no interaction exists between strategy (treatment) and mathematics background. This is expressed in terms of equal performances between cells (row and column numbers) i.e. $\overline{X}ß_{11}$ is treatment 1 and high mathematics background, $\overline{X}\,ß_{12}$ is treatment 1 and average mathematics background, etc.

The researcher needs to discuss results shown in the rectangular array to prepare the 2nd table presentation and analysis of the two-way ANOVA.

Illustration 6.

The second table of the two-way ANOVA (computer print out) is shown as follows:

ANOVA Statistics of the Differences in Performances in Analytic Geometry by teaching Approach & Mathematical Background

Sources of Variation	Sum of Squares	Df	Mean Square	F	Prob. of F
Row Mean	115.70	3	38.56	6.17	0.029
Column Mean	35.00	2	17.50	2.80	0.115
Interaction	77.10	6	12.85	2.05	0.145
Error	150.10	24	6.25		
Total	377.90	35			

By analyzing the probability of F, a researcher may know what among the null hypotheses would be rejected. Based on the probabilities the following decisions would be arrived at.

5. Reject H_o for row and conclude that a difference in the average performance in analytic geometry exists when the different treatments were used.

6. Accept H_o for columns and conclude that there is no difference in the performance in analytic geometry when grouped as to background in mathematics.
7. Accept H_o and conclude that there is no interaction between teaching approaches and background in mathematics.

Results of the ANOVA table may be analyzed based on the decisions arrived at. The most important decision is the interaction effect between the two variables. This must carry the bulk of the discussion because significant interaction effect denotes that the other two variables caused differences in performance when taken together; all null hypotheses are rejected. The occurrence of interaction may be explained by the researcher on the context of the variables, and may be further strengthened by citing the cell means as examples.

If no interaction occurs, the researcher may move into the discussion of the significant variable only.

In this study, no interaction exists between the treatments (strategies) and mathematical background of the students. Thus, the focus of the discussion must be on the significant portion of the results only.

5. MULTIVARIATE ANALYSIS.

Tools of multivariate analysis such as multiple regression analysis and discriminant analysis can be easily accessed thru computer softwares.

Multiple Regression Analysis – considers the problem of estimating or predicting the value of a dependent variable on the basis of several independent variables.

$$\hat{Y} = b_0 + b_1X_1 + b_2X_2 + \ldots\ldots b_nX_n$$

$\hat{Y}$ is the predicted value of Y while X_1, X_2 . . . X_n are independent variables. b_0, b_1, b_2 . . . b_n are beta coefficients; while the equation is called the regression model to predict Y. The research problem considers the estimation of predicting the dependent variable Y on the basis of known measurements of the independent variables. Multiple Regression procedures basically fall under 2 common methods: the stepwise (forward and background selection combined) and full model (method enter).

In the stepwise multiple regression model, all the independent variables are screened for entry and released on a step number from the variable with the largest partial correlation with the dependent variable. The variable released on a step 1 is the most correlated variable to the dependent variable, step number 2-second largest partially correlated variable, etc. until no variable qualifies for entry requirement (ie, 0.05 or 0.01 level) and removal criteria. The actual criteria for entry are the minimum value of F statistics; the probability associated with the F statistics must be significant. Because of this nature of the procedure, the multiple regression analysis is also used by many researchers as a tool to establish relationship between one variable in focus and multiple independent variables.

The full model or method "enter" releases all variables at the same step together with the statistical test for variation (between the dependent and each independent variable). To determine which among the variables significantly predict the dependent variable.

Illustration 7.

This computer print out may be summarized by the researcher to serve the purpose of presenting the data as follows.

Stepwise Multiple Regression Statistics of
Prediction of Readiness for Accreditation

Variable entered on step number	Beta Coefficient	R	MR^2	F	Prob. of F
Var4- Administrators Motivation to undergo Accreditation	-0.2	0.4	0.3	19.654	5.384e-05
Var 3- Financial capability of the institution	0.453	0.7	0.4	17.790	1.769e-06
Var 8- Faculty administration Relationship	-0.0117	0.7	0.4	15.873	3.191e-07

The variable entered in the multiple regression equation could be the focus of the discussion. Each variable as a prediction of readiness for accreditation may be discussed thoroughly. The variables themselves as processes may be expressed on the context of accreditation, for instance, the most important predictor entered on step number 1 is variable 5- administrator's motivation to undergo motivation. The administrator is the primary personality in an institution who can influence and motivate people to work towards the same goal; i.e., having the institution accredited. Without this motivation, there will be no leadership that would induce people towards one concerted effort.

Full Model of Multiple Regression Analysis

The computer output showing the results of multiple regression analysis is shown in illustration 8.

Illustration 8.

Multiple Regression Statistics of External
Factors Indicating Athletic Performance

Model	Unstandardized Coefficent		Standardized Coefficent	t	Sig t
	B	Std Error	Beta		
Constant	46.322	4.719		9.817	0.000
LGOVFIN	1.591	1.997	-0.06	0.805	0.422
EXTPRNTP	0.827	0.306	0.192	2.702	0.008
COMMSV	-0.773	0.543	-0.112	-1.422	0.157

Of the three variables entered in the multiple regression model. Only the variable EXTPRNTP was found significant (refer to the Sig t .008; probability of error less than the entry requirement 0.05). This variable is "extent of parental involvement

in the athletic affairs of children" (Agunday, 2000). This occurrence should be discussed fully on the premise of athletic performance of children. In sum, the interpretation of the results should resolve on explaining the significant variable and why the other variable did not account for any variation in athletic performance of children.

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Chapter 5:
SUMMARY OF FINDINGS, CONCLUSIONS, AND RECOMMENDATIONS

While this is the chapter that is placed at the end of the thesis or a dissertation, it could very well be the first part a reader reads and therefore, it should be the best-written chapter of all.

Normally, it is composed of three basic sections, namely: summary, conclusions and recommendations. At times, depending on the purpose and intent of the study, it may also include implications, before the recommendation part. In some other research papers, this chapter goes by the names "Conclusions and Discussions;" or "Conclusions and Recommendations;" or simply "Conclusions."

In whatever names this chapter is called, it should be well organized, clearly presented, briefly discussed but substantial enough to cover all sections. Everything written here comes as an offshoot of what has previously been done and presented.

For this chapter to be well written, a brief discussion on each section shall be made followed by a suggestion on some guidelines for each presentation.

A well-written final chapter ties-up all loose ends, recapitulates all that is essentially important and emphasizes that which is to be done for the research undertaking to be meaningful. It therefore neatly closes the research work done but provides the opening for other research undertaking in the future. While it may seem the most difficult chapter to write, actually, this Chapter, should be the easiest to make.

1. SUMMARY OF FINDINGS

A summary puts together all the important aspects made in the study. However, it is not supposed to be a mere repetition of what has been previously presented in every chapter of the thesis or the dissertation. Rather, it is a brief statement of the main purpose of the study, the description of the population or respondents, the research method used and the sampling design. However, while the presentation here may utilize some statements that have previously appeared in specific chapters (i.e. introduction, methodology, etc), the restatement of these should not be followed with long explanations as if they are being justified anew.

The need to re-state said parts in summarized form is to keep the readers focused on the subject matter on hand and to be able to follow through the study till the end. Also, for some readers who go straight up to the final chapter in reading a report, the summary will be very helpful and can lead them to the complete appreciation of the research paper even without having read the report from the beginning.

Guidelines in Writing the Summary of Findings:

1. Brief statements should be the rule of the game. The briefer the statements, the safer and clearer will be the impact. Though brief the presentation is, the substance of the report should not be sacrificed though.

2. Each stated problem should be answered without citing the specifics. Words and statements may come as textual generalization without repeating what were earlier stated in the presentation of findings.

3. Explanations, justifications or interpretation of the findings need not follow the generalizations in this part. The previous chapter should have been the appropriate place where explanations come after the presentation of facts.

4. The order by which the summarized answers appear must follow the sequence and order in which the questions are answered.

5. Only those findings that expressly answer the questions raised should be included in the summary.

6. Findings that have resulted to and have led to the making of the recommendations may be included, provided that these are not new findings which are not supported by the data gathered and presented earlier.

7. To emphasize the strength of the findings, they should not be sugarcoated and laced with unnecessary words.

2. CONCLUSIONS

After all is said and done, the conclusion part comes in. This is the part that recapitulates all that is done, in the study and presented in neatly packed statements. The conclusion summarizes in clear thoughts and ideas what the findings are, and what these findings mean. This is in preparation to the succeeding statements with probable implications and the necessary recommendations in answer to the problems raised at the beginning of the study.

The conclusions put together what else is yet to be stated on the findings. It is in this portion, where the researcher's thoughts are synthesized. This is where the link between the problems raised and the answers to the problems are established. This is the portion which we can appropriately call, the tying up of loose ends.

The researcher's contribution here is to force the significant issues out in the open, and differentiate or set them apart from those that are less significant in the study. In here, the emphases are on those findings that present new knowledge, new ways of looking and doing things and those that will open up new dimensions that can bring about fresh insights on the topic at hand.

To make the conclusions as meaningful and helpful as they should be, some points are worth considering as guidelines.

Guidelines in Writing the Conclusions:

1. The researcher's grasp of the significant findings that would suggest new ways of doing things and new implications should be reflected in the conclusions. The researcher's rich background, his expertise and critical mindedness should be reflected in the concluding statements he makes in this part of the thesis/dissertation.

2. Conclusions must be offshoots of the findings. No new and unfounded generalizations should be made. As always, every statement should be supported by the findings which are earlier presented.

3. Conclusions should be followed by citing the verified, validated findings. Other parallel theories can also be cited to strengthen or invalidate the assumptions or theories posited in the theoretical/conceptual frameworks used in the conduct of the study.

4. Conclusions, which are short summative statements or summarized concepts borne out of the analysis made in the study, are supported to tie-up loose ends and to bring the study to an end in neatly wrapped up arguments.

5. Conclusions must be stated positively without any hint of uncertainties.

6. Conclusions which are stated as inferences, deductions, generalizations and abstractions must always be stated briefly but substantially. All that is supposed to be known in answer to the specific problem raised must be found in the conclusions.

7. Finally, conclusions are not repetitions of any statement earlier found in the study. If they are to emphasize some points to be raised, these recapitulations could contain the same information but are stated more simply, briefly and plainly.

4. RECOMMENDATIONS

Treaties, appeals, and entities which are perceived to solve the problems and help establish new systems to ease out present problems and make better existing situations, form part of the recommendation.

This portion is the researcher's way of capping up the study with doable and implementable programs and activities.

The recommendation states plans for ready implementation or those that have far reaching effects that could solve the present problems. Recommendations may also be given as possibilities in the establishment of measures and programs to ease out the problems earlier presented in the study.

As always, recommendations are the direct results of the findings and the conclusions reached.

Guidelines in Writing the Recommendations

1. The recommendations should follow the order in which the problems are presented. As much as possible, each identified problem should have one recommendation each.

2. If there are one or two more recommendations for a particular problem, these recommendations should come one after the other. The doable or the best possible recommendation comes first, followed by the second best and so on.

3. The recommendations should follow sequential and logical ordering for easier and better adoption by any beneficiary/implementor.

4. Only the doable, practicable and probable recommendations should be given. The suggested plans of action must be within realistic boundaries.

5. A recommendation that is specific is better appreciated than a general one. If general recommendations are given, mechanics for implementation or a program of work for the operationalization of the recommendation will be ideal and must support the recommendation.

6. Recommendations must be specifically addressed to the implementors. Persons or units or agencies that will have the authority to implement should be identified for the realistic adoption of the recommendation.

7. Suggested recommendations must be based on the analysis of findings and in no case should they be taken from nowhere.

8. No recommendation which is whimsical in nature should found their way into the papers. Recommendations are not wishful thinking but are pragmatic, practical solutions to the problems.

9. Recommendations should take into consideration the current situation under which the research study is made. The availability of resources and the timeliness of the recommendations should justifiably be reflected for ready adoption.

10. Finally, recommendations that seem far-flung but otherwise may later present opportunities may also be considered and stated for as long as the recommendations are offshoots of the present study.

5. IMPLICATIONS

Some research papers may not have a separate part for this since implications gathered from the analysis may be integrated or embodied in the discourses following the presentation of findings or the discussion of the recommendation.

Nonetheless, for those research works that may naturally find a need for a separate section to discuss the implication, the following guidelines can be suggested:

1. Implications may be far-reaching or plainly within sight as a natural consequence of the study.

2. Most implications could have policy considerations or are addressed bearing procedural or operational considerations. In any case, implications can find their way into the considerations of a policy, organizational structure, a system of operation, procedural matters or human/personal relations.

3. Implications may be ideally conceptualized and need not be short-ranging. Practicality is still to be considered but is not a rule.

4. The implications should move researchers, implementors, policy makers' leaders, managers, teachers, students, and readers to think way beyond the matter on hand.

5. While the implications induce one to think, along with this thinking should come the creative act of transforming a way of thinking and a way of doing things.

6. Finally, the implications of the study open the realities, the existence, and the possibilities of another way of thinking and doing things.

BIBLIOGRAPHY

1) Forms/Styles/Formats

The American Psychological Association of APA provides formats or styles on the reference section or the bibliography of a research work. In formatting a reference list, the following are generally observed:

1.1. first line of the reference list entry starts from the left,
1.2. list is arranged alphabetically based on the last name of the author/s,
1.3. chronological order is based on the date of publication starting from the earliest to the latest work, if the same author is cited for two or more reference materials,
1.4. list shall follow the alphabetical order based on the title of the said works, if two or more materials or works authored by the same writer consequently have the same publication dates, and
1.5. name of the author is repeated in every entry, if two or more materials, articles or works are authored by the same writer.

2) Compilation of the Bibliography

Research authorities agree on the following rules regarding the compilation of the bibliography:

2.1. References are arranged in alphabetical order with the last name of the author listed first.

2.2. Each entry line is positioned flush with the left margin of the page and subsequent lines are single-spaced and indented by five spaces.

2.3. A double space is observed in between entries.

2.4. The bibliography may also be divided or classified into different parts or sections such as the books reference materials. Published or unpublished masteral theses or doctoral dissertations may also constitute another part separately from other types of works.

2.5. Annotated bibliography may also be used. The annotation provides a brief descriptive or evaluative assertion that gives idea of the nature of the reference and the topics it covers. The annotation is separated from the bibliographical entry by a double space. The annotation, however, is single spaced.

2.6. The basic format for each entry line starts with the author's last name, followed by a comma, the author's first name initial, followed by a period. The date of book's publication is enclosed in a parenthesis and is followed by a period. The title of the book is stated, and italicized, followed by a period. Facts of publication include the city of publication, name of the publication, followed by a colon and the name of the publisher. The entry line ends with a period.

Dela Cruz, J.T. (2000). ***Essentials of Research***. Bulacan: Bulacan State University Press.

2.7. Books with two or more authors start with the list of all the names of all concern starting with the family name, comma, first name and middle initial, period. Commas are used to separate surnames and initials. Place an ampersand (&) before the name of the last author. The basic format for each entry line as to the book title, publication and the like also applies.

Dela Cruz, J.T., & Dimasalang K.M. (2000). ***Essentials of Research***. Bulacan: Bulacan State University Press.

2.8. For book entries without an author, enter and alphabetize the books without an author starting with its title. The same format follows for the year of publication, city, location of publication and the publisher.

Essentials of Research. (2000). Bulacan: Bulacan State University Press.

2.9. The entry for an individual titled work in a series provides both the volume and the series titles.

Dagoon, J.D. (1990). ***Exploratory Fishery Arts,*** *Volume I.* Manila: Rex Printing Company, Inc.

2.10. The entry for a newspaper (or magazine) article without a by-line begins with the headline or title in the author position without underlining or quotation marks. However, when the newspaper article has discontinuous pages provide all page numbers and separate each number page with comma.

Impact of Information Technology to the Commercial World. (1998 November 13). ***The Philippine Times***. p. A-4.

Lagman, M.G. (1999 March 5). "Philippine Educational System." ***The Herald Times***. pp. A-4, B-9, C-8.

2.11. Entries for Technical and research reports follow the book entry format. The series or number of the report should be identified by a parenthesis right after the title.

Manlapaz, E.Z. & Francisco, E.N. (1985). ***The Total Quality Management In Education.*** (Technical Paper No. 555). Manila: Technology and Livelihood Center for Asia.

2.12. For papers on research which are unpublished contribution during conferences or symposium, indicate the location/place and the date of said symposium.

Vinluan,, D.C. (2000 August 11). ***Total Quality Management of Education Institutions***. Research Paper Presented at the National Research Forum, Bocobo Hall, College of Law, UP Diliman, Quezon City.

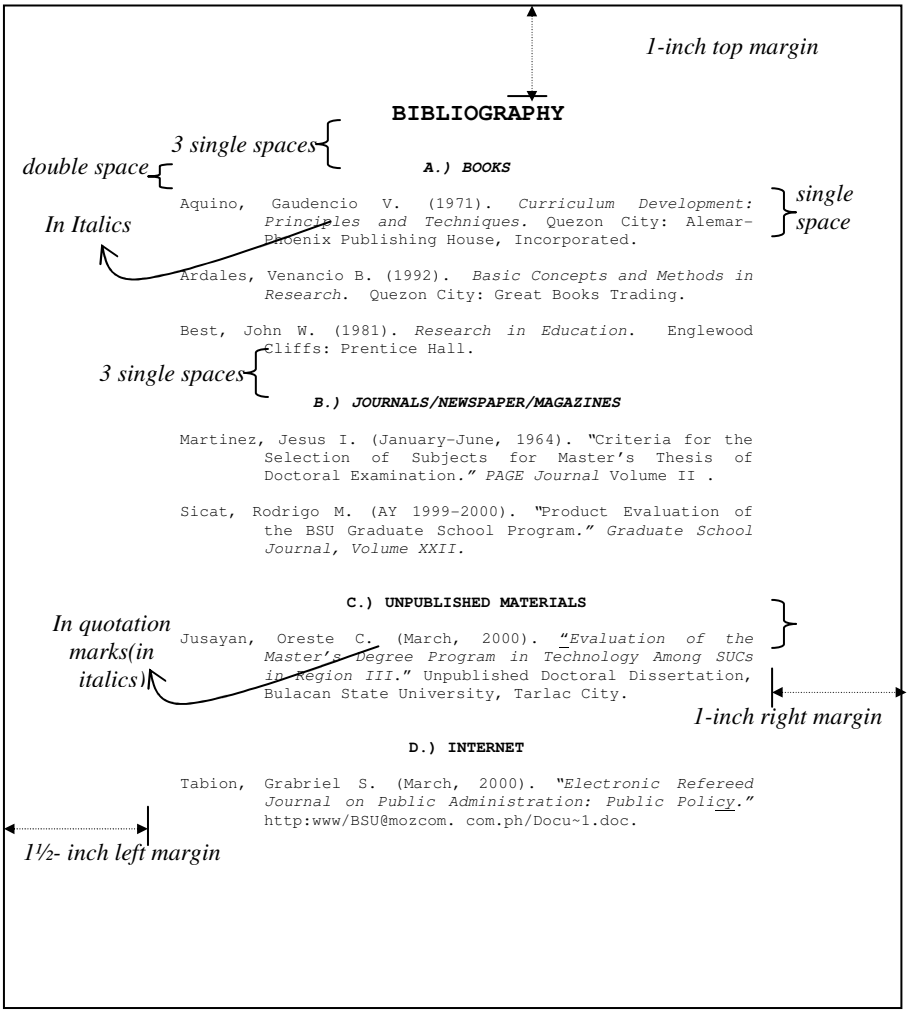
2.13. Entries for unpublished materials in completed form, underline the title and indicate the unpublished status at the end of the entry.

Perez, A.R. (2000). ***Food Products and Projects Using Water Lily***. Unpublished Manuscript.

2.14. For unpublished masteral theses and doctoral dissertations provide the university and year as well as the volume and page numbers in masteral or dissertation. If the dates are different, provide the date of the theses/dissertation after the name of the college or university.

Jusayan, O.C. (2000). ***Evaluation of the Master's Degree Program in Technology Among State Universities and Colleges in Region III.*** Unpublished doctoral dissertation, Bulacan State University, Bulacan.

Figure 13. Bibliography Format



REFERENCES AND FOOTNOTES

This portion present entries based on the American Psychological Association (APA) procedures. The basic procedures for APA documentation are spelled out in the following sections.

REFERENCE CITATIONS IN TEXT

APA journals use the *author-date method* of citation; that is, the surname of the author and the year of publication are inserted in text at an appropriate point:

Mateo (1985) correlated the effects of fertilizers.

In a study conducted on the effects of fertilizers (Mateo, 1985).

This method gives readers useful information in text and enables them to locate the citation easily in the alphabetical reference list.

As indicated in the first example, if the name of the author occurs in textual discussion, only the year of publication is cited in parentheses. Otherwise, both name and date appear in parentheses, separated by comma (second example).

Two or More Authors

If a work has two authors, always cite both names every time the reference occurs in the text. If the work has more than two authors, cite all authors the first time the reference occurs; include only the surname of the first author followed by "et. al." (Latin abbreviation for "and others") and the year in subsequent citations of the same reference:

Mendoza, Cristina, and Pineda (1985)found... (1st occurrence)
Mendoza, et. al. (1985) found... (subsequent citations)

If citation of two references in the same year is shorten to the same form e.g., (Mendoza et al., 1985), for (Mendoza, Santos, & Mateo, 1985), and (Mendoza, Santos, Mateo, & Cruz, 1985), always cite reference in full to avoid confusion. *(Note: All multiple-author citations in footnotes, tables, and figures should include surnames of all authors.)*

If multiple-author citations occur in running text, the names are connected by "and." In parenthetical and tabular material, the names are joined by an ampersand (&):

……as shown by Mateo and Santos (1985).
……as has been shown (Mateo & Santos, 1985).

No Author or Corporate Author

If there is no author in the next citation use the first two or three words of the entry in the reference list (usually the title):

…….with religious devotion (Graduate Journal, 1985).

If the author is a lengthy corporate name, the parenthetical text citation may be abbreviated unless the full name adds to the understanding of the text:

BSU (1999).	(Abbreviated in text)
Bulacan State University	(Corporate author in reference list)

As a general rule, give enough information in the text citation to locate the entry in the reference list without difficulty.

Authors with Same Surname

If a reference list includes publications by two or more authors with the same surname, citations in text include their initials to avoid confusion, even if the year of publication differs.

Multiple Citations

Multiple citations in parentheses at the same point in text follow the order of the reference list. Therefore, multiple citations of the same author are arranged in chronological order, separated by commas, and the author's name is not repeated for each work. In citing more than one paper by the same author in one year, the suffixes a, b, c, etc., are added after the year, and the year is repeated. In - press citations come last.

Example:

> Previous studies (Santos, 1976, 1977, 1979a, 1979b, in press-a, in press-b) have shown……..

If different authors are cited at the same point in text, the citations are arranged alphabetically by author's surnames, separated by a semi-colon, and enclosed in one pair of parentheses.

Example:

> Previous studies (Santos & Mateo, 1980; Mateo, 1975, 1976; Mendoza, 1979) have shown ……..

Citation of a Particular Part of a Source

Citation of a particular page, chapter, figure, table, or equation should be made at the appropriate point in text rather than in the reference list. Because material within a book is often difficult to locate, authors should whenever possible give page numbers in books to assist readers. Page numbers are always given for quotations. Note that the words page and chapter are abbreviated in such citations:

> (Santos, 1980, pp. 5-10)
> (Mateo, 1980, chap. 3)

REFERENCE LIST

The reference list, at the end of each journal article, establishes the authority of the article by citing material publicly available. Researchers should choose references judiciously and only include sources that readers may retrieve. Materials not generally available should be cited as reference notes.

Citation in Text and Reference List

A reference list cites works that specifically support a particular article. This is in contrast to a bibliography, which cites works for background or further reading. Reference list, and conversely, each entry in the reference list must be cited in the text. The author must make certain that references appear in both places and are in agreement with what is written.

Accuracy and Completeness

Listing of reference data must be entered in the reference list accurately and completely. Each entry must contain all data necessary for identification and library search; hence, the most important requirement in preparing a reference list is to check carefully against the original publication. Attention should be given to spelling of proper names, spelling of words in foreign languages including accents and other special marks, and whether journal titles, years, volume numbers, and pages are complete. Authors are responsible for all information in a reference.

APA Style

All references should follow the APA prescribed style. Follow the style religiously; it is a good way to catch omissions and oversights.

Sequence. Arrange the elements in a reference entry in the following order:

1. Author: all authors of the work, with surnames and initials (not full name) in inverted order.
2. Title: article, chapter, or book
3. Facts of Publication;
   For journals – journal name in full, date of publication, volume number, inclusive pages.
   For books – city of publication, publisher's name, publication date.

Punctuation. Use periods to separate the three major subdivisions of a reference citation: author, title, and publication date. Use commas within the subdivisions (e.g., between date and volume number in a journal entry). Use a colon between the place of publication and the book publisher. Use parentheses for extensions, qualifications, or interpretations of each subdivision of the entire entry.

4. Periods separate the subdivisions:
   Santos, R.M. *Title of the work*. Publication data.

5. Commas separate within subdivisions:

   Publication date for a journal
   Graduate School Journal, 1990, 7, 32-35.

   Publication data for a book
   BSU Press, 1990.

6. A colon separates the place of publication and the publisher:
   Bulacan: Bulacan State University Press.

7. Parenthesis extend, qualify, or interpret:
   Writing Manual (3rd ed.).
   ... 32-35 (Abstract)

Capitalization. Capitalize entries according to the following:

8. Journal titles: Capitalize the initial letter of all major words.

9. Article, chapter, or book titles: Capitalize the initial letter of the first word only.

Italics and quotes. Underline book and journal titles and journal volume numbers to indicate italics. Article and chapter titles are set in roman type without quotation marks.

Abbreviations. Titles of journals are not abbreviated; they are spelled out in full. Acceptable abbreviations in reference lists include:

Chap.	Chapter
ed.	edition
rev. ed.	revised edition
2nd ed.	second edition
Ed. (Eds.)	Editor(s)
p. (pp.)	page(s)
Vol.	Volume(as in vol. 1)
vols.	volumes(as in 4 vols.)
No.	number
Pt.	part
Tech. Rep.	Technical report
Suppl.	Supplement
trans.	translated by

Arabic Numerals. APA journals use Arabic numerals for all numbers in reference lists.
(e.g., Vol. 3, not Vol. III).

Ordering References in the Reference List

Inverted Order of Names. List all names in inverted order, last name first followed by the initial or initials (not full name). Each initial is followed by a period and a space.

Santos, R.M.

In case of multiple authorship, use the inverted order for all names, separating each name from the preceding name with a comma. Use a comma and an ampersand (&) before the final name,, even with two authors:

Santos, R.M., & Cruz, D.R.
Santos, R.M., Cruz, D.R., & Mendoza, A.

Alphabetizing names. Arrange entries in alphabetical order by the surname of the first author, using the following rules for special cases:

Alphabetize letter by letter. However, remember that “nothing precedes something”.

Del Carmen, R.M. precedes Dela Rosa, L.S.

Ordering several works by the same first author. When ordering several works by the same first author, repeat the author's name and use the following rules to arrange the entries:

Single-author entries precede multiple-author entries beginning with the same name:

Santos, R.M.
Santos, R.M., & Cruz, D.R.

References with the same first author and different second or third authors are arranged alphabetically by the surname of the second author, etc.:

Santos, R.M., Mendoza, C. & Cruz, D.R.
Santos, R.M., & Cruz, D.R.

Several references to the same author are arranged by year of publication, the earliest first:

Santos, R.M. 1980
Santos, R.M. 1985

References to the same author published in the same year are arranged alphabetically by title (excluding *a* or *the*). Lowercase letters in parentheses – (a), (b), etc. are placed after the final period of each entry:

Santos, R.M. 1980. Correlates . . .1980, 30, 3-5 (a)
Santos, R.M. 1980. Functions of . .1980, 52, 15-12(b)

Entries without personal author. Occasionally, a work will have as its author an agency, association, or institution, or it will have no author at all.

Alphabetize corporate authors, such as associations or government agencies, by the first significant word of the same. Full official names should be used (e.g., Graduate School Student Organization *not* GSSO). A parent body precedes a subdivision (e.g., Bulacan State University, Graduate School).

10. If, and only if, the work is signed "Anonymous," the entry begins with Anonymous spelled out and is alphabetized as if Anonymous were a true name.

11. If there is no author, the title moves to the author position, and the entry is alphabetized by the first significant word of the title.

Entries not numbered. In APA style, entries are not numbered.

Example of Reference Notes

Kind of note	Typewritten example
Unpublished manuscript not submitted for publication	Santos, R.M. (1990). *The Psychology of Poverty*. Unpublished manuscript. *(Available for [author's address])*
Unpublished manuscript submitted for publication but not yet accepted	Cruz, D.R., & Mateo, D.G. (1990). *Effectiveness of Organic Fertilizers*. Manuscript submitted for publication.
Unpublished manuscript with a university cited	Mendoza, A.C. & Mateo, D.G. (1990). *Effective Time Management for School Teachers*. Unpublished manuscript, Bulacan State University.
Book in preparation but not yet accepted by a publisher	Cruz, D.R. (1990). *Compedium of Kapampangan Culinary Arts*. Book in preparation.
Research report available on a limited basis only from its source	Mateo, D.G. (1990). *Hydrophonics: An Approach to Plant Growing*. Bulacan: Department of Biological Sciences.
Paper presented at a meeting	Manuel, C.M., and Mateo, D.G. (1990). *.Assessment of Pupils' Misbehaviors in Rurban Areas*. Paper presented during the Mid-year Conference of the Guidance Personnel Association, Bulacan.
Contributed to a symposium	Damaso, M.P. Correlates of Teaching Aptitudes of Bachelor of Elementary Education Students at the BSU College of Education. In R.M. Cruz. (1990). Effective *Teaching Strategies in the Elementary Schools*. Presented during the Symposium of the BSU Graduate School Student Organization Meeting, Bulacan.
Personal Communication	Cruz, D.R. *Personal Communication,* December 20, 1990.

FOOTNOTES

There are four types of footnotes used in the APA format.

Acknowledgement and Author Identification. This type appear on the first page of an article. They should:

12. acknowledge the basis of a study (e.g., doctoral dissertation or paper presented at a meeting)
13. acknowledge a grant or other financial support
14. acknowledge scholarly review or assistance in conducting the study
15. elaborate on the author's affiliation
16. designate the address of the author to whom requests for reprints should be sent.

Content footnotes. These are explanations or amplifications of the text. Rather than including long materials which are less important and irrelevant information in the discussion, consider (a) indicating a short footnote that the material is available from the author, (b) depositing the material in a national retrieval center and including an appropriate footnote, or (c) adding an appendix. If an Appendix is used, the reference should be read:

(See Appendix B for complete list)

Reference footnotes. Acceptable reference footnotes include:

17. legal citations
18. copyright permission footnotes

Table footnotes. These are appended only to a specific table.

Footnotes of acknowledgement and author identification are not numbered. Text footnotes should be numbered consecutively throughout the article with superscript Arabic numbers. If, after a footnote occurs it is later mentioned, use a parenthetical note rather than the superscript number.

Footnotes to a table should be lettered consecutively within each table with superscript lowercase letters.

Punctuation

Use a comma:

19. before and/or in a series of three or more
    the sex, age, status, and educational qualification
    in a study by Santos, Mateo, Mendoza, and Cruz
    the color, shape, or size

20. to set off a nonessential or nonrestrictive clause, that is, a clause that the sentence can do without
    The teacher, who is the center of the educative process, plays an important role

21. to separate two independent clauses joined by a conjunction, especially if the clauses are lengthy

The nursery was provided with varieties of seedlings, and they can be used for propagation.

Use a semicolon:

22. to separate two independent clauses that are not joined by a conjunction
    The first batch of mountain climbers was male dominated; the second was generally female.

23. to separate items that already contains commas
    Their family affiliations were Santos, Cruz; Santos, Mateo; Santos Mendoza. (Santos & Mendoza, 1985; Mateo, 1985)

Use a colon:

24. before a final phrase or clause that illustrates, extends, or amplifies preceding material
    They have decided on this decision: Educational field trip to be held in Baguio City.
    The winning numbers were as follow: 32, 35, 40, 42, 55, 58.

25. in ratios and proportions
    The teacher student proportions were: 1:25, 1:30, 1:35, and 1:50.

26. in references between place of publication and publisher
    Bulacan: BSU Press, 1985

Use a dash:

27. to indicate a sudden interruption in the continuity of a sentence
    When there are two winning ticket claimants--one male, one female--

Use a quotation mark:

28. In text. Use double quotation marks for quotations in text. Use single quotation marks to enclose any quoted material within a block quotation.
    Quotation 1: He said, "The 'organic effect'...observed when Treatment B had shown better performance during the experiment" (Mendoza, 1985, p. 48).
    Quotation 2: Mendoza (1985) disclosed that "The 'organic effect'...observed when Treatment B had shown better performance during the experiment" (p. 48).

Use parentheses:

29. to set off structurally independent elements
    -was insignificant (see Figure 10)

30. to set off references within text
    -Mateo and Cruz (1985) have indicated
    -is concluded (Mateo and Cruz, 1985).

31. to explain abbreviation
    -effects of nitrogen, phosphorus, and potassium (NPK)

32. to set off letters in a series
The three variables were (a)...,(b)..., and (c)...

33. to group mathematical expressions
(a + b) (a - b)

34. to enclose the citation of a direct quotation
"When effects were observed" (p. 95).

35. to enclose enumeration of displayed formulas and equations
A = l *x* w (1)

Use brackets:

36. to enclose parenthetical material within parentheses
the results for Treatment E[n=25]are shown in Figure 5.)

- to enclose material inserted in a question by some persons other than the original writer
"When [his own and others] researches were presented
(p. 35).

Hyphen

Hyphenate:

37. a compound with a participle when it precedes the noun it modifies.
role–playing strategy
water–growing plants

38. a phrase used as an adjective when it precedes and modifies another noun
trial-by–error technique
to-be-recalled documents

39. an adjective and noun compound when it precedes and modifies another noun
high–level sounds
upper-class groups

40. all self-compounds whether they are adjectives or nouns
self-realization
self-concept

41. a compound with a number as the first element when the compound precedes a noun
one–way analysis of variance
4^{th}-grade pupils

Do not hyphenate:

42. a compound using an adverb ending in *-ly*
largely populated area
randomly chosen respondents

43. a compound using a comparative or superlative adjective

more informed students
higher performing schools

44. chemical terms
    sulfuric acid preparation
    hydrochloric acid solution

45. foreign phrases used as adjectives
    a priori test
    de facto doctrine

46. a modifier using a letter or numeral as the second element
    Column B crops
    Trial I experiment

Capitalization

Do capitalize:

47. nouns followed by numerals or letters that denote a specific place in a number series
    as reflected in Table 10 and Figure 12
    on Day 5 of Experiment 2

48. trade and brand names of drugs, equipment, and food
    Kubota Farmachine
    Aqua Drink

49. factors within a factor analysis

50. exact, complete test titles as published
    Panukat ng Pagkatao Para Sa Batang Filipino
    Santos Mental Ability Test

51. names of university departments only if they refer to a specific department within a specific university
    Graduate School, Bulacan State University

52. major words in titles of books and journals, articles in text but not in reference lists. Conjunctions, articles, and short prepositions are not considered major words.
    In his article, "Nature of Poverty"
    In his book, <u>Abnormal Psychology</u>

53. first word after a colon or dash when the word begins a subtitle of a complete sentence
    They have decided in this decision: Educational field trip to be held in Baguio City.

54. first word in table heads and major words in table titles
    Do not capitalize:

55. names of effects in an analysis of variance
    -a significant height effect
    -effect of distance in planting

56. names of conditions or groups in an experiment
    -treatment and control groups
    -respondents were classified into emotional and no-emotional conditions

57. nouns that precede a variable
    trial A
    item Y

58. laws, theories, and hypotheses
    -Mendoza's theory of regressive learning
    -the law of cause and effect

59. shortened or inexact titles of tests or title of unpublished tests
    -a diagnostic test
    -Cruz test of creativity

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