DISSERTATION

UNIT I

RESEARCH METHODOLOGY

1.0. Meaning of Research

The word research as it is used in everyday speech has numerous meanings, making it a decidedly confusing term for students, especially graduate students, who must learn to use the word in a narrower, more precise sense. From elementary school to college, students hear the word research used in the context of a variety of activities. In some situations, the word connotes finding a piece of information or making notes and then writing a documented paper. In other situations, it refers to the act of informing oneself about what one does not know, perhaps by rummaging through available sources to retrieve a bit of information. Merchandisers sometimes use the word to suggest the discovery of a revolutionary product when, in reality, an existing product has been slightly modified to enhance the product's sales appeal. All of these activities have been called research but are more appropriately called other names: information gathering, library skills, documentation, self-enlightenment, or an attention-getting sales pitch.

The word research has a certain mystique about it. To many people, it suggests an activity that is somehow exclusive and removed from everyday life. Researchers are sometimes regarded as aloof individuals who seclude themselves in laboratories, scholarly libraries, or the ivory towers of large universities. The

public is often unaware of what researchers do on a day-to-day basis or of how their work contributes to people's overall quality of life and general welfare.

Research in common parlance refers to a search for knowledge. Once can also define research as a scientific and systematic search for pertinent information on a specific topic. In fact, research is an art of scientific investigation. *The Advanced Learner's Dictionary of Current English* lays down the meaning of research as "a careful investigation or inquiry specially through search for new facts in any branch of knowledge." Redman and Mory define research as a "systematized effort to gain new knowledge." Some people consider research as a movement, a movement from the known to the unknown. It is actually a voyage of discovery. We all possess the vital instinct of inquisitiveness for, when the unknown confronts us, we wonder and our inquisitiveness makes us probe and attain full and fuller understanding of the unknown. This inquisitiveness is the mother of all knowledge and the method, which man employs for obtaining the knowledge of whatever the unknown, can be termed as research.

Research is an academic activity and as such the term should be used in a technical sense. According to Clifford Woody research comprises defining and redefining problems, formulating hypothesis or suggested solutions; collecting, organising and evaluating data; making deductions and reaching conclusions; and at last carefully testing the conclusions to determine whether they fit the formulating hypothesis. D. Slesinger and M. Stephenson in the *Encyclopaedia of Social Sciences* define research as "the manipulation of things, concepts or symbols for the purpose of generalising to extend, correct or verify knowledge,

whether that knowledge aids in construction of theory or in the practice of an art." Research is, thus, an original contribution to the existing stock of knowledge making for its advancement. It is the persuit of truth with the help of study, observation, comparison and experiment. In short, the search for knowledge through objective and systematic method of finding solution to a problem is research. The systematic approach concerning generalisation and the formulation of a theory is also research. As such the term 'research' refers to the systematic method consisting of enunciating the problem, formulating a hypothesis, collecting the facts or data, analysing the facts and reaching certain conclusions either in the form of solutions(s) towards the concerned problem or in certain generalisations for some theoretical formulation.

The purpose of this chapter is to dispel such myths and misconceptions about research. In the next few pages, we describe what research is not and then what it is.

1.0.1. <u>What Research is not?</u>

We have suggested that the word research has been so widely used in everyday speech that few people have any idea of its true meaning. Following are several statements that describe what research is not. Accompanying each statement is an example that illustrates a common misconception about research.

1. *Research is not mere information gathering*. A sixth grader comes home from school and tells her parents, "The teacher sent us to the library today to do research, and I learned a lot about black holes." For this student, research means going to the library to glean a few facts. This may be information discovery; it may be learning reference skills; but it certainly is not, as the teacher labeled it, research.

2. *Research is not mere transportation of facts from one location to another.* A college student reads several articles about the mysterious "Dark Lady" in the sonnets of William Shakespeare and then writes a "research paper" describing various scholars' suggestions of who she might have been. Although the student does, indeed, go through certain activities associated with formal research—collecting information, organizing it in a certain way for presentation to others, referencing statements properly, and so on—these activities still do not add up to a true research paper. The student has missed the essence of research: the interpretation of data. Nowhere in the paper does the student say, in effect, "These facts that I have gathered seem to indicate this about the Dark Lady." Nowhere does the student interpret and draw conclusions from the facts. This student is approaching genuine research; however, the mere compilation of facts, presented with reference citations and arranged in a logical sequence—no matter how polished and appealing the format—misses genuine research by a hair. A little further, and this student would have traveled from one world to another: from the world of mere transportation of facts to the world of interpretation of facts. The difference between the two worlds is the distinction between transference of information and genuine research, a distinction that is critical for novice researchers to understand.

Unfortunately, many students think that looking up a few facts and presenting them in a written paper with benefit of references constitutes research. Such activity might more realistically be called fact transcription, fact organization, or fact summarization.

3. *Research is not merely rummaging for information*. The house across the street is for sale. You consider buying it, and so you call your realtor to find out for how much your present home would sell. "I'll have to do some research to determine the fair market value of your property," the realtor tells you. What the realtor calls doing "some research" means, of course, reviewing information about recent sales of properties comparable to yours; this information will help the realtor zero in on a reasonable asking price for your current home. Such an activity involves little more than rummaging through files to discover what the realtor previously did not know. Rummaging, whether through one's personal records or at the public or college library, is not research. It is more accurately called an exercise in self-enlightenment.

4. *Research is not a catchword used to get attention.* The morning mail arrives. You open an envelope and pull out its contents. A statement in colorful type catches your eye:

   Years of Research Have Produced a New Car Wash!

   Give Your Car a Miracle Shine with Soapy Suds!

The phrase “years of research” catches your attention. The product must be good, you reason, because years of research have been spent on developing it. You order the product, and what do you get? Dishwashing detergent! No research, merely the clever use of a catchword that, indeed, fulfilled its purpose: to grab your attention. “Years of research”—what an attention-getting phrase, yet how misleading!

As we define the term, research is entirely different from any of the activities listed previously. We describe its essential nature and characteristics in the following section.

1.0.2. What research is?

Research is a systematic process of collecting, analyzing, and interpreting information (data) in order to increase our understanding of a phenomenon about which we are interested or concerned. People often use a systematic approach when they collect and interpret information to solve the small problems of daily living. Here, however, we focus on formal research, research in which we intentionally set out to enhance our understanding of a phenomenon and expect to communicate what we discover to the larger scientific community.

Although research projects vary in complexity and duration, research typically has eight distinct characteristics:

1. Research originates with a question or problem.

2. Research requires clear articulation of a goal.

3. Research requires a specific plan for proceeding.

4. Research usually divides the principal problem into more manageable subproblems.

5. Research is guided by the specific research problem, question, or hypothesis.

6. Research accepts certain critical assumptions.

7. Research requires the collection and interpretation of data in an attempt to resolve the problem that initiated the research.

8. Research is, by its nature, cyclical or, more exactly, helical.

Each of these characteristics is discussed in turn so that you can appreciate more fully the nature of formal research.

1. *Research originates with a question or problem*. The world is filled with unanswered questions and unresolved problems. Everywhere we look, we see things that cause us to wonder, to speculate, to ask questions. And by asking questions, we strike the first spark igniting a chain reaction that leads to the research process. An inquisitive mind is the beginning of research; as one popular tabloid puts it, "Inquiring minds want to know!"

Look around you. Consider the unresolved situations that evoke these questions: What is such-and-such a situation like? Why does such-and-such a phenomenon occur? What does it all mean? These are everyday questions. With questions like these, research begins. We will discuss the research problem at greater length. The problem and its statement are important because they are the point of origin of formal research.

2. *Research requires clear articulation of a goal*. A clear, unambiguous statement of the problem is critical. This statement is an exercise in intellectual honesty: The ultimate goal of the research must be set forth in a grammatically complete sentence that specifically and precisely answers the question, "What

problem do you intend to solve?" When you describe your objective in clear, concrete terms, you have a good idea of what you need to accomplish and can direct your efforts accordingly.

3. *Research requires a specific plan for proceeding*. Research is not a blind excursion into the unknown, with the hope that the data necessary to answer the question at hand will somehow fortuitously turn up. It is, instead, a carefully planned itinerary of the route you intend to take in order to reach your final destination—your research goal. Consider the title of this text: Practical Research: Planning and Design. The last three words are the important ones. Researchers plan their overall research design and specific research methods in a purposeful way so that they can acquire data relevant to their research problem. Depending on the research question, different designs and methods will be more or less appropriate.

Therefore, in addition to identifying the specific goal of your research, you must also identify how you propose to reach your goal. You cannot wait until you're chin deep in the project to plan and design your strategy. In the formative stages of a research project, much can be decided: Where are the data? Do any existing data address themselves to the research problem? If the data exist, are you likely to have access to them? And if you have access to the data, what will you do with them after they are in your possession? We might go on and on. Such questions merely hint at the fact that planning and design cannot be postponed. Each of the questions just listed—and many more—must have an answer early in the research process.

4. *Research usually divides the principal problem into more manageable subproblems*. From a design standpoint, it is often helpful to break a main research problem into several subproblems that, when solved, will resolve the main problem.

Breaking down principal problems into small, easily solvable subproblems is a strategy we use in everyday living. For example, suppose you want to get from your hometown to a town 50 miles away. Your principal goal is to get from one location to the other as expeditiously as possible. You soon realize, however, that the problem involves several subproblems:

Main problem: How do I get from Town A to Town B?

Subproblems: 1. What is the most direct route?

2. How far do I travel on the highway?

3. Which exit should I take to leave the highway?

What seems like a single question can be divided into at least three smaller questions that must be addressed before the principal question can be resolved.

So it is with most research problems. By closely inspecting the principal problem, the researcher often uncovers important subproblems. By addressing each

of the subproblems, the researcher can more easily address the main problem. If researchers don't take the time or trouble to isolate the lesser problems within the major problem, their research projects can become cumbersome and difficult to manage.

5. *Research is guided by the specific research problem, question, or hypothesis.* Having stated the problem and its attendant subproblems, the researcher usually forms one or more hypotheses about what he or she may discover. A hypothesis is a logical supposition, a reasonable guess, an educated conjecture. It provides a tentative explanation for a phenomenon under investigation. It may direct your thinking to possible sources of information that will aid in resolving one or more subproblems and, in the process, the principal research problem.

Hypotheses are certainly not unique to research. They are constant, recurring features of everyday life. They represent the natural working of the human mind. Something happens. Immediately you attempt to account for the cause of the event by making a series of reasonable guesses. In so doing, you are hypothesizing. As an example, let's take a commonplace event: You come home after dark, open the front door, and reach inside for the switch that turns on a nearby table lamp. Your fingers find the switch. You flip it. No light. At this point, you begin to construct a series of reasonable guesses—hypotheses—to explain the lamp's failure:

1. The bulb has burned out.

2. The lamp is not plugged into the wall outlet.

3. A late afternoon thunderstorm interrupted the electrical service.

4. The wire from the lamp to the wall outlet is defective.

5. You forgot to pay your electric bill.

Each of these hypotheses hints at a direction you might proceed in order to acquire information that may resolve the problem of the malfunctioning lamp. Now you go in search of information to determine which hypothesis is correct. In other words, you look for data that will support one of your hypotheses and enable you to reject others.

1. You go out to your car, get a flashlight, find a new bulb, and insert the new bulb. The lamp fails to light. (Hypothesis 1 is rejected.)

2. You glance down at the wall outlet and see that the lamp is plugged into it. (Hypothesis 2 is rejected.)

3. You look at your neighbors' homes. Everyone has electrical power. (Hypothesis 3 is rejected.)

4. You go back into your house and lift the cord that connects the lamp to the wall outlet.

The lamp lights briefly and then goes out. You lift the cord again. Again, the lamp lights briefly. The connecting cord is defective. (Hypothesis 4 is supported. Furthermore, because you clearly do have an active electric current, you can reject hypothesis 5—you did pay your last electric bill.)

5. Fortunately, hypothesis 4 solved the problem. By repairing or replacing the cord, you can count on adequate light from the lamp in the near future.

Hypotheses in a research project are as tentative as those just formed for the malfunctioning lamp. For example, a biologist might speculate that certain human-made chemical compounds increase the frequency of birth defects in frogs. A psychologist might speculate that certain personality traits lead people to show predominantly liberal or conservative voting patterns. A marketing researcher might speculate that humor in a television commercial will capture viewers' attention and thereby increases the odds that viewers will buy the advertised product. Notice the word speculate in all of these examples. Good researchers always begin a project with open minds about what they may—or may not—discover in their data.

Even with the best of data, however, hypotheses in a research project are rarely proved or disproved beyond the shadow of a doubt. Instead, they are either supported or not supported by the data. If the data are consistent with a particular hypothesis, the researcher can make a case that the hypothesis probably has some merit and should be taken seriously. In contrast, if the data run contrary to a hypothesis, the researcher rejects the hypothesis and turns to others as being more likely explanations of the phenomenon in question.

Over time, as particular hypotheses are supported by a growing body of data, they evolve into theories. A theory is an organized body of concepts and principles intended to explain a particular phenomenon. Like hypotheses, theories are tentative explanations that new data either support or do not support. To the extent that new data contradict a particular theory, a researcher will either modify it to better account for the data or reject the theory altogether in favor of an alternative explanation.

Once one or more researchers have developed a theory to explain a phenomenon of interest, the theory is apt to drive further research, in part by posing new questions that require answers and in part by suggesting hypotheses about the likely outcomes of particular investigations. For example, one common way of testing a theory is to make a prediction (hypothesis) about what should occur if the theory is a viable explanation of the phenomenon under study. As an example, let’s consider Albert Einstein’s theory of relativity, first proposed in 1915. Within the context of his theory, Einstein hypothesized that light passes through space as photons—tiny masses of spectral energy. If light has mass,

Einstein reasoned, then it should be subject to the pull of a gravitational field. A year later, Karl Schwarzchild predicted that, based on Einstein's reasoning, the gravitational field of the sun should bend light rays considerably more than Isaac Newton had predicted many years earlier. In May 1919, a group of English astronomers traveled to Brazil and North Africa to observe how the sun's gravity distorted the light of a distant star now visible due to an eclipse of the sun. After the data were analyzed and interpreted, the results clearly supported the Einstein–Schwarzchild hypothesis and, thus, Einstein's theory of relativity.

At this point, we should return to a point made earlier, this time emphasizing a particular word: The researcher usually forms one or more hypotheses about what he or she may discover. Hypotheses—predictions—are an essential ingredient in certain kinds of research, especially experimental research. To a lesser degree, they guide most other forms of research as well, but they are intentionally not identified in the early stages of some kinds of qualitative research. Yet regardless of whether researchers form specific hypotheses in advance, they must, at a minimum, use their research problem or question to focus their efforts.

6. *Research accepts certain critical assumptions.* In research, assumptions are equivalent to axioms in geometry—self-evident truths, the sine qua non of research. The assumptions must be valid or else the research is meaningless. For this reason, careful researchers—certainly those conducting research in an academic environment—set forth a statement of their assumptions as the bedrock upon which their study must rest. In your own research, it is essential that others know what you assume to be true with respect to your project. If one is to judge the

quality of your study, then the knowledge of what you assume as basic to the very existence of your study is vitally important.

An example may clarify the point. Imagine that your problem is to investigate whether students learn the unique grammatical structures of a language more quickly by studying only one foreign language at a time or by studying two foreign languages concurrently. What assumptions would underlie such a problem? At a minimum, the researcher must assume that:

■ The teachers used in the study are competent to teach the language or languages in question and have mastered the grammatical structures of the language(s) they are teaching.

■ The students taking part in the research are capable of mastering the unique grammatical structures of any language(s) they are studying.

■ The languages selected for the study have sufficiently different grammatical structures that students could learn to distinguish between them.

Whereas a hypothesis involves a prediction that may or may not be supported by the data, an assumption is a condition that is taken for granted, without which the research project would be pointless. In the Einstein example presented earlier, we assume that the astronomers who went to observe the star's

light were competent to do so and that their instruments were sensitive enough to measure the slight aberration caused by the sun's gravitational pull.

Assumptions are usually so self-evident that a researcher may consider it unnecessary to mention them. For instance, two assumptions underlie almost all research:

■ The phenomenon under investigation is somewhat lawful and predictable; it is not comprised of completely random events.

■ Certain cause-and-effect relationships can account for the patterns observed in the phenomenon.

Aside from such basic ideas as these, careful researchers state their assumptions so that others inspecting the research project may evaluate it in accordance with their own assumptions. For the beginning researcher, it is better to be overly explicit than to take too much for granted.

7. *Research requires the collection and interpretation of data in an attempt to resolve the problem that initiated the research.* After a researcher has isolated the problem, divided it into appropriate subproblems, posited reasonable questions or hypotheses, and identified the assumptions that are basic to the entire effort, the

next step is to collect whatever data seem appropriate and to organize them in meaningful ways so that they can be interpreted.

Events, observations, and measurements are, in and of themselves, only events, observations, and measurements—nothing more. The significance of the data depends on how the researcher extracts meaning from them. In research, data uninterpreted by the human mind are worthless: They can never help us answer the questions we have posed.

Yet researchers must recognize and come to terms with the subjective and dynamic nature of interpretation. Consider the myriad of books written on the assassination of U.S. President John F. Kennedy. Different historians have studied the same events: One may interpret them one way, and another may arrive at an entirely different conclusion. Which one is right? Perhaps they both are; perhaps neither is. Both may have merely posed new problems for other historians to try to resolve. Different minds often find different meanings in the same set of facts.

Once we believed that clocks measured time and that yardsticks measured space. In one sense, they still do. We further assumed that time and space were two different entities. Then came Einstein's theory of relativity, and time and space became locked into one concept: the time–space continuum. What is the difference between the old perspective and the new perspective? The way we think about, or interpret, the same information. The realities of time and space have not changed; the way we interpret them has.

Underlying and unifying any research project is its methodology. The research methodology directs the whole endeavor: It controls the study, dictates how the data are acquired, arranges them in logical relationships, sets up an approach for refining and synthesizing them, suggests a manner in which the meanings that lie below the surface of the data become manifest, and finally yields one or more conclusions that lead to an expansion of knowledge. Thus, research methodology has two primary functions:

1. To dictate and control the acquisition of data
2. To corral the data after their acquisition and extract meaning from them

The second of these functions is what we mean by the phrase interpretation of the data.

Data demand interpretation. But no rule, formula, or algorithm can lead the researcher unerringly to a correct interpretation. Interpretation is inevitably subjective: It depends entirely on the researcher's hypotheses, assumptions, and logical reasoning processes. In later chapters, we will present a number of potentially useful methods of organizing and interpreting data.

Now think about how we began this chapter. We suggested that certain activities cannot accurately be called research. At this point, you can understand

why. None of those activities demands that the researcher draw any conclusions or make any interpretation of the data.

8. *Research is, by its nature, cyclical or, more exactly, helical.* The research process follows a cycle and begins simply. It follows logical, developmental steps:

a. A questioning mind observes a particular situation and asks, Why? What caused that? How come? (This is the subjective origin of research.)

b. Onequestion becomes formally stated as a problem. (This is the overt beginning of research.)

c. The problem is divided into several simpler, more specific subproblems.

d. Preliminary data are gathered that appear to bear on the problem.

e. The data seem to point to a tentative solution of the problem. A guess is made; a hypothesis or guiding question is formed.

f. Data are collected more systematically.

g. The body of data is processed and interpreted.

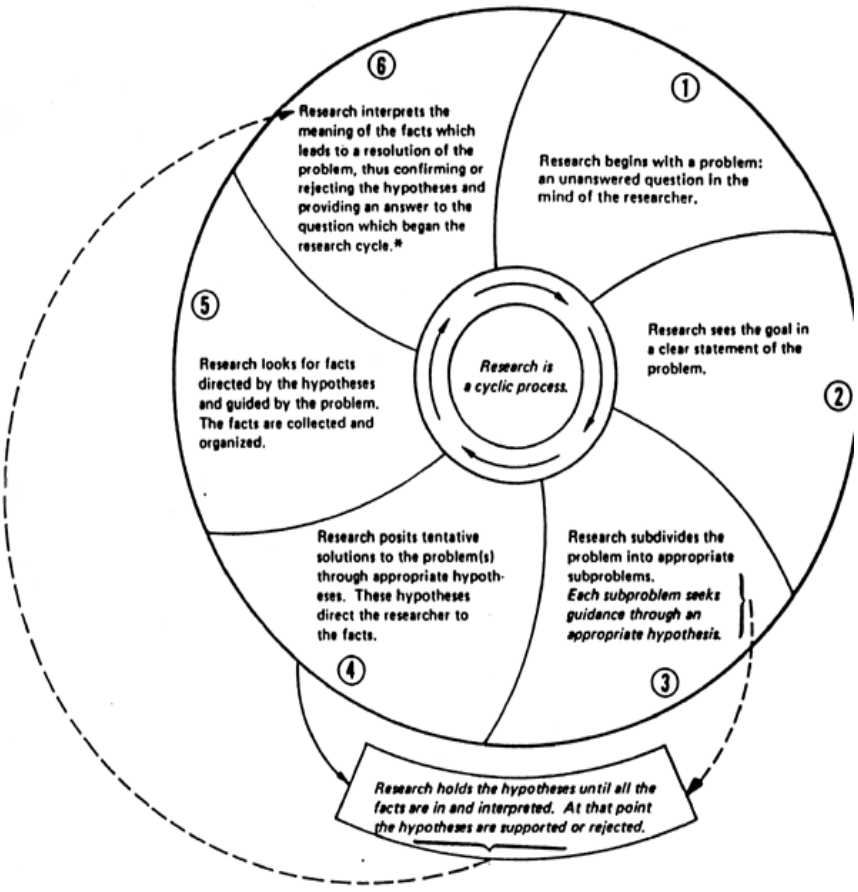
h. A discovery is made; a conclusion is reached.

i. The tentative hypothesis is either supported by the data or is not supported; the question is either answered (partially or completely) or not answered.

j. The cycle is complete.

The resolution of the problem or the tentative answer to the question completes the cycle, as is shown in the following figure. Such is the format of all research. Different academic disciplines merely use different routes to arrive at the same destination.

But the neatly closed circle of Figure is deceptive. Research is rarely conclusive. In a truer sense, the research cycle might be more accurately conceived of as a helix, or spiral, of research. In exploring an area, one comes across additional problems that need resolving, and so the process must begin anew. Research begets more research.



2.0. Objectives of Research:

The purpose of research is to discover answers to questions through the application of scientific procedures. The main aim of research is to find out the truth which is hidden and which has not been discovered as yet. Though each research study has its own specific purpose, we may think of research objectives as falling into a number of following broad groupings:

1. To gain familiarity with a phenomenon or to achieve new insights into it (studies with this object in view are termed as exploratory or formulative research studies);

2. To portray accurately the characteristics of a particular individual, situation or a group (studies with this object in view are known as descriptive research studies);

3. To determine the frequency with which something occurs or with which it is associated with something else (studies with this object in view are known as diagnostic research studies);

4. To test a hypothesis of a causal relationship between variables (such studies are known as hypothesis-testing research studies).

What makes people to undertake research? This is a question of fundamental importance. The possible motives for doing research may be either one or more of the following:

1. Desire to get a research degree along with its consequential benefits;

2. Desire to face the challenge in solving the unsolved problems, i.e., concern over practical problems initiates research;

3. Desire to get intellectual joy of doing some creative work;

4. Desire to be of service to society;

5. Desire to get respectability.

However, this is not an exhaustive list of factors motivating people to undertake research studies. Many more factors such as directives of government, employment conditions, curiosity about new things, desire to understand causal relationships, social thinking and awakening, and the like may as well motivate (or at times compel) people to perform research operations.

3.0. Types of Research:

The basic types of research are as follows:

(i) ***Descriptive vs. Analytical***: Descriptive research includes surveys and fact-finding enquiries of different kinds. The major purpose of descriptive research is description of the state of affairs as it exists at present. In social science and business research we quite often use the term Ex post facto research for descriptive research studies. The main characteristic of this method is that the researcher has

no control over the variables; he can only report what has happened or what is happening. Most ex post facto research projects are used for descriptive studies in which the researcher seeks to measure such items as, for example, frequency of shopping, preferences of people, or similar data. Ex post facto studies also include attempts by researchers to discover causes even when they cannot control the variables. The methods of research utilized in descriptive research are survey methods of all kinds, including comparative and correlational methods. In analytical research, on the other hand, the researcher has to use facts or information already available, and analyze these to make a critical evaluation of the material.

(ii) ***Applied vs. Fundamental***: Research can either be applied (or action) research or fundamental (to basic or pure) research. Applied research aims at finding a solution for an immediate problem facing a society or an industrial/business organisation, whereas fundamental research is mainly concerned with generalisations and with the formulation of a theory. "Gathering knowledge for knowledge's sake is termed 'pure' or 'basic' research." Research concerning some natural phenomenon or relating to pure mathematics are examples of fundamental research. Similarly, research studies, concerning human behaviour carried on with a view to make generalisations about human behaviour, are also examples of fundamental research, but research aimed at certain conclusions (say, a solution) facing a concrete social or business problem is an example of applied research. Research to identify social, economic or political trends that may affect a particular institution or the copy research (research to find out whether certain communications will be read and understood) or the marketing research or evaluation research are examples of applied research. Thus, the central aim of applied research is to discover a solution for some pressing practical problem, whereas basic research is directed towards finding information that has a broad

base of applications and thus, adds to the already existing organized body of scientific knowledge.

(iii) ***Quantitative vs. Qualitative***: Quantitative research is based on the measurement of quantity or amount. It is applicable to phenomena that can be expressed in terms of quantity. Qualitative research, on the other hand, is concerned with qualitative phenomenon, i.e., phenomena relating to or involving quality or kind. For instance, when we are interested in investigating the reasons for human behaviour (i.e., why people think or do certain things), we quite often talk of 'Motivation Research', an important type of qualitative research. This type of research aims at discovering the underlying motives and desires, using in depth interviews for the purpose. Other techniques of such research are word association tests, sentence completion tests, story completion tests and similar other projective techniques. Attitude or opinion research i.e., research designed to find out how people feel or what they think about a particular subject or institution is also qualitative research. Qualitative research is specially important in the behavioural sciences where the aim is to discover the underlying motives of human behaviour. Through such research we can analyse the various factors which motivate people to behave in a particular manner or which make people like or dislike a particular thing. It may be stated, however, that to apply qualitative research in practice is relatively a difficult job and therefore, while doing such research, one should seek guidance from experimental psychologists.

(iv) ***Conceptual vs. Empirical***: Conceptual research is that related to some abstract idea(s) or theory. It is generally used by philosophers and thinkers to develop new concepts or to reinterpret existing ones. On the other hand, empirical research relies on experience or observation alone, often without due regard for system and

theory. It is data-based research, coming up with conclusions which are capable of being verified by observation or experiment. We can also call it as experimental type of research. In such a research it is necessary to get at facts firsthand, at their source, and actively to go about doing certain things to stimulate the production of desired information. In such a research, the researcher must first provide himself with a working hypothesis or guess as to the probable results. He then works to get enough facts (data) to prove or disprove his hypothesis. He then sets up experimental designs which he thinks will manipulate the persons or the materials concerned so as to bring forth the desired information. Such research is thus characterised by the experimenter's control over the variables under study and his deliberate manipulation of one of them to study its effects. Empirical research is appropriate when proof is sought that certain variables affect other variables in some way. Evidence gathered through experiments or empirical studies is today considered to be the most powerful support possible for a given hypothesis.

(v) ***Some Other Types of Research:*** All other types of research are variations of one or more of the above stated approaches, based on either the purpose of research, or the time required to accomplish research, on the environment in which research is done, or on the basis of some other similar factor. Form the point of view of time, we can think of research either as one-time research or longitudinal research. In the former case the research is confined to a single time-period, whereas in the latter case the research is carried on over several time-periods. Research can be field-setting research or laboratory research or simulation research, depending upon the environment in which it is to be carried out. Research can as well be understood as clinical or diagnostic research. Such research follow case-study methods or indepth approaches to reach the basic causal relations. Such studies usually go deep into the causes of things or events that interest us, using

very small samples and very deep probing data gathering devices. The research may be exploratory or it may be formalized. The objective of exploratory research is the development of hypotheses rather than their testing, whereas formalized research studies are those with substantial structure and with specific hypotheses to be tested. Historical research is that which utilizes historical sources like documents, remains, etc. to study events or ideas of the past, including the philosophy of persons and groups at any remote point of time. Research can also be classified as conclusion-oriented and decision-oriented. While doing conclusionoriented research, a researcher is free to pick up a problem, redesign the enquiry as he proceeds and is prepared to conceptualize as he wishes. Decision-oriented research is always for the need of a decision maker and the researcher in this case is not free to embark upon research according to his own inclination. Operations research is an example of decision oriented research since it is a scientific method of providing executive departments with a quantitative basis for decisions regarding operations under their control.

4.0. Research Approaches:

The above description of the types of research brings to light the fact that there are two basic approaches to research, viz., quantitative approach and the qualitative approach. The former involves the generation of data in quantitative form which can be subjected to rigorous quantitative analysis in a formal and rigid fashion. This approach can be further sub-classified into inferential, experimental and simulation approaches to research. The purpose of inferential approach to research is to form a data base from which to infer characteristics or relationships of population. This usually means survey research where a sample of population is

studied (questioned or observed) to determine its characteristics, and it is then inferred that the population has the same characteristics. Experimental approach is characterised by much greater control over the research environment and in this case some variables are manipulated to observe their effect on other variables. Simulation approach involves the construction of an artificial environment within which relevant information and data can be generated. This permits an observation of the dynamic behaviour of a system (or its sub-system) under controlled conditions. The term 'simulation' in the context of business and social sciences applications refers to "the operation of a numerical model that represents the structure of a dynamic process. Given the values of initial conditions, parameters and exogenous variables, a simulation is run to represent the behaviour of the process over time." Simulation approach can also be useful in building models for understanding future conditions.

Qualitative approach to research is concerned with subjective assessment of attitudes, opinions and behaviour. Research in such a situation is a function of researcher's insights and impressions. Such an approach to research generates results either in non-quantitative form or in the form which are not subjected to rigorous quantitative analysis. Generally, the techniques of focus group interviews, projective techniques and depth interviews are used. All these are explained at length in chapters that follow.

5.0. Significance of Research:

"All progress is born of inquiry. Doubt is often better than overconfidence, for it leads to inquiry, and inquiry leads to invention" is a famous Hudson Maxim

in context of which the significance of research can well be understood. Increased amounts of research make progress possible. *Research inculcates scientific and inductive thinking and it promotes the development of logical habits of thinking and organisation.*

The role of research in several fields of applied economics, whether related to business or to the economy as a whole, has greatly increased in modern times. The increasingly complex nature of business and government has focused attention on the use of research in solving operational problems. Research, as an aid to economic policy, has gained added importance, both for government and business.

Research provides the basis for nearly all government policies in our economic system. For instance, government's budgets rest in part on an analysis of the needs and desires of the people and on the availability of revenues to meet these needs. The cost of needs has to be equated to probable revenues and this is a field where research is most needed. Through research we can devise alternative policies and can as well examine the consequences of each of these alternatives.

Decision-making may not be a part of research, but research certainly facilitates the decisions of the policy maker. Government has also to chalk out programmes for dealing with all facets of the country's existence and most of these will be related directly or indirectly to economic conditions. The plight of cultivators, the problems of big and small business and industry, working conditions, trade union activities, the problems of distribution, even the size and nature of defence services are matters requiring research. Thus, research is considered necessary with regard to the allocation of nation's resources. Another area in government, where research is necessary, is collecting information on the

economic and social structure of the nation. Such information indicates what is happening in the economy and what changes are taking place. Collecting such statistical information is by no means a routine task, but it involves a variety of research problems. These day nearly all governments maintain large staff of research technicians or experts to carry on this work. Thus, in the context of government, research as a tool to economic policy has three distinct phases of operation, viz., (i) investigation of economic structure through continual compilation of facts; (ii) diagnosis of events that are taking place and the analysis of the forces underlying them; and (iii) the prognosis, i.e., the prediction of future developments.

Research has its special significance in solving various operational and planning problems of business and industry. Operations research and market research, along with motivational research, are considered crucial and their results assist, in more than one way, in taking business decisions. Market research is the investigation of the structure and development of a market for the purpose of formulating efficient policies for purchasing, production and sales. Operations research refers to the application of mathematical, logical and analytical techniques to the solution of business problems of cost minimisation or of profit maximisation or what can be termed as optimisation problems. Motivational research of determining why people behave as they do is mainly concerned with market characteristics. In other words, it is concerned with the determination of motivations underlying the consumer (market) behaviour. All these are of great help to people in business and industry who are responsible for taking business decisions. Research with regard to demand and market factors has great utility in business. Given knowledge of future demand, it is generally not difficult for a firm, or for an industry to adjust its supply schedule within the limits of its projected

capacity. Market analysis has become an integral tool of business policy these days. Business budgeting, which ultimately results in a projected profit and loss account, is based mainly on sales estimates which in turn depends on business research. Once sales forecasting is done, efficient production and investment programmes can be set up around which are grouped the purchasing and financing plans. Research, thus, replaces intuitive business decisions by more logical and scientific decisions.

Research is equally important for social scientists in studying social relationships and in seeking answers to various social problems. It provides the intellectual satisfaction of knowing a few things just for the sake of knowledge and also has practical utility for the social scientist to know for the sake of being able to do something better or in a more efficient manner. Research in social sciences is concerned both with knowledge for its own sake and with knowledge for what it can contribute to practical concerns. "This double emphasis is perhaps especially appropriate in the case of social science. On the one hand, its responsibility as a science is to develop a body of principles that make possible the understanding and prediction of the whole range of human interactions. On the other hand, because of its social orientation, it is increasingly being looked to for practical guidance in solving immediate problems of human relations."

In addition to what has been stated above, the significance of research can also be understood keeping in view the following points:

(a) To those students who are to write a master's or Ph.D. thesis, research may mean a careerism or a way to attain a high position in the social structure;

(b) To professionals in research methodology, research may mean a source of livelihood;

(c) To philosophers and thinkers, research may mean the outlet for new ideas and insights;

(d) To literary men and women, research may mean the development of new styles and creative work;

(e) To analysts and intellectuals, research may mean the generalisations of new theories.

Thus, research is the fountain of knowledge for the sake of knowledge and an important source of providing guidelines for solving different business, governmental and social problems. It is a sort of formal training which enables one to understand the new developments in one's field in a better way.

6.0. Research Methods versus Research Methodology:

It seems appropriate at this juncture to explain the difference between research methods and research methodology. Research methods may be understood as all those methods/techniques that are used for conduction of research. Research methods or techniques*, thus, refer to the methods the researchers

**At times, a distinction is also made between research techniques and research methods. Research techniques refer to the behaviour and instruments we use in performing research operations such as making observations, recording data, techniques of processing data and the like. Research methods refer to the behaviour and instruments used in selecting and constructing research technique. For instance, the difference between methods and techniques of data collection can better be understood from the details given in the following chart—*

Type	Methods	Techniques
1. Library Research	(i) Analysis of historical records	Recording of notes, Content analysis, Tape and Film listening and analyis.
	(ii) Analysis of documents	Statistical compilations and manipulations, reference and abstract guides, contents analysis.
2. Field Research	(i) Non-Partcipant direct observation	Observational behavioural scales, use of score cards, etc.
	(ii) Participant Observation	Interactional recording, possible use of tape recorders, photo graphic techniques.
	(iii) Mass observation	Recording mass behaviour, interview using independent observers in public places.
	(iv) Mail questionnaire	Identification of social and economic background of respondents.
	(v) Opinionnaire	Use of attitude scales, projective techniques, use of sociometric scales.
	(vi) Personal interview	Interviewer uses a detailed schedule with open and closed questions.
	(vii) Focused interview	Interviewer focuses attention upon a given experience and its effects.
	(viii) Group interview	Small groups of respondents are interviewed simultaneously.
	(ix) Telephone survey	Used as a survey technique for information and for discerning opinion; may also be used as a follow up of questionnaire.
	(x) Case study and life history	Cross sectional collection of data for intensive analysis, longitudinal collection of data of intensive character.
3. Laboratory Research	Small group study of random behaviour, play and role analysis	Use of audio-visual recording devices, use of observers, etc.

From what has been stated above, we can say that methods are more general. It is the methods that generate techniques. However, in practice, the two terms are taken as interchangeable and when we talk of research methods we do, by implication, include research techniques within their compass

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use in performing research operations. In other words, all those methods which are used by the researcher during the course of studying his research problem are termed as research methods. Since the object of research, particularly the applied research, it to arrive at a solution for a given problem, the available data and the unknown aspects of the problem have to be related to each other to make a solution possible. Keeping this in view, research methods can be put into the following three groups:

1. In the first group we include those methods which are concerned with the collection of data. These methods will be used where the data already available are not sufficient to arrive at the required solution;

2. The second group consists of those statistical techniques which are used for establishing relationships between the data and the unknowns;

3. The third group consists of those methods which are used to evaluate the accuracy of the results obtained.

Research methods falling in the above stated last two groups are generally taken as the analytical tools of research.

Research methodology is a way to systematically solve the research problem. It may be understood as a science of studying how research is done scientifically. In it we study the various steps that are generally adopted by a researcher in studying his research problem along with the logic behind them. It is necessary for the researcher to know not only the research methods/techniques but also the methodology. Researchers not only need to know how to develop certain indices or tests, how to calculate the mean, the mode, the median or the standard

deviation or chi-square, how to apply particular research techniques, but they also need to know which of these methods or techniques, are relevant and which are not, and what would they mean and indicate and why. Researchers also need to understand the assumptions underlying various techniques and they need to know the criteria by which they can decide that certain techniques and procedures will be applicable to certain problems and others will not. All this means that it is necessary for the researcher to design his methodology for his problem as the same may differ from problem to problem. For example, an architect, who designs a building, has to consciously evaluate the basis of his decisions, i.e., he has to evaluate why and on what basis he selects particular size, number and location of doors, windows and ventilators, uses particular materials and not others and the like. Similarly, in research the scientist has to expose the research decisions to evaluation before they are implemented. He has to specify very clearly and precisely what decisions he selects and why he selects them so that they can be evaluated by others also.

From what has been stated above, we can say that research methodology has many dimensions and research methods do constitute a part of the research methodology. The scope of research methodology is wider than that of research methods. Thus, when we talk of research methodology we not only talk of the research methods but also consider the logic behind the methods we use in the context of our research study and explain why we are using a particular method or technique and why we are not using others so that research results are capable of being evaluated either by the researcher himself or by others. Why a research study has been undertaken, how the research problem has been defined, in what way and why the hypothesis has been formulated, what data have been collected and what particular method has been adopted, why particular technique of analysing data has

been used and a host of similar other questions are usually answered when we talk of research methodology concerning a research problem or study.

7.0. Importance of knowing how research is done—the Research Process:

The study of research methodology gives the student the necessary training in gathering material and arranging or card-indexing them, participation in the field work when required, and also training in techniques for the collection of data appropriate to particular problems, in the use of statistics, questionnaires and controlled experimentation and in recording evidence, sorting it out and interpreting it. In fact, importance of knowing the methodology of research or how research is done stems from the following considerations:

(i) For one who is preparing himself for a career of carrying out research, the importance of knowing research methodology and research techniques is obvious since the same constitute the tools of his trade. The knowledge of methodology provides good training specially to the new research worker and enables him to do better research. It helps him to develop disciplined thinking or a 'bent of mind' to observe the field objectively. Hence, those aspiring for careerism in research must develop the skill of using research techniques and must thoroughly understand the logic behind them.

(ii) Knowledge of how to do research will inculcate the ability to evaluate and use research results with reasonable confidence. In other words, we can state that the knowledge of research methodology is helpful in various fields such as government or business administration, community development and social work

where persons are increasingly called upon to evaluate and use research results for action.

(iii) When one knows how research is done, then one may have the satisfaction of acquiring a new intellectual tool which can become a way of looking at the world and of judging every day experience. Accordingly, it enables use to make intelligent decisions concerning problems facing us in practical life at different points of time. Thus, the knowledge of research methodology provides tools to took at things in life objectively.

(iv) In this scientific age, all of us are in many ways consumers of research results and we can use them intelligently provided we are able to judge the adequacy of the methods by which they have been obtained. The knowledge of methodology helps the consumer of research results to evaluate them and enables him to take rational decisions.

7.0.1. Research process:

Before embarking on the details of research methodology and techniques, it seems appropriate to present a brief overview of the research process. Research process consists of series of actions or steps necessary to effectively carry out research and the desired sequencing of these steps.

1. **Formulating the research problem:** There are two types of research problems, viz., those which relate to states of nature and those which relate to relationships between variables. At the very outset the researcher must single out

the problem he wants to study, i.e., he must decide the general area of interest or aspect of a subject-matter that he would like to inquire into. Initially the problem may be stated in a broad general way and then the ambiguities, if any, relating to the problem be resolved. Then, the feasibility of a particular solution has to be considered before a working formulation of the problem can be set up. The formulation of a general topic into a specific research problem, thus, constitutes the first step in a scientific enquiry. Essentially two steps are involved in formulating the research problem, viz., understanding the problem thoroughly, and rephrasing the same into meaningful terms from an analytical point of view.

The best way of understanding the problem is to discuss it with one's own colleagues or with those having some expertise in the matter. In an academic institution the researcher can seek the help from a guide who is usually an experienced man and has several research problems in mind. Often, the guide puts forth the problem in general terms and it is up to the researcher to narrow it down and phrase the problem in operational terms. In private business units or in governmental organisations, the problem is usually earmarked by the administrative agencies with whom the researcher can discuss as to how the problem originally came about and what considerations are involved in its possible solutions.

The researcher must at the same time examine all available literature to get himself acquainted with the selected problem. He may review two types of literature—the conceptual literature concerning the concepts and theories, and the empirical literature consisting of studies made earlier which are similar to the one proposed. The basic outcome of this review will be the knowledge as to what data and other materials are available for operational purposes which will enable the

researcher to specify his own research problem in a meaningful context. After this the researcher rephrases the problem into analytical or operational terms i.e., to put the problem in as specific terms as possible. This task of formulating, or defining, a research problem is a step of greatest importance in the entire research process. The problem to be investigated must be defined unambiguously for that will help discriminating relevant data from irrelevant ones. Care must, however, be taken to verify the objectivity and validity of the background facts concerning the problem. Professor W.A. Neiswanger correctly states that the statement of the objective is of basic importance because it determines the data which are to be collected, the characteristics of the data which are relevant, relations which are to be explored, the choice of techniques to be used in these explorations and the form of the final report. If there are certain pertinent terms, the same should be clearly defined along with the task of formulating the problem. In fact, formulation of the problem often follows a sequential pattern where a number of formulations are set up, each formulation more specific than the preceeding one, each one phrased in more analytical terms, and each more realistic in terms of the available data and resources

2. **Extensive literature survey:** Once the problem is formulated, a brief summary of it should be written down. It is compulsory for a research worker writing a thesis for a Ph.D. degree to write a synopsis of the topic and submit it to the necessary Committee or the Research Board for approval. At this juncture the researcher should undertake extensive literature survey connected with the problem. For this purpose, the abstracting and indexing journals and published or unpublished bibliographies are the first place to go to. Academic journals, conference proceedings, government reports, books etc., must be tapped depending on the nature of the problem. In this process, it should be remembered that one

source will lead to another. The earlier studies, if any, which are similar to the study in hand should be carefully studied. A good library will be a great help to the researcher at this stage.

3. **Development of working hypotheses**: After extensive literature survey, researcher should state in clear terms the working hypothesis or hypotheses. Working hypothesis is tentative assumption made in order to draw out and test its logical or empirical consequences. As such the manner in which research hypotheses are developed is particularly important since they provide the focal point for research. They also affect the manner in which tests must be conducted in the analysis of data and indirectly the quality of data which is required for the analysis. In most types of research, the development of working hypothesis plays an important role. Hypothesis should be very specific and limited to the piece of research in hand because it has to be tested. The role of the hypothesis is to guide the researcher by delimiting the area of research and to keep him on the right track. It sharpens his thinking and focuses attention on the more important facets of the problem. It also indicates the type of data required and the type of methods of data analysis to be used.

How does one go about developing working hypotheses? The answer is by using the following approach:

(a) Discussions with colleagues and experts about the problem, its origin and the objectives in seeking a solution;

(b) Examination of data and records, if available, concerning the problem for possible trends, peculiarities and other clues;

(c) Review of similar studies in the area or of the studies on similar problems; and

(d) Exploratory personal investigation which involves original field interviews on a limited scale with interested parties and individuals with a view to secure greater insight into the practical aspects of the problem.

Thus, working hypotheses arise as a result of a-priori thinking about the subject, examination of the available data and material including related studies and the counsel of experts and interested parties. Working hypotheses are more useful when stated in precise and clearly defined terms. It may as well be remembered that occasionally we may encounter a problem where we do not need working hypotheses, specially in the case of exploratory or formulative researches which do not aim at testing the hypothesis. But as a general rule, specification of working hypotheses in another basic step of the research process in most research problems.

4. **Preparing the research design**: The research problem having been formulated in clear cut terms, the researcher will be required to prepare a research design, i.e., he will have to state the conceptual structure within which research would be conducted. The preparation of such a design facilitates research to be as efficient as possible yielding maximal information. In other words, the function of research design is to provide for the collection of relevant evidence with minimal expenditure of effort, time and money. But how all these can be achieved depends mainly on the research purpose. Research purposes may be grouped into four categories, viz., (i) Exploration, (ii) Description, (iii) Diagnosis, and (iv) Experimentation. A flexible research design which provides opportunity for considering many different aspects of a problem is considered appropriate if the purpose of the research study is that of exploration. But when the purpose happens to be an accurate description of a situation or of an association between variables,

the suitable design will be one that minimises bias and maximises the reliability of the data collected and analysed.

5. **Determining sample design**: All the items under consideration in any field of inquiry constitute a 'universe' or 'population'. A complete enumeration of all the items in the 'population' is known as a census inquiry. It can be presumed that in such an inquiry when all the items are covered no element of chance is left and highest accuracy is obtained. But in practice this may not be true. Even the slightest element of bias in such an inquiry will get larger and larger as the number of observations increases. Moreover, there is no way of checking the element of bias or its extent except through a resurvey or use of sample checks. Besides, this type of inquiry involves a great deal of time, money and energy. Not only this, census inquiry is not possible in practice under many circumstances. For instance, blood testing is done only on sample basis. Hence, quite often we select only a few items from the universe for our study purposes. The items so selected constitute what is technically called a sample.

The researcher must decide the way of selecting a sample or what is popularly known as the sample design. In other words, a sample design is a definite plan determined before any data are actually collected for obtaining a sample from a given population. Thus, the plan to select 12 of a city's 200 drugstores in a certain way constitutes a sample design. Samples can be either probability samples or non-probability samples. With probability samples each element has a known probability of being included in the sample but the non-probability samples do not allow the researcher to determine this probability. Probability samples are those based on simple random sampling, systematic

sampling, stratified sampling, cluster/area sampling whereas non-probability samples are those based on convenience sampling, judgement sampling and quota sampling techniques.

6. **Collecting the data**: In dealing with any real life problem it is often found that data at hand are inadequate, and hence, it becomes necessary to collect data that are appropriate. There are several ways of collecting the appropriate data which differ considerably in context of money costs, time and other resources at the disposal of the researcher.

Primary data can be collected either through experiment or through survey. If the researcher conducts an experiment, he observes some quantitative measurements, or the data, with the help of which he examines the truth contained in his hypothesis. But in the case of a survey, data can be collected by any one or more of the following ways:

(i) By observation: This method implies the collection of information by way of investigator's own observation, without interviewing the respondents. The information obtained relates to what is currently happening and is not complicated by either the past behaviour or future intentions or attitudes of respondents. This method is no doubt an expensive method and the information provided by this method is also very limited. As such this method is not suitable in inquiries where large samples are concerned.

(ii) Through personal interview: The investigator follows a rigid procedure and seeks answers to a set of pre-conceived questions through personal interviews.

This method of collecting data is usually carried out in a structured way where output depends upon the ability of the interviewer to a large extent.

(iii) Through telephone interviews: This method of collecting information involves contacting the respondents on telephone itself. This is not a very widely used method but it plays an important role in industrial surveys in developed regions, particularly, when the survey has to be accomplished in a very limited time.

(iv) By mailing of questionnaires: The researcher and the respondents do come in contact with each other if this method of survey is adopted. Questionnaires are mailed to the respondents with a request to return after completing the same. It is the most extensively used method in various economic and business surveys. Before applying this method, usually a Pilot Study for testing the questionnaire is conduced which reveals the weaknesses, if any, of the questionnaire. Questionnaire to be used must be prepared very carefully so that it may prove to be effective in collecting the relevant information.

(v) Through schedules: Under this method the enumerators are appointed and given training. They are provided with schedules containing relevant questions. These enumerators go to respondents with these schedules. Data are collected by filling up the schedules by enumerators on the basis of replies given by respondents. Much depends upon the capability of enumerators so far as this method is concerned. Some occasional field checks on the work of the enumerators may ensure sincere work.

The researcher should select one of these methods of collecting the data taking into consideration the nature of investigation, objective and scope of the inquiry, finanical resources, available time and the desired degree of accuracy. Though he should pay attention to all these factors but much depends upon the ability and experience of the researcher. In this context Dr A.L. Bowley very aptly remarks that in collection of statistical data commonsense is the chief requisite and experience the chief teacher.

7. **Execution of the project**: Execution of the project is a very important step in the research process. If the execution of the project proceeds on correct lines, the data to be collected would be adequate and dependable. The researcher should see that the project is executed in a systematic manner and in time. If the survey is to be conducted by means of structured questionnaires, data can be readily machine-processed. In such a situation, questions as well as the possible answers may be coded. If the data are to be collected through interviewers, arrangements should be made for proper selection and training of the interviewers. The training may be given with the help of instruction manuals which explain clearly the job of the interviewers at each step. Occasional field checks should be made to ensure that the interviewers are doing their assigned job sincerely and efficiently. A careful watch should be kept for unanticipated factors in order to keep the survey as much realistic as possible. This, in other words, means that steps should be taken to ensure that the survey is under statistical control so that the collected information is in accordance with the pre-defined standard of accuracy. If some of the respondents do not cooperate, some suitable methods should be designed to tackle this problem. One method of dealing with the non-response problem is to make a list of the non-respondents and take a small sub-

sample of them, and then with the help of experts vigorous efforts can be made for securing response.

8. **Analysis of data:** After the data have been collected, the researcher turns to the task of analysing them. The analysis of data requires a number of closely related operations such as establishment of categories, the application of these categories to raw data through coding, tabulation and then drawing statistical inferences.

9. **Hypothesis-testing**: After analysing the data as stated above, the researcher is in a position to test the hypotheses, if any, he had formulated earlier. Do the facts support the hypotheses or they happen to be contrary? This is the usual question which should be answered while testing hypotheses. Various tests, such as Chi square test, t-test, F-test, have been developed by statisticians for the purpose. The hypotheses may be tested through the use of one or more of such tests, depending upon the nature and object of research inquiry. Hypothesis-testing will result in either accepting the hypothesis or in rejecting it. If the researcher had no hypotheses to start with, generalisations established on the basis of data may be stated as hypotheses to be tested by subsequent researches in times to come.

10. **Generalisations and interpretation**: If a hypothesis is tested and upheld several times, it may be possible for the researcher to arrive at generalisation, i.e., to build a theory. As a matter of fact, the real value of research lies in its ability to arrive at certain generalisations. If the researcher had no hypothesis to start with, he might seek to explain his findings on the basis of some theory. It is known as interpretation. The process of interpretation may quite often trigger off new questions which in turn may lead to further researches.

11. **Preparation of the report or the thesis**: Finally, the researcher has to prepare the report of what has been done by him. Writing of report must be done with great care keeping in view the following:

1. The layout of the report should be as follows: (i) the preliminary pages; (ii) the main text, and (iii) the end matter.

In its preliminary pages the report should carry title and date followed by acknowledgements and foreword. Then there should be a table of contents followed by a list of tables and list of graphs and charts, if any, given in the report.

The main text of the report should have the following parts:

(a) **Introduction**: It should contain a clear statement of the objective of the research and an explanation of the methodology adopted in accomplishing the research. The scope of the study along with various limitations should as well be stated in this part.

(b) **Summary of findings**: After introduction there would appear a statement of findings and recommendations in non-technical language. If the findings are extensive, they should be summarised.

(c) **Main report**: The main body of the report should be presented in logical sequence and broken-down into readily identifiable sections.

(d) **Conclusion**: Towards the end of the main text, researcher should again put down the results of his research clearly and precisely. In fact, it is the final summing up.

At the end of the report, appendices should be enlisted in respect of all technical data. Bibliography, i.e., list of books, journals, reports, etc., consulted, should also be given in the end. Index should also be given specially in a published research report.

2. Report should be written in a concise and objective style in simple language avoiding vague expressions such as 'it seems,' 'there may be', and the like.

3. Charts and illustrations in the main report should be used only if they present the information more clearly and forcibly.

4. Calculated 'confidence limits' must be mentioned and the various constraints experienced in conducting research operations may as well be stated.

8.0. Criteria of Good Research:

Whatever may be the types of research works and studies, one thing that is important is that they all meet on the common ground of scientific method employed by them. One expects scientific research to satisfy the following criteria:

1. The purpose of the research should be clearly defined and common concepts be used.

2. The research procedure used should be described in sufficient detail to permit another researcher to repeat the research for further advancement, keeping the continuity of what has already been attained.

3. The procedural design of the research should be carefully planned to yield results that are as objective as possible.

4. The researcher should report with complete frankness, flaws in procedural design and estimate their effects upon the findings.

5. The analysis of data should be sufficiently adequate to reveal its significance and the methods of analysis used should be appropriate. The validity and reliability of the data should be checked carefully.

6. Conclusions should be confined to those justified by the data of the research and limited to those for which the data provide an adequate basis.

7. Greater confidence in research is warranted if the researcher is experienced, has a good reputation in research and is a person of integrity.

In other words, we can state the qualities of a good research as under:

1. *Good research is systematic*: It means that research is structured with specified steps to be taken in a specified sequence in accordance with the well defined set of rules. Systematic characteristic of the research does not rule out creative thinking but it certainly does reject the use of guessing and intuition in arriving at conclusions.

2. *Good research is logical*: This implies that research is guided by the rules of logical reasoning and the logical process of induction and deduction are of great value in carrying out research. Induction is the process of reasoning from a part to the whole whereas deduction is the process of reasoning from some premise to a conclusion which follows from that very premise. In fact, logical reasoning makes research more meaningful in the context of decision making.

3. *Good research is empirical*: It implies that research is related basically to one or more aspects of a real situation and deals with concrete data that provides a basis for external validity to research results.

4. *Good research is replicable*: This characteristic allows research results to be verified by replicating the study and thereby building a sound basis for decisions.

DISSERTATION

UNIT II

THE LITERATURE REVIEW

1.0. What is a literature review?

The reasons for undertaking a literature review are numerous and include eliciting information for developing policies and evidence-based care, a step in the research process and as part of an academic assessment. Frequently-asked questions range from where to start, how to select a subject, and how many articles to include, to what is involved in a review of the literature.

A literature review is an objective, thorough summary and critical analysis of the relevant available research and non-research literature on the topic being studied (Hart, 1998). Its goal is to bring the reader up-to-date with current literature on a topic and form the basis for another goal, such as the justification for future research in the area. A good literature review gathers information about a particular subject from many sources. It is well written and contains few if any personal biases. It should contain a clear search and selection strategy (Carnwell and Daly, 2001). Good structuring is essential to enhance the flow and readability of the review. Accurate use of terminology is important and jargon should be kept to a minimum. Referencing should be accurate throughout (Colling, 2003).

1.0.1. Types of Literature Reviews:

1. **Traditional or Narrative literature review**

This type of review critiques and summarizes a body of literature and draws conclusions about the topic in question. The body of literature is made up of the relevant studies and knowledge that address the subject area. It is typically selective in the material it uses, although the criteria for selecting specific sources for review are not always apparent to the reader. This type of review is useful in gathering together a volume of literature in a specific subject area and summarizing and synthesizing it.

Its primary purpose is to provide the reader with a comprehensive background for understanding current knowledge and highlighting the significance of new research. It can inspire research ideas by identifying gaps or inconsistencies in a body of knowledge, thus helping the researcher to determine or define research questions or hypotheses. Beecroft et al (2006) argue that a sufficiently focused research question is essential before undertaking a literature review. Equally, however, it can help refine or focus a broad research question and is useful for both topic selection and topic refinement. It can also be helpful in developing conceptual or theoretical frameworks (Coughlan et al, 2007). In addition, literature reviews can be undertaken independently of a research study (Polit and Beck, 2006).

2. Systematic literature review

In contrast to the traditional or narrative review, systematic reviews use a more rigorous and well-defined approach to reviewing the literature in a specific subject area. Systematic reviews are used to answer well-focused questions about clinical practice.

Parahoo (2006) suggests that a systematic review should detail the time frame within which the literature was selected, as well as the methods used to evaluate and synthesize findings of the studies in question. In order for the reader to assess the reliability and validity of the review, the reviewer needs to present the precise criteria used to:

- Formulate the research question
- Set inclusion or exclusion criteria
- Select and access the literature
- Assess the quality of the literature included in the review
- Analyse, synthesize and disseminate the findings.

Unlike traditional reviews, the purpose of a systematic review is to provide as complete a list as possible of all the published and unpublished studies relating to a particular subject area. While

traditional reviews attempt to summarize results of a number of studies, systematic reviews use explicit and rigorous criteria to identify, critically evaluate and synthesize all the literature on a particular topic.

3. Meta-analysis

Meta-analysis is the process of taking a large body of quantitative findings and conducting statistical analysis in order to integrate those findings and enhance understanding. Meta-analysis is seen as a form of systematic review which is largely a statistical technique. It involves taking the findings from several studies on the same subject and analysing them using standardized statistical procedures. This helps to draw conclusions and detect patterns and relationships between findings (Polit and Beck, 2006).

4. Meta-synthesis

Meta-synthesis is the non-statistical technique used to integrate, evaluate and interpret the findings of multiple qualitative research studies. Such studies may be combined to identify their common core elements and themes. Findings from phenomenological, grounded theory or ethnographic studies may be integrated and used. Unlike meta-analysis, where the ultimate intention is to reduce findings, metasynthesis involves analysing and synthesizing key elements in

each study, with the aim of transforming individual findings into new conceptualizations and interpretations (Polit and Beck, 2006).

2.0. How to write a literature review?

Given the particular processes involved in systematic reviews, meta-analysis and meta-synthesis, the focus of the remainder of this article is on the steps involved in undertaking a traditional or narrative review of the literature. The first step involves identifying the subject of the literature review. The researcher undertaking a quantitative study may have decided this already. However, for the individual undertaking a non-research based literature review this will be the first step.

A. Selecting a review topic:

Selecting a review topic can be a daunting task for students and novice reviewers (Timmins and McCabe, 2005). A common error for novices is to select a review title that is all encompassing, such as 'the novels of Thomas Hardy'. Although this may be a useful initial strategy for determining how much literature is available, subjects such as these generate a considerable amount of data making a review infeasible. Therefore, it is advisable to refine this further so that the final amount of information generated is manageable. For example, to focus the topic of interest, consider what aspects of Hardy's novels are of particular significance. Is there a specific element of this topic that is of interest, such as thematic, structural, or symbolic? Identifying

what exactly is of interest and why can help refine the topic (Hendry and Farley, 1998). Talking to other researchers, or reading around a topic can also help to identify what areas of the subject the reviewer is interested in and may help indicate how much information exists on the topic (Timmins and McCabe, 2005).

Having sufficient literature is also important, particularly when the review is an academic assignment. These academic exercises usually have short deadlines, so having enough literature is key from the perspective of being able to do the review and submit it on time. Attempting to change the topic close to the deadline for submission is usually a recipe for disaster so select an area that will hold your interest and ensure that there is enough data to meet your needs.

Literature reviews that are part of academic coursework usually have strictly enforced word limits and it is important to adhere to that limit. Topics that are too broad will result in reviews that are either too long or too superficial. As a rule of thumb, it is better to start with a narrow and focused topic, and if necessary broaden the scope of the review as you progress. It is much more difficult to cut content successfully, especially if time is short.

B. Searching the literature:

Having selected a topic the next step is to identify, in a structured way, the appropriate and related information. A systematic approach is considered most likely to generate a review that will be beneficial in

informing practice (Hek and Langton, 2000). While a narrative or traditional review is not the same as a systematic review, its principles and structure may be helpful in determining your approach (Timmins and McCabe, 2005). Newell and Burnard (2006) suggest that comprehensiveness and relevance are what reviewers need to consider and add that the more specific the topic or question being searched is, the more focused the result will be.

Nowadays, literature searches are undertaken most commonly using computers and electronic databases. Computer databases offer access to vast quantities of information, which can be retrieved more easily and quickly than using a manual search (Younger, 2004). There are numerous electronic databases, many of which deal with specific fields of information. It is important therefore to identify which databases are relevant to the topic. University and State libraries often subscribe to a number of databases and access can be gained using student or staff passwords.

Existing literature reviews and systematic reviews can also be important sources of data. They can offer a good overview of the research that has been undertaken, so that the relevance to the present work can be determined. They also offer the bibliographic references for those works that can be accessed (Ely and Scott, 2007). Manual searches of journals that are specifically related to the topic of interest or those that are likely to cover the topic can also be performed. This can be a slow but often rewarding way of sourcing articles (Hek and Moule, 2006). As with all of the above search methods, a maximum

time frame of 5–10 years is usually placed on the age of the works to be included. This is usually determined by the amount of available information. Seminal or influential works are the exception to this rule (Paniagua, 2002).

Source	**Definition**
a. Primary source	Usually a report by the original researchers of a study
b. Secondary source	Description or summary by somebody other than the original researcher, e.g. a review article
c. Conceptual/theoretical Papers	concerned with description or analysis of theories or concepts associated with the topic
d. Anecdotal/opinion/clinical	Views or opinions about the subject that are not research, review or theoretical in nature. Clinical may be case studies or reports from clinical settings

From: Colling (2003)

Generally, journals are regarded as being more up-to-date than books as sources of information. Books can be dated due to the length of time it takes for publication.

However, this does not mean they should be excluded as they are an acceptable and valuable source of information.

C. Analyzing and synthesizing the literature:

At this point of the process, what has been determined as appropriate literature will have been gathered. While the focus of the literature may vary depending on the overall purpose, there are several useful strategies for the analysis and synthesis stages that will help the construction and writing of the review.

Initially, it is advisable to undertake a first read of the articles that have been collected to get a sense of what they are about. Most published articles contain a summary or abstract at the beginning of the paper, which will assist with this process and enable the decision as to whether it is worthy of further reading or inclusion. At this point, it may also be of benefit to undertake an initial classification and grouping of the articles by type of source.

Once the initial overview has been completed it is necessary to return to the articles to undertake a more systematic and critical review of the content. It is recommended that some type of structure is adopted during this process such as that proposed by Cohen (1990). This simple method is referred to as the preview, question, read, summarize (PQRS) system and it not only keeps you focussed and consistent but ultimately facilitates easy identification and retrieval of

material particularly if a large number of publications are being reviewed.

Following the preview stage, a reviewer may end up with four stacks of articles that are deemed relevant to the purpose of the review. Although some papers may have been discarded at this point, it is probably wise to store them should you need to retrieve them at a later stage.

In the question stage, questions are asked of each publication. Here several writers have suggested using an indexing or summary system (or a combination of both) to assist the process (Patrick and Munro, 2004; Polit and Beck, 2004; Timmins and McCabe, 2005; Burns and Grove, 2007). Although there are slight variations in the criteria proposed in the indexing and summary systems, generally they are concerned with the title of the article, the author, the purpose and methodology used in a research study, and findings and outcomes. It is also useful to incorporate comments or key thoughts on your response to the article after it has been reviewed. For the purpose of good record keeping, it is suggested that the source and full reference are also included. It can be very frustrating trying to locate a reference or a key point among a plethora of articles at a later stage. As it is likely that not all of the articles will be primary sources, you may wish to adapt your summary system to accommodate other sources, such as systematic reviews or non-research literature.

Like primary sources, not all reviews classed as secondary sources are the same. For example, systematic reviews follow strict criteria and are appraised on those (Parahoo, 2006). However, there are reviews that simply present a perspective on a topic or explore the relevance of a concept for practice. Some theoretical papers, such as concept, analysis may fall into this bracket. If appraised against the criteria for evaluating systematic reviews, these publications would be found lacking in this area. Therefore, an important first step in the appraisal of a review is to determine its original purpose and perspective. In this way it will be possible to determine appropriate evaluation questions.

Evaluating non-research and non-review publications can be complex. These publications can extend from papers claiming to address issues of theoretical importance to practice, research or education, personal opinion or editorials, or case studies to name but a few. As with the other types of sources, a key factor is to determine the purpose of the paper and evaluate the claims to significance that are being made. Hek and Langton (2000) focussed on the criteria of quality, credibility and accuracy when appraising this type of literature. Quality and credibility encompassed issues related to the journal, the processes of peer review, the standing of the author(s) and the claims being made. In addition, content is judged for its accuracy and its coherence with what is already known on the subject.

The final stage of appraisal is to write a short summary of each article and may include key thoughts, comments, strengths and weaknesses of the publication. It should be written in your own words to facilitate

your understanding of the material. It also forms a good basis for the writing of the review.

D. Writing the review:

Once the appraisal of the literature is completed consideration must be given to how the review will be structured and written. The key to a good academic paper is the ability to present the findings in such a way that it demonstrates your knowledge in a clear and consistent way. The basis of good writing is to avoid long and confusing words and keep jargon to a minimum. Sentences should be kept as short as possible with one clear message and spelling and grammar should be accurate and consistent with the form of English being used. Many universities provide facilities for developing and improving writing skills and it is a good idea to try to attend such a course. Study skills books, such as that of Ely and Scott (2007), offer some good tips for writing competently.

The organization of material in an objective manner and the structure of the review are crucial to its comprehensiveness. To some extent, the structure will depend on the purpose of the review. For example, systematic reviews have a clear structure that must be followed and that will dictate for the most part how the writing should be undertaken. However, for most students or practitioners a review is either part of a coursework assignment, research proposal or research dissertation, and as such, there is some freedom in how the writing is

structured. Nonetheless, it is important to be logical and there are some key elements that need to be included in all literature reviews.

Primarily, the written report should include an introduction, body and conclusion (Burns and Grove, 2007). The length of literature reviews vary and word limits and assignment criteria must be considered in the overall construction. If it is a stand alone review, an abstract may also be necessary. An abstract is a short summary of the findings of the review and is normally undertaken last (Hendry and Farley, 1998).

- **Introduction:**

  The introduction should include the purpose of the review and a brief overview of the 'problem'. It is important that the literature sources and the key search terms are outlined. Any limits, boundaries or inclusion/exclusion criteria should be clearly described. Some comment on what was found in the literature should be offered, that is, whether there was a dearth or wealth of literature on the topic. This gives the reader some insight into the breadth and depth of the literature sourced and also facilitates some judgement as to the validity of the claims being made.

- **Main Body:**

  The main body of the report presents and discusses the findings from the literature. There are several ways in which this can be

done. Regardless of the manner in which the main body of the review is framed, there are key points that must be considered. Literature that is central to the topic should be analysed indepth here. When discussing empirical or research literature a critical review of the methodologies used should be included. Care must be taken, however, that the review does not end up just as a description of a series of studies. In addition, it is best to avoid broad sweeping statements about the conclusiveness of research studies. Polit and Beck (2006) suggest that when describing a study's findings it is best to use language that indicates the tentativeness of the results rather than making definite statements about the research. Similarly, it is necessary for the reviewer to remain objective about the literature and personal opinions about the quality of research studies should not be included. Neither should it be a series of quotes or descriptions but needs to be written succinctly in the writer's own words.

The reader should know that the reviewer has understood and synthesized the relevant information, rather than merely describing what other authors have found. The review should read like a critical evaluation of the information available on the topic, highlighting and comparing results from key sources. If using a thematic approach, the account should flow logically from one section or theme to the next, to maintain continuity and consistency (Beyea and Nicholl, 1998). This can be

achieved by summarizing each theme or section and outlining how it is related to the ensuing one.

In respect of theoretical literature, consensus or difference regarding the topic should be outlined. Sometimes, where the theoretical literature dominates and there are few studies undertaken in the area of interest, the review may include an analysis of methodologies used across the studies. Inconsistencies and contradictions in the literature should also be addressed (Colling, 2003) as should the strengths and weaknesses inherent in the body of literature. The role of the reviewer is to summarize and evaluate evidence about a topic, pointing out similarities and differences and offering possible explanations for any inconsistencies uncovered (Polit and Beck, 2006).

- **Conclusion:**

The review should conclude with a concise summary of the findings that describes current knowledge and offer a rationale for conducting future research. In a review, which forms part of a study, any gaps in knowledge that have been identified should lead logically to the purpose of the proposed study. In some cases, it may also be possible to use the developed themes to construct a conceptual framework that will inform the study. In all reviews, some recommendations or implications for practice, education and research should be included.

- **References:**

The literature review should conclude with a full bibliographical list of all the books, journal articles, reports and other media, which were referred to in the work. Regardless of whether the review is part of a course of study or for publication, it is an essential part of the process that all sourced material is acknowledged. This means that every citation in the text must appear in the reference/bibliography and vice versa. Omissions or errors in referencing are very common and students often lose vital marks in assignment because of it. A useful strategy is to create a separate file for references and each time a publication is cited, it can be added to this list immediately.

Some universities offer their students access to referencing systems, such as Endnote, and while they may initially appear difficult to learn they are worth the effort later in terms of ensuring the reference list is accurate. Remember, the reference list may be a useful source of literature for others who are interested in studying this topic (Coughlan et al, 2007), and, therefore, every effort should be made to ensure it is accurate.

3.0. Sample Literature review:

Here is an example of a Literature review, on the subject of *Language & Gender*. It was written by Alastair Pennycook, as an example for his students.
http://ecdev.hku.hk/acadgrammar/litrev/examples/three.htm

After reading this, Work out:

1. The comparison the writer establishes in the review

2. The sequence to his review (why that sequence?)

3. What the writer's own perspective is

Note:

1. The use the writer makes of each of the sources he refers to.

2. How, in his language particularly, he avoids a "black and white", right/wrong type of judgment of the positions he reviews.

Language and Gender: a brief literature review

With the general growth of feminist work in many academic fields, it is hardly surprising that the relationship between language and gender has attracted considerable attention in recent years. In an attempt to go beyond "folklinguistic" assumptions about how men and women use language (the assumption that women

are "talkative", for example), studies have focused on anything from different syntactical, phonological or lexical uses of language to aspects of conversation analysis, such as topic nomination and control, interruptions and other interactional features. While some research has focused only on the description of differences, other work has sought to show how linguistic differences both reflect and reproduce social difference. Accordingly, Coates (1988) suggests that research on language and gender can be divided into studies that focus on dominance and those that focus on difference.

Much of the earlier work emphasized dominance. Lakoff's (1975) pioneering work suggested that women's speech typically displayed a range of features, such as tag questions, which marked it as inferior and weak. Thus, she argued that the type of subordinate speech learned by a young girl "will later be an excuse others use to keep her in a demeaning position, to refuse to treat her seriously as a human being" (1975, p.5). While there are clearly some problems with Lakoff's work - her analysis was not based on empirical research, for example, and the automatic equation of subordinate with `weak' is problematic - the emphasis on dominance has understandably remained at the Centre of much of this work. Research has shown how men nominated topics more, interrupted more often, held the floor for longer, and so on (see, for example, Zimmerman and West, 1975). The chief focus of this approach, then, has been to show how patterns of interaction between men and women reflect the dominant position of men in society.

Some studies, however, have taken a different approach by looking not so much at power in mixed-sex interactions as at how same-sex groups produce certain types

of interaction. In a typical study of this type, Maltz and Borker (1982) developed lists of what they described as men's and women's features of language. They argued that these norms of interaction were acquired in same-sex groups rather than mixed-sex groups and that the issue is therefore one of (sub-)cultural miscommunication rather than social inequality. Much of this research has focused on comparisons between, for example, the competitive conversational style of men and the cooperative conversational style of women.

While some of the more popular work of this type, such as Tannen (1987), lacks a critical dimension, the emphasis on difference has nevertheless been valuable in fostering research into gender subgroup interactions and in emphasizing the need to see women's language use not only as ‘subordinate’ but also as a significant subcultural domain.

Although Coates' (1988) distinction is clearly a useful one, it also seems evident that these two approaches are by no means mutually exclusive. While it is important on the one hand, therefore, not to operate with a simplistic version of power and to consider language and gender only in mixed-group dynamics, it is also important not to treat women's linguistic behaviour as if it existed outside social relations of power. As Cameron, McAlinden and O'Leary (1988) ask, "Can it be coincidence that men are aggressive and hierarchically-organized conversationalists, whereas women are expected to provide conversational support?" (p.80). Clearly, there is scope here for a great deal more research that

• is based on empirical data of men's and women's speech;

• operates with a complex understanding of power and gender relationships (so that women's silence, for example, can be seen both as a site of oppression and as a site of possible resistance);

• looks specifically at the contexts of language use, rather than assuming broad gendered differences;

• involves more work by men on language and gender, since attempts to understand male uses of language in terms of difference have been few (thus running the danger of constructing men's speech as the ‘norm’ and women's speech as ‘different’);

• aims not only to describe and explain but also to change language and social relationships.

References

Cameron, D., F. McAlinden and K. O'Leary (1988). "Lakoff in context: the social and linguistic function of tag questions." In J. Coates and D. Cameron (op. cit.). pp. 74-93.

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Lakoff, R. (1975) Language and Woman's Place. New York: Harper and Row Maltz, D.N. and R.A. Borker (1982). "A cultural approach to male-female

miscommunication." In J. Gumperz (Ed.), Language and social identity. Cambridge: Cambridge U.P.

Tannen, D. (1987). That's not what I meant. London: Dent.

Zimmerman, D. & C. West (1975) "Sex roles, interruptions and silences in conversation." In B. Thorne & N. Henley (Eds.) Language and sex: difference and dominance. Rowley, Mass: Newbury House.

Sample 2:

In the literature it is recognised that a dichotomy exists between agricultural and business marketing because the marketing management approach is not prominent in agricultural marketing theory. Bateman (1976) suggests that agricultural marketing has traditionally incorporated everything that happens between the farm gate and the consumer, therefore encompassing areas which 'the purist' may not consider marketing. While analysis of government intervention and policy form the focus of agricultural marketing theory, studies of the objectives and decisions confronting individual businesses are central to business marketing theory.

Muelenberg (1986) also identifies the gap existing between the two disciplines. He notes that agricultural marketing theory has not adopted the marketing management approach of business marketing theory or examined competitive strategy in the same way as business literature. According to Richardson (1986) the marketing management approach (which he refers to as the agribusiness concept)

has “gained very little acceptance … and no significant analytical or research results” in the area of agricultural marketing (100). However, it appears that parts of agricultural marketing theory seem to be moving towards the marketing management approach.

Breimyer (1973) was the first to identify an agricultural marketing school of thought focusing on business marketing theory, and this school of thought seems to be growing more prominent. For example Watson (1983) acknowledges that during the 1970s a minor paradigm shift occurred in agricultural marketing with a move towards business marketing. He notes how successive editions of Kohl’s agricultural marketing textbook (1972 and 1980) have changed to describe the marketing concept. Muelenberg (1986) points out a number of agricultural marketeers who have partially incorporated the marketing management approach, but mainly focus on the behaviour of agribusiness companies (e.g. Bresch 1981; Yon 1976), rather than individual farm firms.

Ritson (1986) argues that agricultural marketing theory should focus on government policy, because in European agriculture parts of the marketing mix which would normally be undertaken by individual businesses are controlled by the government. In some countries, marketing boards have exclusive control of the price, place and promotion of agricultural products. These organisations supposedly carry out many marketing management practices on behalf of business including farm firms.

Although central control or government intervention may limit the marketing options available to individual business, farm firms still have some control over their marketing mix and production decisions. The presence of government intervention or marketing activity does not preclude or excuse individual business firms from any marketing activity or strategic process associated with the market place. In business marketing theory the external environment has a major influence on the marketing activities of most firms.

The apparent differences between agricultural marketing and business marketing theories may not present a problem because both disciplines examine issues which are likely to require different theories and techniques for analysis. However, concern must be expressed at the failure of researchers to comprehensive examine the marketing strategies undertaken by individual farm businesses. Businesses in the agricultural sector include farmers and other often larger and more sophisticated agribusinesses, such as input suppliers and merchants. Business literature contains published articles examining the marketing strategies of large agribusiness companies; however, little research appears to reach down to the farm business level.

**** Notice the "Gap" (italicised passages). Notice also how the research begins by focussing on the main topic area and then narrowing down to the gap in the research. The writer will then go on to formally state the research question and outline their thesis statement.**

4.0. Quick guidelines on how to write a literature review:

What is a literature review?

The aim of a literature review is to show your reader (your tutor) that you have read, and have a good grasp of, the main published work concerning a particular topic or question in your field. This work may be in any format, including online sources. It may be a separate assignment, or one of the introductory sections of a report, dissertation or thesis. In the latter cases in particular, the review will be guided by your research objective or by the issue or thesis you are arguing and will provide the framework for your further work.

It is very important to note that your review should not be simply a description of what others have published in the form of a set of summaries, but should take the form of a critical discussion, showing insight and an awareness of differing arguments, theories and approaches. It should be a synthesis and analysis of the relevant published work, linked at all times to your own purpose and rationale.

According to Caulley (1992) of La Trobe University, the literature review should:

- compare and contrast different authors' views on an issue
- group authors who draw similar conclusions
- criticise aspects of methodology
- note areas in which authors are in disagreement

• highlight exemplary studies
• highlight gaps in research
• show how your study relates to previous studies
• show how your study relates to the literature in general
• conclude by summarizing what the literature says

The purposes of the review are:

• to define and limit the problem you are working on
• to place your study in an historical perspective
• to avoid unnecessary duplication
• to evaluate promising research methods
• to relate your findings to previous knowledge and suggest further research

A good literature review, therefore, is critical of what has been written, identifies areas of controversy, raises questions and identifies areas which need further research.

Structure of the literature review

The overall structure of your review will depend largely on your own thesis or research area. What you will need to do is to group together and compare and contrast the varying opinions of different writers on certain topics. What you must not do is just describe what one writer says, and then go on to give a general overview of another writer, and then another, and so on. Your structure should be dictated instead by topic areas, controversial issues or by questions to which there are varying approaches and theories. Within each of

these sections, you would then discuss what the different literature argues, remembering to link this to your own purpose.

Linking words are important. If you are grouping together writers with similar opinions, you would use words or phrases such as:

similarly, in addition, also, again

More importantly, if there is disagreement, you need to indicate clearly that you are aware of this by the use of linkers such as:

however, on the other hand, conversely, nevertheless

At the end of the review you should include a summary of what the literature implies, which again links to your hypothesis or main question.

Writing the review

You first need to decide what you need to read. In many cases you will be given a booklist or directed towards areas of useful published work. Make sure you use this help. With dissertations, and particularly theses, it will be more down to you to decide. It is important, therefore, to try and decide on the parameters of your research. What exactly are your objectives and what do you need to find out? In your review, are you looking at issues of theory, methodology, policy, quantitative research, or what? Before you start reading it may be useful to compile a list of the main areas and questions involved, and then read with the purpose of finding out about or answering

these. Unless something comes up which is particularly important, stick to this list, as it is very easy to get sidetracked, particularly on the internet.

A good literature review needs a clear line of argument. You therefore need to use the critical notes and comments you made whilst doing your reading to express an academic opinion. Make sure that:

• you include a clear, short introduction which gives an outline of the review, including the main topics covered and the order of the arguments, with a brief rationale for this.

• there is always a clear link between your own arguments and the evidence uncovered in your reading. Include a short summary at the end of each section.
Use quotations if appropriate.

• you always acknowledge opinions which do not agree with your thesis. If you ignore opposing viewpoints, your argument will in fact be weaker.

Your review must be written in a formal, academic style. Keep your writing clear and concise, avoiding colloquialisms and personal language. You should always aim to be objective and respectful of others' opinions; this is not the place for emotive language or strong personal opinions. If you thought something was rubbish, use words such as "inconsistent", "lacking in certain areas" or "based on false assumptions"! (See Guide 1.21)

When introducing someone's opinion, don't use "says", but instead an appropriate verb which more accurately reflects this viewpoint, such as "argues", "claims" or "states". Use the present tense for general opinions and theories, or the past when referring to specific research or experiments:

Although Trescothick (2001) argues that attack is the best form of defence, Boycott (1969) claims that...

In a field study carried out amongst the homeless of Sydney, Warne (1999) found that...

And remember at all times to avoid plagiarizing your sources. Always separate your source opinions from your own hypothesis. Making sure you consistently reference the literature you are referring to. When you are doing your reading and making notes, it might be an idea to use different colors to distinguish between your ideas and those of others.

Final checklist

Here is a final checklist, courtesy of the University of Melbourne:

Selection of Sources

Have you indicated the purpose of the review?
Are the parameters of the review reasonable?
Why did you include some of the literature and exclude others?
Which years did you exclude?

Have you emphasized recent developments?

Have you focused on primary sources with only selective use of secondary sources?

Is the literature you have selected relevant?

Is your bibliographic data complete?

Critical Evaluation of the Literature

Have you organized your material according to issues?

Is there a logic to the way you organized the material?

Does the amount of detail included on an issue relate to its importance?

Have you been sufficiently critical of design and methodological issues?

Have you indicated when results were conflicting or inconclusive and discussed possible reasons?

Have you indicated the relevance of each reference to your research?

Interpretation

Has your summary of the current literature contributed to the reader's understanding of the problems?

Does the design of your research reflect the methodological implications of the literature review?

Note

The literature review will be judged in the context of your completed research.

The review needs to further the reader's understanding of the problem and whether it provides a rationale for your research.

DISSERTATION

UNIT III

WRITING A DISSERTATION

1.0. What is a dissertation?

A thesis (Often Bachelors/Masters) or dissertation (often Doctoral) is a document submitted in support of candidature for an academic degree or professional qualification presenting the author's research and findings. In some contexts, the word "thesis" or a cognate is used for part of a bachelor's or master's course, while "dissertation" is normally applied to a doctorate, while in other contexts, the reverse is true. The term graduate thesis is sometimes used to refer to both master's theses and doctoral dissertations. Dissertations and theses may be considered to be grey literature.

In academic papers, an effective thesis should generally answer the "how", "what", and "so what." It should be a statement that represents an argument, yet is refutable by the reader.

The required complexity and/or quality of research of a thesis or dissertation can vary by country, university and/or program, therefore, the required minimum study period may vary significantly in duration.

The word dissertation can at times be used to describe a treatise without relation to obtaining an academic degree. The term thesis is also used to refer to the general claim of an essay or similar work.

The term "thesis" comes from the Greek θέσις, meaning "something put forth", and refers to an intellectual proposition. "Dissertation" comes from the Latin dissertātiō, meaning "path".

1.0.1. Structure and Presentation Style of a dissertation:

A thesis (or dissertation) may be arranged as a thesis by publication or a monograph, with or without appended papers respectively. An ordinary monograph has a title page, an abstract, a table of contents, comprising the various chapters (introduction, literature review, findings, etc.), and a bibliography or (more usually) a references section. They differ in their structure in accordance with the many different areas of study (arts, humanities, social sciences, technology, sciences, etc.) and the minimal differences between them. In a thesis by publication, the chapters constitute an introductory and comprehensive review of the appended published and unpublished article documents.

Dissertations normally report on a research project or study, or an extended analysis of a topic. The structure of the thesis or dissertation explains the purpose, the previous research literature which impinges on the

topic of the study, the methods used and the findings of the project. Most world universities use a multiple chapter format:

a) An introduction, which introduces the research topic, the methodology, as well as its scope and significance;

b) A literature review, reviewing relevant literature and showing how this has informed the research issue;

c) A methodology chapter, explaining how the research has been designed and why the research methods/population/data collection and analysis being used have been chosen;

d) A findings chapter, outlining the findings of the research itself;

e) An analysis and discussion chapter, analyzing the findings and discussing them in the context of the literature review (this chapter is often divided into two—analysis and discussion);

f) A conclusion.

2.0. Choosing a Topic:

While some students come to their research project with a clear research question to address, many others arrive at this point with several ideas, but with no specific research question. In view of the pressure to get started fairly quickly, this can cause anxiety and even panic. It is, however, a common situation to be in. There are several ways forward:

- Talk to others: what topics are other students considering? Does this spark an interest? Don't wait until you have a fully formed research question before discussing your ideas with others, as their comments and questions may help you to refine your focus.

- Look at other writing: set aside some time to spend in the library, skimming through the titles of research papers in your field over the past five years, and reading the abstracts of those you find most interesting.

- Look through the dissertations of previous students in your department: the topics may give you inspiration, and they may have useful suggestions for further research.

- Think about your own interests: which topic have you found most interesting, and is there an element that could be developed into a research project?

- Is there a related topic of interest to you that has not been covered in the syllabus, but would fit with the theory or methodology you have been working with?

- Be extra critical: is there something in your course so far that you have been sceptical about, or which you think needs further study?

- Read about an interesting topic and keep asking the question ‘Why?’ :this may identify a research question you could address.

Remember that a research study can:

- replicate an existing study in a different setting;

- explore an under-researched area;

- extend a previous study;

- review the knowledge thus far in a specific field;

- develop or test out a methodology or method;

- address a research question in isolation, or within a wider programme of work; or

- apply a theoretical idea to a real world problem.

This list is not exhaustive, and you need to check whether your department has a preference for particular kinds of research study.

Discuss your proposed topic with a member of academic staff who you think might be appropriate to supervise the project. Provided they feel that they know enough about the subject to supervise it, and provided that it can be interpreted as falling within the broad fields of your degree subject, academic staff are generally open to suggestions.

You should think realistically about the practical implications of your choice, in terms of:

- the time requirement;
- necessary travelling;
- access to equipment or room space;
- access to the population of interest; and
- possible costs.

For example, a project on coal mining in the Odisha may require you to visit Record Offices, or to interview coal miners from the region. Is this something that you are prepared and able to do? If the practical

considerations associated with your research ideas are unrealistic, you need to consider whether you are willing to modify or reconsider your project.

3.0. Developing a Research Question:

Once your topic has been accepted by your department, you need to begin the process of refining the topic and turning it into something that is focused enough to guide your project. Try describing it as a research problem that sets out:

- the issue that you are going to be investigating;
- your argument or thesis (what you want to prove, disprove, or explore); and
- the limits of your research (i.e. what you are not going to be investigating).

It is important that you establish a research problem at, or close to the start of, your project. It is one of the key tools you have, to ensure that your project keeps going in the right direction. Every task you undertake should begin with you checking your research problem and asking "will this help me address this problem?"

You should be willing to revise your research problem as you find out more about your topic. You may, for example, discover that the data you

were hoping to analyze is not available, or you may encounter a new piece of information or a new concept while undertaking a literature search, that makes you rethink the basis of your research problem. You should always talk to your supervisor before you make any substantial revision to your plans, and explain why you think you need to make the change.

Research Problem	Commentary
• "Public transport in Scotland"	This sets out your research field but does not frame a research problem because it is too general. You do not have time to study everything about a topic, so you should focus on an aspect that you are interested in.
• "Examination of the influence of public transport links on new housing development in Western Scotland"	This is a much better research problem as it establishes an argument (existence of public transport may have some influence on new housing development). However, it is still quite general and could be improved by further focus.
• "Investigation of the relationship between public transport links and the development of new areas of housing in Western Scotland: a comparison of local plans and building development since 1990"	This is better still. It shows the limits of the project. You will be investigating a complex subject (public transport in Scotland), but will be focusing on only one aspect of it (possible influence on new housing development). You will make this large subject manageable by focusing on a limited period of time (1990 onwards), and limited sources.

4.0. Effective Planning of the Research:

4.0.1. Writing a Research proposal:

A research proposal is a more detailed description of the project you are going to undertake. Some departments require you to submit a research proposal as part of the assessment of your dissertation, but it is worth preparing one even if it is not a formal requirement of your course. It should build on the thinking that you have done in defining your research problem; on the discussions that you have had with your supervisor; and on early reading that you have done on the topic. A comprehensive research proposal will make you think through exactly what it is that you are going to do, and will help you when you start to write up the project.

You could try outlining your project under the following headings (Booth, Williams, & Colomb, 2003. The craft of research. Chicago: The University of Chicago Press.):

Topic: this project will study...

Question/problem: to find out...

Significance: so that more will be known about...

Primary resources: the main data will be...

Secondary sources: additional data comes from...

Methods: the research will be conducted as follows...

Justification: the method is most appropriate because...

Limitations: there are some matters that this methodology may not help me to explain. These might include...

You may find that some of these headings are difficult to fill in right at the start of your project. However, you can use the gaps to help identify where you need to begin work. If, for example, you are unsure about the limitations of your methodology you should talk to your supervisor and read a bit more about that methodology before you start.

4.0.2. Creating a Research Plan:

A dissertation is an extended project that asks you to manage your time and undertake a variety of tasks. Some courses schedule the dissertation at the end, while others have it running along concurrently with other modules. Whichever way your course is organized, it is essential that you create a plan that helps you allocate enough time to each task you have to complete.

It is useful to work out how many weeks you have until you need to submit your completed dissertation, and draw a chart showing these weeks. Block out the weeks when you know you will be unable to work, and mark in other main commitments you have that will take time during this period. Then allocate research tasks to the remaining time.

January

Christmas	Write Research Proposal	Literature Review	Complete Literature Review and conduct pilot study	Main data collection

February

Complete data collection	Analyze data	Analyze data	Write dissertation plan, then begin first draft

March

Complete first draft	Discuss draft with supervisor	Second draft	Second draft	Proofing/checking

It is very important to be realistic about how long each task is likely to take. Some focused thought at the beginning, then at the planning stage of each phase, could save hours later on. Write down the resources needed for each stage. It could be time in the library; the resource of your working hours; or the use of equipment or room space that needs to be booked in advance.

4.0.3. Procrastination:

Some people find that they procrastinate more than they would like. This is a common problem, so it is probably best to be well-prepared to identify it and deal with it if it does start to happen. People procrastinate for various reasons for example:

- poor time management
- dauted by the scale of the task
- negative beliefs
- loss of motivation
- perfectionism
- difficulty concentrating
- need to feel under pressure
- personal problems

Early identification of the signs of procrastination will give you the best chance of minimising any negative effects. Once you suspect that you are procrastinating, it can be helpful to review what you are expecting of

yourself, and check that those expectations are realistic. This is where planning is vital.

4.0.4. Realistic Planning:

To improve the prospect of completing on time, and avoiding procrastination, you need to:

- be realistic about when you can/will start;
- devote time to planning and revising your plan;
- try to work out if any of your research will take a set amount of time to complete;
- allocate appropriate time for any travelling you need to do for your research;
- include other (non-dissertation related) things that you have to do between now and then;
- have clear and achievable objectives for each week;
- focus on one thing at a time;

- leave time for editing and correcting;
- reward yourself when you complete objectives that you have timetabled; and
- if you fall behind make sure you spend time reworking your plan.

Your research plan should also include information about what equipment you will need to complete your project, and any travel costs or other expenses that you are likely to incur through the pursuit of your research. You should also think about whether you are dependent on any one else to complete your project, and think about what you are going to do if they are unable to help you.

Once you have created your plan it is a good idea to show it to someone else. Ideally you will be able to show it to a member of academic staff or bring it to the Learning Development, but talking it over with a friend may also help you to spot anything that you have forgotten or anywhere that you have been unrealistic in your planning.

5.0. Being organized and methodical while conducting you research:

5.0.1. The Role of the Supervisor:

Although a dissertation is an opportunity for you to work independently, you will usually be allocated a member of academic staff as a

supervisor. Supervisors are there to help you shape your ideas and give you advice on how to conduct the research for your dissertation. They are not there to teach you the topic you have chosen to investigate: this is your project. They are, however, one of the resources that you can call on during your research.

Academics are busy people, so to get the most out of your supervisor you will need to be organised and to take responsibility for the relationship. It is not your supervisor's job to chase you into completing your dissertation, or to tell you how to manage the different stages of the project. To ensure that you get the most out of your supervisor you need to:

- agree a timetable of meetings at the start of your project and stick to it;
- make sure that each meeting has a focus e.g. "setting a research problem", "analysing the data";
- send something that can form the basis of a discussion about your progress to your supervisor before each meeting. This could include your research plan, early results of your data collection or draft chapters;
- turn up on time to each meeting you have arranged. Do not assume that your supervisor is available at all times to see you;
- at the end of each supervision agree some action points for you to focus on before the next time you meet; and

- keep a record of what you decide in supervision sessions.

If you are not happy with the way you are being supervised, explain why to your supervisor or discuss the issue with your personal tutor.

5.0.2. Undertaking a literature survey:

Regardless of whether you have been given a dissertation topic or you have developed your own ideas, you will need to be able to demonstrate the rationale for your research, and to describe how it fits within the wider research context in your area. To support you in doing this you will need to undertake a literature review, which is a review of material that has already been published, either in hard copy or electronically, that may be relevant for your research project. Key tools that are available to help you, include:

- internet search engines, especially ones that offer advanced search features (see http://www.google.com/ and http://scholar.google.com/);

- the University of Leicester Library Catalogue;

- electronic journals available via the library; and

- bibliographies in any key texts about your topic.

It is a good idea to make an appointment to see the librarian specializing in your subject. An information librarian should be able to give you advice on your literature search, and on how to manage the information that you generate.

You will probably generate more references than you can read. Use the titles and abstracts to decide whether the reference is worth reading in detail. Be selective by concentrating on references that:

- are recommended by your supervisor;
- contain a high number of specifically relevant keywords;
- are cited in a number of other works; and
- are published in the last five years, unless they are key texts in your field

. Once you start reading, ensure that you think about what you are trying to get out of each article or book that you read. Your notes should enable you to write up your literature search without returning to the books you have read. Refer to the guides Effective Note Making, Referencing and Bibliographies, and Avoiding Plagiarism, for further help with note-making.

5.0.3. Collecting Data:

For most research projects the data collection phase feels like the most important part. However, you should avoid jumping straight into this phase until you have adequately defined your research problem, and the extent and limitations of your research. If you are too hasty you risk collecting data that you will not be able to use.

Consider how you are going to store and retrieve your data. You should set up a system that allows you to:

- record data accurately as you collect it;
- retrieve data quickly and efficiently;
- analyse and compare the data you collect; and
- create appropriate outputs for your dissertation e.g. tables and graphs, if appropriate.

There are many systems that support effective data collection and retrieval. These range from card indexes and cross-referenced exercise books, through electronic tools like spreadsheets, databases and bibliographic software, to discipline-specific tools. You should talk about how you plan to store your data with your supervisor, an information librarian, or a study adviser in the Learning Development. As you undertake your research you are likely to come up with lots of ideas. It can be valuable to keep a record of these ideas on index cards, in a dedicated notebook, or in an electronic file. You can refer back to this 'ideas store' when you start to write. They may be useful as ideas in themselves, and may be useful as a record of how your thinking developed through the research process.

5.0.4. Pilot Studies:

A pilot study involves preliminary data collection, using your planned methods, but with a very small sample. It aims to test out your approach, and identify any details that need to be addressed before the main data collection goes ahead. For example, you could get a small group to fill in your questionnaire, perform a single experiment, or analyse a single novel or document.

When you complete your pilot study you should be cautious about reading too much into the results that you have generated (although these

can sometimes be interesting). The real value of your pilot study is what it tells you about your method.

- Was it easier or harder than you thought it was going to be?
- Did it take longer than you thought it was going to?
- Did participants, chemicals, processes behave in the way you expected?
- What impact did it have on you as a researcher?

Spend time reflecting on the implications that your pilot study might have for your research project, and make the necessary adjustment to your plan. Even if you do not have the time or opportunity to run a formal pilot study, you should try and reflect on your methods after you have started to generate some data.

5.0.5. Dealing with Problems:

Once you start to generate data you may find that the research project is not developing as you had hoped. Do not be upset that you have encountered a problem. Research is, by its nature, unpredictable. Analyse the situation. Think about what the problem is and how it arose. Is it possible

that going back a few steps may resolve it? Or is it something more fundamental? If so, estimate how significant the problem is to answering your research question, and try to calculate what it will take to resolve the situation. Changing the title is not normally the answer, although modification of some kind may be useful.

If a problem is intractable you should arrange to meet your supervisor as soon as possible. Give him or her a detailed analysis of the problem, and always value their recommendations. The chances are they have been through a similar experience and can give you valuable advice. Never try to ignore a problem, or hope that it will go away. Also don't think that by seeking help you are failing as a researcher.

Finally, it is worth remembering that every problem you encounter, and successfully solve, is potentially useful information in writing up your research. So don't be tempted to skirt around any problems you encountered when you come to write-up. Rather, flag up these problems and show your examiners how you overcame them.

5.0.6. Understanding originality and significance:

"Originality" and "significance" are terms that come up frequently when discussing dissertations and theses. What do professors mean when they use these terms?

Defining Originality

Lovitts and Wert (2009) define originality using the results from a series of faculty surveys.

An original contribution offers a novel or new perspective. The faculty in the social sciences who participated in the study described an original contribution as 'something that has not been done, found, proved, or seen before. It is publishable because it adds to knowledge, changes the way people think, informs policy, moves the field forward, or advances the state of the art.'

To achieve this goal, you might develop an original insight or advance, or you might borrow a contribution from another discipline and apply it to your field for the first time. It is important to understand that the contribution is not necessarily your entire dissertation but something that is part of it (p. 4).

It is important to clarify, in early discussions with your advisors, what is expected of you in terms of originality. Consider asking for samples of exemplary completed dissertations, and think critically about how you can most clearly display your original contribution to the reader.

Defining Significance

What is significance?

The faculty who participated in the [Lovitts and Wert] study described a significant contribution as something that is useful and will have an impact, and is therefore publishable in top-tier journals because it

- offers a nontrivial to a very important breakthrough at the empirical, conceptual, theoretical, or policy level;
- is useful and will have an impact;
- causes those inside, and possibly those outside, the community to see things differently;
- influences the conversation, research, and teaching;
- has implications for and advances the field, the discipline, other disciplines, or society.

As with originality, there are degrees of significance. At the highest level, significance is a function of the field's long-term interest in the problem, the difficulty involved in solving the problem, the influence of the results on further developments in the field, as well as the degree to which the results affect other fields, disciplines, and even society (p. 5).

Again, it is important to talk with your advisors early in the process about their expectations for significance. Are you expected to make a significant contribution in your dissertation, or are you expected to demonstrate that you're capable of making a significant contribution in later work?

5.0.7. Reporting the research:

As you conduct research, you are likely to realize that the topic that you have focused on is more complex than you realized when you first defined your research question. The research is still valid even though you are now aware of the greater size and complexity of the problem. A crucial skill of the researcher is to define clearly the boundaries of their research and to stick to them. You may need to refer to wider concerns; to a related field of literature; or to alternative methodology; but you must not be diverted into spending too much time investigating relevant, related, but distinctly separate fields.

Starting to write up your research can be intimidating, but it is essential that you ensure that you have enough time not only to write up your research, but also to review it critically, then spend time editing and improving it. The following tips should help you to make the transition from research to writing:

- In your research plan you need to specify a time when you are going to stop researching and start writing. You should aim to stick to this plan unless you have a very clear reason why you need to continue your research longer.

- Take a break from your project. When you return, look dispassionately at what you have already achieved and ask yourself the question: 'Do I need to do more research?'

- Speak to your supervisor about your progress. Ask them whether you still need to collect more data.

Remember that you can not achieve everything in your dissertation. A section where you discuss 'Further Work' at the end of your dissertation will show that you are thinking about the implications your work has for the academic community.

The companion study guide Writing a Dissertation focuses on the process of writing up the research from your research project.

5.0.8. Aiming for Excellence in the Dissertation:

Quality varies across dissertations. As you plan and evaluate your own dissertation, think about appropriate markers for important components of the project. If you answer “yes” to most of the following questions, you are probably working towards a strong dissertation.

Originality and Significance

Does your dissertation ask new questions or address important problems? Does it use current or new tools or methods? Does it expand the boundaries of the discipline? Does it have practical or policy implications? Would an interdisciplinary community find your project interesting?

Understanding of the Discipline

Does your dissertation display a strong understanding and command of preexisting literature? Is the literature challenged or advanced by your research? Does your dissertation clearly state the problem it addresses and explain its importance?

Research Design

Is your research project well-planned and well-executed? Does your dissertation utilize reliable data from multiple sources? Is your dissertation theoretically sophisticated?

Writing

Is your dissertation well-written and organized? Does it clearly explain your project and your findings? Does your writing engage the reader and advance their understanding of your research?

Maintaining Consistent Quality within the Dissertation

Again, expectations are crucial as you work toward a high quality dissertation. It is important to talk with advisors about what exactly they mean when they refer to the overall form (e.g., a series of essays or a book)

and the smaller components of your dissertation. A typical dissertation is comprised of an introduction, a literature review, a theory section, a method section, a results or data analysis section, a discussion of these results, and a conclusion. With your advisors, discuss expectations for each section and map out a plan for tackling them.

5.0.9. Achieving excellence:

After years of training, you are probably already prepared to write a competent dissertation. The guidelines we've already discussed will help you turn that dissertation into an excellent one. We close with some tips for promoting that forward progress.

Practice Academic Honesty

Honesty is the keystone to academic work. The strength of your presentation and contribution are worthless if you plagiarize or misuse data.

Develop Professional-Level Writing Skills

The quality of your writing matters. Brilliant ideas and findings are easily lost in poor writing, not only in your dissertation but throughout your career. Your writing demonstrates your ability to speak to peers in your field.

Take Action to Improve Your Writing

Students often have trouble with grammar and composition, yet most faculty members (with good reason) do not want to devote hours to improving student writing. If the feedback on your drafts indicates that your writing could use some improvement, consider the following steps.

• *Know good scholarly writing* by familiarizing yourself with the writing style of authors recommended by your advisors.

• *Plan your dissertation* by mapping or outlining what you want to express prior to writing it. Show this plan to advisors and peers before you begin writing.

• *Plan the pieces of your dissertation.* Map or outline the order and content of each chapter before actually writing.

• *Write and revise in separate steps to improve efficiency*. After drafting a section, give it a break before going back to review and revise it. You will likely spot more errors than if you revised it while writing.

• *Follow convention*. There are norms for the form and style of dissertations in your field. Use handbooks of grammar and style; read books about academic writing; and understand the formatting conventions of your field.

• *Get feedback*. The feedback of others is extremely important. At Yale, go to the Graduate Writing Center for writing tutoring. Ask peers and faculty advisors for help with short revisions. Join a writing group.

• *Practice writing and presenting your research*. Take opportunities to practice both written and oral presentation.

Set the Bar

We've said it before, but it's worth repeating: set clear expectations. Setting worthy, transparent, and achievable goals will help any project.

Engage Your Advisors

Be sure to speak with your advisors throughout the process of writing your dissertation. Be clear about goals and deadlines. When you meet, have questions prepared and make sure you understand their directions. Be proactive about solving problems, rather than withdrawing. If you are not getting the guidance you need, consider talking with another professor or administrator who can help.

Engage Your Peers

Sharing your work with your peers is useful. Setting up regular appointments to discuss your research will not only keep you on track with your dissertation, but it will ensure that you have helpful colleagues in the future.

Applaud Yourself

Though you may feel like you are making incremental progress, you have already come so far in your academic career. Be sure step back along the way and acknowledge the work you have done. Writing a dissertation is an enormous endeavor, and you deserve credit for all you've achieved!

6.0. Summary:

- Think carefully about your topic and ensure that it is sufficiently focused.

- Write a detailed research proposal to help you anticipate the issues/problems that you are going to deal with.

- Devote time to planning and stick to your plan.

- Work closely with your supervisor and respect the time and advice that they give you.

- Be organized and take detailed notes when you are undertaking your literature survey and data collection.

- Make a clear decision about stopping data collection.

- Move positively into writing-up your research.

- Allocate enough time to reviewing and editing your writing.

- Remember that you cannot achieve everything in your dissertation, but you can critically appraise what you have done, and outline ideas for further, relevant research.

DISSERTATION

UNIT 4

ETHICAL ISSUES IN RESEARCH

1.0. Introduction:

Scientific writing can be a complex and arduous process, for it simultaneously demands clarity and conciseness; two elements that often clash with each other. In addition, accuracy and integrity are fundamental components of the scientific enterprise and, therefore, of scientific writing. Thus, good scientific writing must be characterized by clear expression, conciseness, accuracy of what is being reported, and perhaps most importantly, honesty. Unfortunately, writing, or for that matter the entire scientific process, often occurs within the constraints of tight deadlines and other competing pressures. As a result of these constraints, scientific papers, whether generated by science students or by seasoned professionals, will at times be deficient in one or more of the above components.

Insufficient clarity or lack of conciseness is typically unintentional and relatively easy to remedy by standard educational or editorial steps. Lapses in the accuracy of what is reported (e.g., faulty observations, incorrect interpretation of results) are also assumed to be most often unintentional in nature, but such lapses, even if unintentional, can have

significant undesirable consequences if not corrected. Intentional lapses in integrity, even if seemingly minor, are by far the most serious type of problem because such misconduct runs contrary to the primary goal of the scientific enterprise, which is the search for truth.

In scientific writing, perhaps the most widely recognized unethical lapse is plagiarism. Plagiarism can occur in many forms and some of the more subtle instances, while arguably unethical in nature, may not be classified as scientific misconduct by federal agencies such as the National Science Foundation (NSF) or the Office of Research Integrity (ORI). Nevertheless, the ethical professional is expected to operate at the highest levels of scientific integrity and, therefore, must avoid all forms of writing that could be conceptualized as plagiarism.

There are other questionable writing practices, some of which may be quite common in professional scientific writing. One example is reporting and discussing results of one's research in the context of literature that is supportive of our conclusions while at the same time ignoring evidence that is contrary to our findings. Another writing 'malpractice' occurs when another author's review of a literature is used, yet the reader is led to believe that the current author has conducted the actual review.

2.0. On Ethical Writing:

A general principle underlying ethical writing is the notion that the written work of an author, be it a manuscript for a magazine or scientific journal, a research paper submitted for a course, or a grant proposal submitted to a funding agency, represents an implicit contract between the author of that work and its readers. According to this implicit contract, the reader assumes that the author is the sole originator of the written work, that any text or ideas borrowed from others are clearly identified as such by established scholarly conventions, and that the ideas conveyed therein are accurately represented to the best of the author's abilities. In sum, as Kolin (2002) points out, "Ethical writing is clear, accurate, fair, and honest". It also conveys to the reader that we strive for ethical conduct as well as ethical practice.

As is the case with most other human activities, errors in writing which violate the spirit of the contract do occur. For example, in proposing a new idea or data, an author may dismiss a certain line of evidence as unimportant, and thus quite unintentionally, ignore other established data or other evidence that fail to support, or outright contradict, his/her own ideas or data thereby misleading the reader. Judging by some of the readers' letters and commentaries published in scientific journals in response to certain published articles, this type of oversight appears to be not all that uncommon in the sciences, particularly when dealing with controversial topics.

Other errors include situations in which an idea claimed by its author to be completely original, may have actually been articulated earlier by

someone else. Such “rediscovery” of ideas is a relatively well-known phenomenon in the sciences, often occurring within a very close timeframe. Cognitive psychologists have provided considerable evidence for the existence of cryptomnesia, or unconscious plagiarism, which refers to the notion that individuals previously exposed to others’ ideas will often remember the idea, but not its source, and mistakenly believe that they themselves originated the idea.

Other unintentional errors occur, such as when authors borrow heavily from a source and, in careless oversight, fail to fully credit the source. These and other types of inadvertent lapses are thought to occur with some frequency in the sciences. Unfortunately, in some cases, such lapses are thought to be intentional and therefore constitute clear instances of unethical writing. Without a doubt, plagiarism is the most widely recognized and one of the most serious violations of the contract between the reader and the writer. Moreover, plagiarism is one of the three major types of scientific misconduct as defined by the Public Health Service; the other two being falsification and fabrication (U. S. Public Health Service, 1989). Most often, those found to have committed plagiarism pay a steep price. Plagiarists have been demoted, dismissed from their schools, from their jobs, and their degrees and honors have been rescinded as a result of their misdeeds (Standler, 2000).

2.1. Plagiarism:

"taking over the ideas, methods, or written words of another, without acknowledgment and with the intention that they be taken as the work of the deceiver." American Association of University Professors (September/October, 1989).

As the above quotation states, plagiarism has been traditionally defined as the taking of words, images, ideas, etc. from an author and presenting them as one's own. It is often associated with phrases, such as kidnapping of words, kidnapping of ideas, fraud, and literary theft. Plagiarism can manifest itself in a variety of ways and it is not just confined to student papers or published articles or books. For example, consider a scientist who makes a presentation at a conference and discusses at length an idea or concept that had already been proposed by someone else and that is not considered common knowledge. During his presentation, he fails to fully acknowledge the specific source of the idea and, consequently, misleads the audience into thinking that he was the originator of that idea. This, too, may constitute an instance of plagiarism. Consider the following real-life examples of plagiarism and the consequences of the offender's actions:

- A historian resigns from the Pulitzer board after allegations that she had appropriated text from other sources in one of her books.

- A biochemist resigns from a prestigious clinic after accusations that a book he wrote contained appropriated portions of text from a National Academy of Sciences report.

- A famous musician is found guilty of unconscious plagiarism by including elements of another musical group's previously recorded song in one of his new songs that then becomes a hit. The musician is forced to pay compensation for the infraction.

- A college president is forced to resign after allegations that he failed to attribute the source of material that was part of a college convocation speech.

- A member of Congress running for his party's nomination withdraws from the presidential race after allegations of plagiarism in one of his speeches.

- A psychologist has his doctoral degree rescinded after the university finds that portions of his doctoral dissertation had been plagiarized.

In sum, plagiarism can be a very serious form of ethical misconduct. For this reason, the concept of plagiarism is universally addressed in all scholarly, artistic, and scientific disciplines. In the humanities and the sciences, for example, there are a plethora of writing guides for students and professionals whose purpose, in part, is to provide guidance to authors on discipline-specific procedures for acknowledging the contributions of others. Curiously, when it comes to the topic of plagiarism, many professional writing guides appear to assume that the user is already familiar with the concept. In fact, while instruction on attribution, a key concept in avoiding

plagiarism, is almost always provided, some of the most widely used writing guides do not offer specific sections on plagiarism. Moreover, those that provide coverage often fail to go beyond the most basic generalities about this type of transgression.

Although plagiarism can take many forms there are two major types in scholarly writing: plagiarism of ideas and plagiarism of text.

2.1.1.1. Plagiarism of Ideas:

Appropriating an idea (e.g., an explanation, a theory, a conclusion, a hypothesis, a metaphor) in whole or in part, or with superficial modifications without giving credit to its originator.

In the sciences, as in most other scholarly endeavors, ethical writing demands that ideas, data, and conclusions that are borrowed from others and used as the foundation of one's own contributions to the literature, must be properly acknowledged. The specific manner in which we make such acknowledgement varies from discipline to discipline. However, source attribution typically takes the form of either a footnote or a reference citation.

3.0. Acknowledging the Source of our ideas:

Just about every scholarly or scientific paper contains several footnotes or reference notes documenting the source of the facts, ideas, or evidence that is reported in support of arguments or hypotheses. In some cases, as in those papers that review the literature in a specific area of research, the reference section listing the sources consulted can be quite extensive, sometimes taking up more than a third of the published article (see, for example, Logan, Walker, Cole, & Leukefeld, 2000). Most often, the contributions we rely upon come from the published work or personal observations of other scientists or scholars. On occasion, however, we may derive an important insight about a phenomenon or process that we are studying, through a casual interaction with an individual not necessarily connected with scholarly or scientific work. Even in such cases, we still have a moral obligation to credit the source of our ideas. A good illustrative example of the latter point was reported by Alan Gilchrist in a 1979 Scientific American article on color perception. In a section of the article which describes the perception of rooms uniformly painted in one color, Gilchrist states: "We now have a promising lead to how the visual system determines the shade of gray in these rooms, although we do not yet have a complete explanation. (John Robinson helped me develop this lead.)" (p.122; Gilchrist, 1979). A reader of the scientific literature might assume that Mr. Robinson is another scientist working in the field of visual perception, or perhaps an academic colleague or an advanced graduate student of Gilchrist's. The fact is that John Robinson was a local plumber and an acquaintance of Gilchrist in the town where the author spent his summers. During a casual discussion of Gilchrist's work, Robinson's

insights into the problem that Gilchrist had been working on were sufficiently important to the development of his theory of lightness perception that Gilchrist felt ethically obligated to credit Robinson's contribution.

Even the most ethical authors can fall prey to the inadvertent appropriation of others' ideas, concepts, or metaphors. Here we are referring to the phenomenon of unconscious plagiarism, which, as stated earlier, takes place when an author generates an idea that s/he believes to be original, but which in reality had been encountered at an earlier time. Given the free and frequent exchange of ideas in science, it is not unreasonable to expect instances in which earlier exposure to an idea that lies dormant in someone's unconscious, emerges into consciousness at a later point, but in a context different from the one in which the idea had originally occurred. Presumably, this is exactly what happened in the case of former Beatle George Harrison, whose song "My Sweet Lord" was found to have musical elements of the song "He's So Fine", which had been released years earlier by The Chiffons (see Bright Tunes Music Corp. v. Harrisongs Music, Ltd., 1976). Unfortunately, there are probably other John Robinsons, as well as other accomplished scientists, scholars, and artists, now forgotten, whose original, but unacknowledged ideas have been subsequently and unconsciously (or sadly, perhaps quite intentionally) "reinvented/rediscovered" by others and have, thus, failed to get their due credit.

In some cases the misappropriation of an idea can be a subtle process. Consider the famous case of Albert Schatz who, as a graduate student working under Selman Waksman at Rutgers, discovered the antibiotic streptomycin. Even though the first publications describing his discovery identified Schatz as primary author (Martin, 1997), it was Wakman who, over a period of time, began to take sole credit for the discovery ultimately earning him the Nobel prize in 1952 (see, for example, Shatz, 1993; Mistiaen, 2002 for a fuller description of this case).

Of course, there also have been instances in which unscrupulous scientists have intentionally misappropriated ideas. The confidential peer review process is a ripe source from which ideas may be plagiarized. Consider the scenario where the offender is a journal or conference referee, or a member of a review panel for a funding agency. He reads a paper or a grant proposal describing a promising new methodology in an area of research directly related to his own work. The grant fails to get funded based, in large part, on his negative evaluation of the protocol. He then goes back to his lab and prepares a grant proposal using the methodology stolen from the proposal that he refereed earlier and submits his proposal to a different granting agency.

Most of us would deem the behavior depicted in the above scenario as downright despicable. Unfortunately, similar situations have occurred. In fact, elements of the above scenario are based on actual cases of scientific misconduct investigated by ORI. The peer review context appears to be

sufficiently susceptible to the appropriation of ideas that in 1999 the federal Office of Science and Technology expanded their definition of plagiarism as follows:

"Plagiarism is the appropriation of another person's ideas, processes, results, or words without giving appropriate credit, including those obtained through confidential review of others' research proposals and manuscripts." (Office of Science and Technology Policy, 1999).

Guideline 1: **<u>An ethical writer ALWAYS acknowledges the contributions of others and the source of his/her ideas.</u>**

Plagiarism of text

Copying a portion of text from another source without giving credit to its author and without enclosing the borrowed text in quotation marks.

When it comes to using others' word-for-word (verbatim) text in our writing the universally accepted rule is to enclose that information in quotations and to indicate the specific source of that text. When quoting text from other sources, you must provide a reference citation and the page number indicating where the text comes from. Although the use of direct quotes is uncommon in the biomedical literature, there may be occasions when it is warranted. The material quoted earlier from Gilchrist (1979) serves as a good example of when to use quotations.

Although the evidence indicates that most authors, including college students, are aware of rules regarding the use of quotation marks, plagiarism of text is probably the most common type of plagiarism. However, plagiarism of text can occur in a variety of forms. The following review will allow the reader to become familiar with the various subtle forms of plagiarism of text.

Guideline 2: **<u>Any verbatim text taken from another author must be enclosed in quotation marks.</u>**

Let's consider the following variety:

Copying a portion of text from one or more sources, inserting and/or deleting some of the words, or substituting some words with synonyms, but never giving credit to its author nor enclosing the verbatim material in quotation marks.

The above form of plagiarism is relatively well known and has been given names, such as patchwriting (Howard, 1999) and paraphragiarism (Levin & Marshall, 1993). Iverson, et al. (1998) in the American Medical Association's Manual of Style identify this type of unethical writing practice as mosaic plagiarism and they define it as follows:

"Mosaic: Borrowing the ideas and opinions from an original source and a few verbatim words or phrases without crediting the original author. In this case, the plagiarist intertwines his or her own ideas and opinions with those of the original author, creating a 'confused plagiarized mass'" (p. 104).

Another, more blatant form which may also constitute plagiarism of ideas occurs when an author takes a portion of text from another source, thoroughly paraphrases it, but never gives credit to its author.

Guideline 3: <u>We must always acknowledge every source that we use in our writing; whether we paraphrase it, summarize it, or enclose it quotations.</u>

Inappropriate paraphrasing

Taking portions of text from one or more sources, crediting the author/s, but only changing one or two words or simply rearranging the order, voice (i.e., active vs. passive) and/or tense of the sentences.

Inappropriate paraphrasing is perhaps the most common form of plagiarism and, at the same time, the most controversial. This is because the criteria for what constitutes proper paraphrasing differs between individuals

even within members of the same discipline. We will discuss these issues shortly, but first let's consider the process of paraphrasing.

Paraphrasing and Summarizing

Scholarly writing, including scientific writing, often involves the paraphrasing and summarizing of others' work. For example, in the introduction of a traditional scientific paper it is customary to provide a brief and concise review of the pertinent literature. Such a review is accomplished by the cogent synthesis of relevant theoretical and empirical studies and the task typically calls for the summarizing of large amounts of information.

Guideline 4: <u>When we summarize, we condense, in our own words, a substantial amount of material into a short paragraph or perhaps even into a sentence.</u>

At other times, and for a variety of reasons, we may wish to restate in detail and in our own words a certain portion of another author's writing. In this case, we must rely on the process of paraphrasing. Unlike a summary, which results in a substantially shorter textual product, a paraphrase usually results in writing of equivalent textual length as the original, but, of course, with a different words and, ideally, different sentence structure. Whether paraphrasing or summarizing others' work, we must always provide proper

credit. In fact, when paraphrasing in the humanities, one may thoroughly modify another author's text and provide the proper citation. However, if the original sentence structure is preserved in the paraphrase, some will classify such writing as an instance of plagiarism.

Guideline 5: <u>Whether we are paraphrasing or summarizing we must always identify the source of our information.</u>

Paraphrasing and Plagiarism: What the writing guides say

Although virtually all professional and student writing guides, including those in the sciences, provide specific instructions on the proper use of quotes, references, etc., many fail to offer specific details on proper paraphrasing. With some exceptions, writing guides that provide instructions for proper paraphrasing and avoiding plagiarism tend to subscribe to a 'conservative' approach to paraphrasing. That is, these guides often suggest that when paraphrasing, an author must substantially modify the original material. Consider the following examples of paraphrasing guidelines:

"Don't plagiarize. Express your own thoughts in your own words…. Note, too, that simply changing a few words here and there, or changing the order of a few words in a sentence or paragraph, is still plagiarism. Plagiarism is one of the most serious crimes in academia." (Pechenik, 2001; p.10).

"You plagiarize even when you do credit the author but use his exact words without so indicating with quotation marks or block indentation. You also plagiarize when you use words so close to those in your source, that if your work were placed next to the source, it would be obvious that you could not have written what you did without the source at your elbow." (Booth, Colomb, & Williams, 1995; p. 167)

On the other hand, some writing guides appear to suggest a more liberal approach to paraphrasing. For example, consider the following guideline from the Publication Manual of the American Psychological Association (2001), a guide that is also used by other disciplines (e.g., Sociology, Education), in addition to psychology:

"…Each time you paraphrase another author (i.e., summarize a passage or rearrange the order of a sentence and change some of the words), you need to credit the source in the text." (p. 349).

However, this same resource provides an example of paraphrasing that is consistent with the more conservative definitions outlined above. Moreover, other writing guides (e.g., Hacker, 2000) that review the style used by American Psychological Association (APA) interpret the APA guidelines in the same conservative fashion. I advocate the more conservative approach to paraphrasing with one caveat (see below).

Guideline 6: <u>When paraphrasing and/or summarizing others' work we must reproduce the exact meaning of the other author's ideas or facts using our words and sentence structure.</u>

Examples of paraphrasing: Good and Bad

The ethical writer takes great care to insure that any paraphrased text is sufficiently modified so as to be judged as new writing. Let's consider various paraphrased versions of the following material on the electrochemical properties of neurons (taken from Martini & Bartholomew, 1997). In acknowledging the source, we will use the footnote method commonly used in the biomedical sciences. The actual reference would appear in the reference section of the paper.

"Because the intracellular concentration of potassium ions is relatively high, potassium ions tend to diffuse out of the cell. This movement is driven by the concentration gradient for potassium ions. Similarly, the concentration gradient for sodium ions tends to promote their movement into the cell. However, the cell membrane is significantly more permeable to potassium ions than to sodium ions. As a result, potassium ions diffuse out of the cell faster than sodium ions enter the cytoplasm. The cell therefore experiences a net loss of positive charges, and as a result the interior of the cell membrane contains an excess of negative charges, primarily from negatively charged proteins."[1] (p. 204).

Here is an Appropriate Paraphrase of the above material:

A textbook of anatomy and physiology reports that the concentration of potassium ions inside of the cell is relatively high and, consequently, some potassium tends to escape out of the cell. Just the opposite occurs with sodium ions. Their concentration outside of the cell causes sodium ions to cross the membrane into the cell, but they do so at a slower rate. According to these authors, this is because the permeability of the cell membrane is such that it favors the movement of potassium relative to sodium ions. Because the rate of crossing for potassium ions that exit the cell is higher than that for sodium ions that enter the cell, the inside portion of the cell is left with an overload of negatively charged particles, namely, proteins that contain a negative charge.

Notice that, in addition to thoroughly changing much of the language and some of the structure of the original paragraph, the paraphrase also indicates, as per guideline 5, that the ideas contained in the rewritten version were taken from another source. When we paraphrase and/or summarize others' work we must also give them due credit, a rule not always applied by inexperienced writers.

Let's suppose that instead of paraphrasing, we decide to summarize the above paragraph from Martini and Bartholomew. Here is one summarized version of that paragraph:

The interior of a cell maintains a negative charge because more potassium ions exit the cell relative to sodium ions that enter it, leaving an over abundance of negatively charged protein inside of the cell.

In their attempts at paraphrasing, sometimes authors commit 'near plagiarism' (or plagiarism, depending on who is doing the judging) because they fail to sufficiently modify the original text and thus, produce an inappropriately paraphrased version. Depending on the extent of modifications to the original, the extent of text involved, and on who is doing the judging, inappropriate paraphrasing may constitute an instance of plagiarism. For example, the following versions of the Martini and Bartholomew paragraph are inappropriately paraphrased and can thus be classified as plagiarized versions:

Inappropriate paraphrase (version 1):

Because the intracellular concentration of potassium ions is _ high, potassium ions tend to diffuse out of the cell. This movement is triggered by the concentration gradient for potassium ions. Similarly, the concentration gradient for sodium ions tends to promote their movement into the cell. However, the cell membrane is much more permeable to potassium ions than to it is to sodium ions. As a result, potassium ions diffuse out of the cell more rapidly than sodium ions enter the cytoplasm. The cell therefore experiences a _ loss of positive charges, and as a result the interior of the cell membrane contains a surplus of negative charges, primarily from negatively charged proteins.[1] (p. 204).

A comparison between the original version of the Martini and Bartholomew paragraph to the 'rewritten' version above reveals that the rewritten version is a mere copy of the original. The few modifications that were made are superficial, consisting merely of a couple of word deletions, substitutions, and additions. Even though by the insertion of a reference note ([1]) the writer has credited Martini and Bartholomew with the ideas expressed, most of the words and structure of the original paragraph are preserved in the rewritten version. Therefore, the reader would have been misled as to the origin of the writing.

Inappropriate paraphrase (version 2):

The concentration gradient for sodium (Na) ions tends to promote their movement into the cell. Similarly, the high intracellular concentration of potassium (K) ions is relatively high resulting in K's tendency to diffuse out of the cell. Because the cell membrane is significantly more permeable to K than to Na, K diffuses out of the cell faster than Na enter the cytoplasm. The cell therefore experiences a net loss of positive charges and, as a result the interior of the cell membrane now has an excess of negative charges, primarily from negatively charged proteins.[1] (p. 204).

At first glance this second 'rewritten' version may look as if it has been significantly modified from the original, but in reality, it is not unlike the first inappropriately paraphrased version in that only superficial changes have been made to the original. In this particular case, the writer has made a seemingly

disingenuous change by substituting the names of the atoms by using their chemical symbols (e.g., sodium = Na). In addition, the order of the first two sentences was changed giving the appearance of a substantial modification. However, as in the previous version, the language and much of the rest of structure is still too similar to the original.

Again, it must be emphasized that when we paraphrase we must make every effort to restate the ideas in our words. Here is another properly paraphrased version:

Appropriate paraphrase (version 2):

The relatively high concentration gradient of sodium ions outside of the cell causes them to enter into the cell's cytoplasm. In a similar fashion, the interior concentration gradient of potassium ions is also high and, therefore, potassium ions tend to scatter out of the cell through the cell's membrane. But, a notable feature of this process is that Potassium ions tend to leave the cell faster than sodium ions enter the cytoplasm. This is because of the nature of the cell membrane's permeability, which allows potassium ions to cross much more freely than sodium ions. The end result is that the interior of the cell membrane's loss of positive charges results in a greater proportion of negative charges and these made up mostly of proteins that have acquired a negative charge.

Paraphrasing highly technical language

We have established that taking a paragraph, or for that matter, even a sentence from another source, and using it in our own writing without enclosing the material in quotations can constitute plagiarism. Similarly, inappropriate paraphrasing may also be classified as plagiarism.

The available evidence indicates that one of the reasons writers misappropriate text is because they may be unfamiliar with the concepts and/or language with which s/he is working. The ability to properly paraphrase technical text depends in large part on an author's conceptual understanding of the ideas being processed and his/her mastery and command of the technical language involved. Accordingly, correct paraphrases are easy when the language of the original material allows us many options for substituting words and phrases. Research shows that when asked to paraphrase, students, as well as university professors, are more likely to appropriate and, therefore, plagiarize text when the original material to be paraphrased is made up of technical language and it is difficult to read than when the material is written in plain language and is easier to read.

Obviously, inexperienced authors (e.g., students) have the greatest difficulty paraphrasing the advanced technical text often found in the primary literature. In an effort to introduce them to primary sources of information in a given discipline, college students are often required to write a research paper using only articles

from professional journals. For those students who must complete this type of assignment for the first time, and, in particular, for foreign students whose primary language is not English, writing a research paper can be a daunting task. This is because scholarly prose: 1) can be very intricate, 2) adheres to unique, stylistic conventions (e.g., use of the passive voice in the biomedical sciences), and 3) relies heavily on jargon that novice writers have yet to master. Consequently, students' need to create an acceptable academic product that is grammatically correct and that demonstrates knowledge of the concepts discussed, forces many of them to rely on close paraphrases of the original text. Unfortunately, such writing can result in a charge of plagiarism.

Guideline 7: <u>In order to make substantial modifications to the original text that result in a proper paraphrase, the author must have a thorough understanding of the ideas and terminology being used.</u>

An analogous situation can occur at the professional level when we wish to paraphrase, say, a complex process or methodology. Traditional writing conventions give us the option to use any material that is difficult to paraphrase by enclosing it in quotation marks with some type of indication (e.g., a footnote) as to its origin. Therefore, if the text is so technical that it would be very difficult or near impossible to modify substantially without altering its meaning, then perhaps it would be best to leave it in the original author's wording, enclose it in quotation marks, and include a citation. However, unlike literature or philosophy, quoting in certain disciplines (e.g., biological sciences) is not encouraged (see Pechnick, 2001). One would be hard pressed to find an entire sentence quoted, let alone a

short paragraph, in the pages of prestigious journals in the biomedical sciences (e.g., Nature, Science, New England Journal of Medicine).

In sum, the reality is that traditional scientific prose and diction do not always facilitate paraphrasing. To illustrate the difficulties inherent in paraphrasing highly technical language, let's consider the following paragraph from a report recently published in Science (Lunyak, et al., 2002).

"Mammalian histone lysine methyltransferase, suppressor of variegation 39H1 (SUV39H1), initiates silencing with selective methylation on Lys9 of histone H3, thus creating a high-affinity binding site for HP1. When an antibody to endogenous SUV39H1 was used for immunoprecipitation, MeCP2 was effectively coimmunoprecipitated; conversely, αHA antibodies to HA-tagged MeCP2 could immunoprecipitate SUV39H1 (Fig. 2G)."[2] (p. 1748)

Here is an attempt at paraphrasing the above material:

A high affinity binding site for HP1 can be produced by silencing Lys9 of histone H3 by methylation with mammalian histone lysine methyltransferase, a suppressor of variegation 39H1 (SUV39H1). MeCP2 can be immunoprecipitated with antibodies prepared against endogenous SUV39H1; on the other hand, immunoprecipitation of SUB39H1 resulted from aHA antibodies to HA-tagged MeCP2.

Unlike the previous examples of appropriate paraphrasing, the above example does not embody as many textual modifications. For the exact meaning of the original Science paragraph to be preserved in the present case, many of the same terms must be left intact in the paraphrased version. Although synonyms for some of the words may be available, their use would likely alter the meaning of the original. For example, take the word affinity, which is defined as "that force by which a substance chooses or elects to unite with one substance rather than with another" (Dorland, 2000). Roget's Thesaurus (Chapman, 1992) lists the following synonyms for affinity: accord, agreement, attraction, friendship, inclination, marriage relationship, preference, relationship, similarity, and tendency. Although it might be possible to rewrite the first sentence using the synonym "attraction", this alternative fails to capture the precise meaning conveyed by the original sentence, given how the term is used in this area of biomedical research. The fact of the matter is that the word affinity has a very specific denotation in the context in which is being used in the Science paragraph and it is the only practical and meaningful alternative available. The same can be said for other words that might have synonyms (e.g., binding, silencing, site). Other terms, such as methylation and antibodies are unique and do not have synonyms available. In sum, most of the terms (e.g., immunoprecipitation, endogenous, coimmunoprecipitated) and expressions (e.g., HA-tagged, high-affinity, mammalian histone lysing methyltransferase) in the above paragraph are extremely difficult, if not impossible, to substitute without altering the intended meaning of the paragraph. As a result, the paraphrased version looks somewhat similar to the original and thus, applying the strict definitions of paraphrasing, such as those provided by

some writing guides would render our paragraph as a borderline or an outright case of plagiarism.

Perhaps in recognition of the fact that highly technical descriptions of a methodology, phenomena, etc., can be extremely difficult, if not impossible, to properly paraphrase, ORI's definition of plagiarism provides the following caveat:

"ORI generally does not pursue the limited use of identical or nearly-identical phrases which describe a commonly-used methodology or previous research because ORI does not consider such use as substantially misleading to the reader or of great significance."

The above considerations may underlie the reason for the absence of an operational definition of proper paraphrasing. Nevertheless, and in spite of the above clarification provided by ORI, the following guideline is offered:

Guideline 8: <u>A responsible writer has an ethical responsibility to readers, and to the author/s from whom s/he is borrowing, to respect others' ideas and words, to credit those from whom we borrow, and whenever possible, to use one's own words when paraphrasing.</u>

Plagiarism and common knowledge

As has been pointed earlier, one must give credit to those whose ideas and facts we are using. One general exception to this principle occurs when the ideas we are discussing represent ‘common knowledge’. If the material we are discussing is assumed to be known by the readership, then one need not cite its origin. Suppose you are an American student writing a paper on the history of the United States for a college course and in your paper, you mention the fact that George Washington was the first president of the United States and that the Declaration of Independence was signed in the year 1776. Must you provide a citation for that pair of facts? Most likely not, as these are facts commonly known by average American college and high school students. The general expectation is that “everybody knows that”. However, suppose that in the same paper the student must identify the 23rd president and his running mate and the main platform under which they were running for office, plus the year they both assumed power. Should such material be considered common knowledge? The answer is probably no. It is doubtful that the average American, would know those facts. In fact, I had to look up the answers.

Let’s take another example. Imagine that we are writing a paper and in it we have a need to discuss the movement of sodium and potassium ions across a cell’s membrane (see the Martini and Bartholomew paragraph above). Surely, those ideas are not common knowledge amongst college students and if they were expected to use those concepts in a paper they would be required to provide a citation. However, let’s suppose that the individual writing the paper was a seasoned neuroscientist and that she intended to submit her paper for publication to

a professional journal. Would the author need to provide a citation for that material? Not necessarily. Although for the non-scientist the description of the concentration gradients of sodium and potassium ions inside neurons may look sufficiently complex and unfamiliar, the material is considered common knowledge amongst neuroscientists. It would, indeed, be shocking to find a neuroscientist or biologist who was not familiar with those concepts.

In sum, the question of whether the information we write about constitutes common knowledge is not easily answerable and it depends on several factors, such as who the author is, who the readers are, and the expectations of each of these groups. Given these considerations, we recommend that authors abide by the following guideline:

Guideline 9: <u>When in doubt as to whether a concept or fact is common knowledge, provide a citation.</u>

Plagiarism and authorship disputes

Consider the following scenario. Two researchers who have collaborated on various projects have, in the past, have jointly published a number of papers. Three quarters into the writing of the manuscript from their most recent joint projects, the researchers experience a profound difference of opinion regarding the direction of the current project and the incident leads to the eventual break-up of their research

association. Soon after, one of the researchers moves to another institution in another country and begins to pursue a different line of research. A year later, the remaining researcher decides to finish writing the manuscript and submits it for publication with his name as sole author. By appropriating the joint manuscript and submitting it under his name, has this other researcher committed plagiarism?

Let's consider another scenario, a graduate student working under her mentor's supervision makes an interesting discovery as part of her doctoral thesis work. Before she is ready to publish her thesis, however, her mentor feels that the discovery merits immediate publication and decides to report her data, along with other data he had collected from other graduate fellows working in his lab, in a journal article. The mentor does not list the graduate student's name as a co-author nor is there a byline in the article indicating the exent of her contribution under the pretext that the student's contribution in and of itself did not merit authorship.

Clearly, the above scenarios represent ethical breaches that many individuals and institutions, including the National Science Foundation, would consider as instances of plagiarism. However, not everyone agrees that these types of cases are plagiarism. For example, ORI classifies these problems not as plagiarism, but as authorship disputes. The involved parties can avoid these and other troublesome situations, such as disputes regarding the order of authorship of a paper, by discussing and agreeing on a plan BEFORE work on a project commences.

As this document illustrates, there are many varieties of plagiarism. Although we have covered some of the most common forms, these can be combined in a variety of ways to form new types of plagiarism not discussed here. In the next section we turn our attention to the problem of self-plagiarism.

SELF-PLAGIARISM

When plagiarism is conceptualized as theft, the notion of self-plagiarism may seem impossible. After all, one might ask: Is it possible to steal from oneself? As Hexam (1999) points out, it is possible to steal from oneself as when one engages in embezzlement or insurance fraud. In writing, self-plagiarism occurs when authors reuse their own previously written work or data in a 'new' written product without letting the reader know that this material has appeared elsewhere. According to Hexam, "… the essence of self-plagiarism is [that] the author attempts to deceive the reader".

Although in scholarly and scientific writing there are some situations in which some forms of text reuse are acceptable, many other instances in which text and/or data are known to have been reused violate the ethical spirit of scholarly research. The concept of ethical writing, about which this instructional resource revolves, entails an implicit contract between reader and writer whereby the reader assumes, unless otherwise noted, that the material was written by the author, is new, is original and is accurate to the best of the author's abilities. In this section

we review some of the most common instances of self-plagiarism and provide guidelines to avoid these pitfalls.

The available literature on self-plagiarism is concerned with four major problems: The publication of what is essentially the same paper in more than one journal, but without any indication that the paper has been published elsewhere (i.e., redundant and duplicate publication), the partitioning of a large study which should have been reported in a single paper into smaller published studies (i.e., salami-slicing), copyright infringement, and the practice of text recycling.

Guideline 10: Authors of complex studies should heed the advice previously put forth by Angell & Relman (1989). If the results of a single complex study are best presented as a 'cohesive' single whole, they should not be partitioned into individual papers. Furthermore, if there is any doubt as to whether a paper submitted for publication represents fragmented data, authors should enclose other papers (published or unpublished) that might be part of the paper under consideration (Kassirer & Angell, 1995). Similarly old data that has been merely augmented with additional data points and that is subsequently presented as a new study is an equally serious ethical breach.

One element likely to be common to both redundant publication and salami publication is the potential for copyright infringement. This is because data or text (or both elements) appearing in one copyrighted publication will also appear in

another publication whose copyright is owned by a different entity. Let's turn our attention now to this topic.

Copyright Law

Because some instances of plagiarism and self-plagiarism (e.g., redundant publication) have the potential for violating copyright law, the following section is devoted to a brief review of the concept of copyright.

Copyright law is based on Article 1, sec. 8, cl. 8 of the United States Constitution. It's fundamental purpose was "to promote the progress of science and useful arts, by securing for limited times to authors and inventors the exclusive right to their respective writings and discoveries". Once owners of an artistic (e.g., song, lyrics, films) or an intellectual work (e.g., book, article) copyright a product, they have the exclusive right to publish, reproduce, sell, distribute, or modify those products. For authors who wish to have their papers published in traditional journals, the typical arrangement is for the copyright of the author's work to be transferred to the publisher of the journal. The journal can then reproduce and distribute the author's work legally. An increasing number of journals now allow the author to maintain ownership of their work, but both entities sign an agreement specifying the journals' right to publish and re-use the author's material. In the case of "Open Access" journals (freely available to the public without expectation of payment), the author agrees to allow for the free dissemination of his/her works without prior permission.

With some exceptions, the unauthorized use of copyrighted work violates copyright law and represents copyright infringement. Exceptions to copyright infringement fall under the doctrine of "Fair Use" of copyright law and represent instances in which the activity is largely for nonprofit educational, scholarship, or research purposes (see US Copyright Office, 1996). For example, in some situations, a student or individual researcher may make a copy of a journal article or book chapter for his/her own personal use without asking permission. Likewise, an author describing the results of a published study may take a couple of lines of data from a table from a journal article, include a citation, and reproduce it in his/her paper. The American Medical Association's Manual of Style (Iverson, et al., 1998) provides additional examples of instances of "fair use".

Copyright Infringement, fair use, and plagiarism

The use of relatively short direct quotes from a published work does not usually require permission from the copyright holder as it typically falls under the "fair use" provision. However, extensive quoting of text from a copyrighted source can constitute copyright infringement, whether the appropriated text is properly enclosed in quotation marks or correctly paraphrased, even if a citation is provided according to established scholarly conventions. Obviously, the same applies if the material is plagiarized outright. Moreover, the reader should note that intellectual or artistic work does not need to be published in order to be copyrighted. In fact, the moment the work becomes final it is automatically copyrighted. Thus, instances of plagiarism, whether from a published article or an unpublished

manuscript, such as a grant proposal, can also constitute copyright infringement, though copyright infringement does not always constitute plagiarism.

Iverson, et al., (1998) cautions the reader that the amount of text that can be taken from a copyrighted source without permission depends on its proportion to the entire work. However, the reader should also note that some publishers have established word limits for borrowing text. For example, according to the Publication Manual of the American Psychological Association (APA), authors who wish to borrow text of more than 500 words from a published APA publication must seek permission from the APA.

Given the above considerations, it should be clear that redundant or duplicate publication, which occurs without the respective editors' knowledge, is not only considered a form of self-plagiarism, but it may also qualify as copyright infringement because the copyright may be held by the publisher; not by the author. This would certainly be the case if the original article were published in a journal owned by one publisher and the second article were to appear in a journal owned by a different publisher.

GUIDELINE 11: Authors are strongly urged to double-check their citations. Specifically, authors should always ensure that each reference notation appearing in the body of the manuscript corresponds to the correct citation listed in the reference section and vice versa and that each source listed in the reference section has been cited at some point in the manuscript. In addition,

authors should also ensure that all elements of a citation (e.g., spelling of authors' names, volume number of journal, pagination) are derived directly from the original paper, rather than from a citation that appears on a secondary source. Finally, authors should ensure that credit is given to those authors who first reported the phenomenon being studied.

Inappropriate Manipulation of References

In a later section I discuss the tendency on the part of some scientists to provide what may be a biased review of the relevant literature. That is, in providing a context for the presentation of our data or theory, we sometimes cite only references that are favorable to our position. However, ethical writers have a responsibility to cite all relevant material, even work that may contradict our own point of view. Failure to do so compromises our objectivity and is contrary to the primary mission of a scientist which is to search for truth.

Citation Stuffing

Another way in which references are thought to be inappropriately manipulated occurs when authors intentionally cite their own articles, regardless of their relevance, in an attempt to raise their own articles' impact factor. The impact factor is a measure of importance and prestige of journals that takes into account how often articles published in those journals are cited. However, a measure of the

number of times an article is cited in other articles can also be used as a measure of their importance in an individuals' tenure and review decisions, thus the tendency of some authors to weave into their paper references of their own prior work that are largely irrelevant to the current topic.

A related matter involves the inappropriate inclusion of references that are authored by individuals thought to be likely peer reviewers of the article in question. The thought being that the reviewer will be more likely to give a favorable review to a paper that cites his or her own work than to one that does not.

Finally, there is some evidence that editors of some journals sometimes insist that authors include references from their journal for the mere purpose of enhancing that journal's impact factor (see WAME discussion of March 7th to the 16th, 2006: Manipulating a Journal's Impact Factor). Authors should attempt to resist such requests unless the editors' recommendations are genuinely relevant to their paper.

GUIDELINE 12: <u>Authors should follow a simple rule: Strive to obtain the actual published paper. When the published paper cannot be obtained, cite the specific version of the material being used, whether it is conference presentation, abstract, or an unpublished manuscript.</u>

Citing sources that were not read or thoroughly understood

The practice of relying on a published paper's abstract to describe its contents also fits in the present category. However, there are other scenarios that better illustrate the practice of citing papers that were either poorly understood or perhaps not even read by the author citing them. Let's go over a couple of examples:

Consider an investigator who is in the process of writing the results of a series of studies he conducted. In his search for background literature relevant to his work, he finds one particular journal article whose introduction cites a number of other works that seem very relevant to his own paper. Although he recognizes most of the references cited, there are a couple of papers that he is not familiar with and, unfortunately, for a variety of reasons he cannot obtain copies of them at this point. Given the context of the published paper's description of these two other papers that are unfamiliar to him, our author decides to include them in his own review of the literature by paraphrasing the relevant portions of the published paper's introduction that summarize the contributions of these two unfamiliar papers. He then includes these papers as references in his manuscript's reference section, along with the journal article from which he derived the information. Finally, although our author cites the published article in at least one other context, he does not indicate that this article had served as the source of the paraphrase.

By not indicating the true source of the paraphrase of these two papers, the reader is deceived by falsely assuming that the brief summary of these two papers was based on our author's direct reading of these papers. Technically, this type of

transgression qualifies as a form of plagiarism because the author has paraphrased a summary of another's work that was written by someone else and has not properly attributed his summary to the author of the journal article. Of course, a formal charge of plagiarism would depend on a number of variables, such as the amount of paraphrasing that took place without proper attribution, the significance or uniqueness of the material involved, etc.

This type of deceptive practice can also be risky because there could conceivably be other aspects of the papers cited (but which were not read) that do not quite correspond with the offending author's thesis. Therefore our author may be citing references that do not entirely support his data or point of view. Inexperienced students sometimes use this inappropriate strategy when they review the literature and discover a paper that reviews roughly the same literature that the student must describe. In an effort to optimize his time and given the effort needed to write a proper paper some students will paraphrase, in whole or in part, a review of the same literature that has already appeared in a published source. In an effort to maintain the deception, the student cites in his/her paper's reference section every source mentioned in the paraphrase, including the article from which the material was taken. This strategy is designed to mislead the professor into assuming that the student has actually read all of the papers cited in his/her review. Ironically, these transgressions are typically uncovered, not only because the students' paraphrases are often too close to the original, thus betraying the students' less sophisticated writing, but also because at least some of the papers cited are known to their professor to not be directly supportive of the students' main position. Other clues in the writing often point to the deception.

The reader should note, however, that there might be instances in which the practice of citing sources that were not read may be acceptable. For example, an author may simply wish to point out a well-known discovery or theory and provide the reader with the original citation. When this is done without misleading the reader into believing that the author read the paper detailing the discovery and is thoroughly acquainted with its contents, then no real harm is done.

GUIDELINE 13: <u>When borrowing heavily from a source, authors should always craft their writing in a way that makes clear to readers, which ideas are their own and which are derived from the source being consulted.</u>

ETHICALLY INAPPROPRIATE WRITING PRACTICES

Responsible science and scholarship entails the highest degree of objectivity in reporting the results of our research. Authors, often with the assistance of the editorial process, make every effort to describe their observations without exaggerating the importance of the findings or overstating their conclusion. However, lapses in preserving that high level of objectivity when presenting research to a general audience have been noted. For example, Woloshin and Schwartz (2002) have carried out an analysis of press releases and reported that these often fail to emphasize the limitations of the studies. These authors noted that "[d]ata are often presented using formats that may exaggerate the perceived

importance of findings". Their results are noteworthy because, in some cases, study authors are consulted during the editorial stages of producing a press release.

Other ethically questionable writing practices have been identified in which subtle biases are introduced in the writing process. What follows is a brief discussion of some of the most frequent problems.

Selective reporting of Literature

Whether one is working on a paper for a course, a doctoral dissertation, or a paper targeted for publication in a scientific journal, one of the main purposes of reviewing the relevant literature and citing others' work is to provide empirical and/or theoretical support for one's thesis. The literature review also provides readers with the proper context to understand a proposed study or theory by informing them of important issues, such as the current state of knowledge on the topic, the type of methodologies being used in the area, the theoretical underpinnings of the research, and the significance of the problem. Depending on the type of manuscript being developed, the literature review will be either comprehensive (e.g., doctoral dissertation, review article) or very succinct (e.g., journal article). The latter situation presents a unique challenge because journal space can be very expensive forcing authors to be very concise in their writing.

For aspiring scholars and scientists, the classroom represents the training ground for future professionals. As a result, professors tailor the requirements for academic papers assigned in many graduate and advanced undergraduate courses to those demanded by scholarly journals (see for example, Salazar, 1993). These constraints sometimes present a real challenge for authors, who must always make an effort to simplify their literature reviews and only include a very concise summary of highly relevant papers.

Obviously, literature that is cited in support of our point of view must be grounded in sound arguments, tight research methodologies, and flawless data. Citing references in support of our work, that are known to be methodologically or logically deficient, and that fail to mention these shortcomings is ethically inappropriate. Likewise, if in our search for relevant literature we become aware of important relevant evidence that runs contrary to our data or point of view, we have an ethical obligation to cite such evidence, either in the introduction or the discussion section of our paper and to do so objectively. Of course, there are instances in which the extent of our review is extremely limited as, for example, when reporting in the format of a short communication or brief report. Space limitations in such contexts may be such that it is impractical to provide adequate coverage of relevant literature, let alone contrary evidence.

Given that the main purpose of a literature review is to find evidence in support of our research, it is not uncommon to find instances in which authors fail to cite relevant literature that runs contrary to their thesis. Based on the pace at which science and scholarship continues to grow, that many of these lapses may be

due to authors' inability to keep up with the burgeoning literature. However, a perusal of scholarly journals that accept letters to the editor as commentaries to recently published articles will reveal instances in which such writing practices appear intentional (see Goodman, 1998; Perkin, 1999; Nathan, 1994).

GUIDELINE 14: <u>Authors have an ethical obligation to report all aspects of the study that may impact the independent replicability of their research.</u>

Selective reporting of results

Designing an empirical study takes planning and careful consideration of existing theory and research in the area under investigation. When testing for simple causal relationships, it should be relatively easy to predict the specific outcome when producing a change in the causal variable. Most modern investigations, however, are far from simple as they often involve several variables all of which interact in ways that are sometimes difficult, if not impossible, to predict. One positive feature of complex studies is that they can yield many interesting outcomes, but some of these outcomes may also generate results that are contrary to our expectations. When this happens, there may be a temptation to manipulate the statistical analyses in a way that obscures the actual unwanted results obtained (e.g., using a less powerful statistical test, removing outliers), while perhaps simultaneously enhancing the hypothesized results. Another temptation is to simply not report negative results and only report those results that are consistent with our line of thinking. Other techniques, such as the manipulation

of graphs, have been used to subtly change, and therefore distort, the presentation of results in a way that make them more consistent with our hypotheses and theories. Such practices are almost always deceptive and are contrary to the basic scholarly-scientific mission of searching for truth. However, there are instances in which practices, such as the removal of outliers, are acceptable given that the author follows established procedures, informs readers of these actions, and provides a cogent rationale for carrying them out.

GUIDELINE 15: Researchers have an ethical responsibility to report the results of their studies according to their a priori plans. Any post hoc manipulations that may alter the results initially obtained, such as the elimination of outliers or the use of alternative statistical techniques, must be clearly described along with an acceptable rationale for using such techniques.

AUTHORSHIP ISSUES AND CONFLICTS OF INTEREST

An instructional resource on scholarly and scientific writing would not be complete without some discussion of conflicts of interest and authorship issues, such as the conditions that merit the granting of authorship. We now turn our attention to these matters.

Advances in biotechnology, communication, instrumentation, and computing have allowed scientists to investigate increasingly complex problems. It

is not uncommon these days for large-scale investigations to be carried out by a handful of scientists from various institutions sometimes spanning two or more continents. Groups and individual contributors may work on the same or different key aspects of a project and these collaborations will invariably result in multiple-authored publications. Unfortunately, some of these collaborative efforts have given rise to disputes about authorship issues. The most frequent disputes center around the following questions: 1) Which members of a research team merit authorship? 2) Who is designated as senior author of the resulting journal article? And 3) How is the rest of the authorship order determined?

Given that authorship, particularly the designation of senior author of a paper in scientific and scholarly publications plays such a prominent role in the current merit system, it is extremely important to have sound guidelines for establishing the conditions for authorship. For example, in writing about these issues, Steinbok (1995) questions whether various situational roles in biomedical research merit authorship. He writes: "Should the head of the department automatically be an author? Should the various clinicians involved in the care of the patients who are subjects of a paper automatically be authors? What about the person who goes through a set of charts and puts information into a database? What about the statistician who analyzes the data?" (p. 324). Others have raised questions related to the current trend for graduate and undergraduate students to be directly involved in research and in the authoring of papers.

Fortunately, individuals and a number of professional societies have proposed relevant guidelines in this area (see references in later section). Although

these sets of guidelines are not identical there is sufficient overlap to offer readers certain recommendations. In considering these guidelines, readers are advised to consult their professional associations for any specific authorship guidelines that these entities may have developed. Readers are also advised to consult the institutions with which they are affiliated, as well as the individual journals to which they intend to submit a manuscript.

Deciding on authorship

Whether students or professionals, individuals collaborating on a research project should discuss authorship issues, such as who will be designated as senior author, the order of other authors, and any other individual acknowledgements for other contributions to the project, before initiating work on the project. All parties should familiarize themselves with authorship guidelines suggested by their respective disciplines. In the absence of such guidelines, prospective authors should follow the guidelines of the International Committee of Medical Journal Editors. Any agreement reached regarding authorship should be recorded in writing and should outline the formula used for determining whom the senior author should be and the authorship order for the rest of the investigators involved in the project. The agreement should be sufficiently flexible to accommodate changes that may arise while the project is in progress (e.g., an individual not initially designated as author ends up making substantive contributions that earn her authorship in the paper, or an individual previously designated as author fails to carry out the designated duties, making his contributions not sufficient or important to merit authorship).

GUIDELINE 16: Faculty-student collaborations should follow the same criteria to establish authorship. Mentors must exercise great care to neither award authorship to students whose contributions do not merit it, nor to deny authorship and due credit to the work of students.

Ghost Authorship

Ghost authorship occurs when a written work fails to identify individuals who made significant contributions to the research and writing of that work. Although in recent times this unethical practice is typically associated with the pharmaceutical and biomedical device industry, the term is also applicable in a number of other contexts. For example, in academic contexts, it is widely recognized as cheating to have someone other than the named student author write a paper that is then submitted as the student's own. Perhaps with some exceptions (e.g., speech writers), ghost authorship is ethically unacceptable because the reader is mislead as to the actual contributions made by the named author.

Academic Ghost Authorship

A not uncommon form of academic dishonesty that has probably always existed is to have someone else other than the student (a friend or relative), complete an assignment or write a paper. Several Internet sites now exist that, in addition to making available copies of papers that have already been written, they

also provide custom-written papers, including doctoral theses. The customer (i.e., student) specifies the topic and other requirements for the paper and, for a fee, a staff writer for the service will supply a custom-written product. For an eye-opening account of how this practice works even before the proliferation of on-line paper mill sites, I refer the reader to Whitherspoon (1995)'s personal account as a Ghostwriter.

Situations in which authors, whether students or professionals, find themselves in need of extensive external assistance with their writing can also raise some interesting ethical dilemmas. For example, consider the doctoral candidate who, because of limited writing skills, relies heavily on an individual or editorial service resulting in that individual making substantial editorial changes to the writing of the thesis. Such a situation may be acceptable as long as the named author indicates in a byline or acknowledgement section the full extent of others' assistance. This, however, is not always done and one of the reasons is that such acknowledgement may reflect negatively on the author as possibly indicating that s/he does not have the necessary skills expected of a doctoral candidate. By mischaracterizing or by not acknowledging altogether the high level of assistance received, students falsely portray a level of academic competency that they truly lack. In instances in which doctoral students anticipate relying on outside individuals to help with the writing of a thesis or even term paper, it is strongly recommended that they confer with their thesis committee and supervisor to determine the accepted parameters of such assistance and to fully disclose the nature of the assistance received.

Professional Ghost Authorship

In the literary world ghost authorship is most often associated with celebrity-authored works in which a celebrity, together with a skilled writer produce written products, such as an autobiography or a sort of "tell all" book. Although much of the writing may be done by the ghost writer, his/her contributions are not always acknowledged and, consequently, in those instances the reader may be mislead into believing that the celebrity is the sole author of the work.

In the biomedical sciences ghost writing has become particularly problematic (see Ngai, Gold, Gill, & Rochon, 2005). For example, in a typical scenario, a pharmaceutical or medical device company will hire an outside researcher with known expertise in the company's line of products (e.g., antidepressants) to write an "balanced " review of their product. To facilitate the write-up of the paper, the company furnishes the expert with a draft of the paper that had already been prepared by a ghost author employed by the company. And, as it often happens in these types of cases, the resulting paper ends up portraying the product in a more favorable light than in reality it might deserve.

The extent of ghost contributions can range from the initial draft framing of a manuscript to the complete or nearly complete write-up of the paper (see the distinction made by Chalmers as cited by Altus, 2006). In either case, the main concern is the extent to which the writing influences the reader toward a particular product or point of view rather than presenting an unbiased position or data. In the

past few years, several articles and editorials have condemned the practice as ethically questionable. For example, the World Association of Medical Editors has produced a position statement, which considers ghost authorship dishonest and unacceptable.

Complete list of Guidelines

1. An ethical writer ALWAYS acknowledges the contributions of others and the source of his/her ideas.

2. Any verbatim text taken from another author must be enclosed in quotation marks.

3. We must always acknowledge every source that we use in our writing; whether we paraphrase it, summarize it, or enclose it quotations.

4. When we summarize, we condense, in our own words, a substantial amount of material into a short paragraph or perhaps even into a sentence.

5. Whether we are paraphrasing or summarizing we must always identify the source of our information.

6. When paraphrasing and/or summarizing others' work we must reproduce the exact meaning of the other author's ideas or facts using our words and sentence structure.

7. In order to make substantial modifications to the original text that result in a proper paraphrase, the author must have a thorough understanding of the ideas and terminology being used.

8.A responsible writer has an ethical responsibility to readers, and to the author/s from whom s/he is borrowing, to respect others' ideas and words, to credit those from whom we borrow, and whenever possible, to use one's own words when paraphrasing.

9. When in doubt as to whether a concept or fact is common knowledge, provide a citation.

10. Authors who submit a manuscript for publication containing data, reviews, conclusions, etc., that have already been disseminated in some significant manner (e.g., published as an article in another journal, presented at a conference, posted on the internet) must clearly indicate to the editors and readers the nature of the previous dissemination.

11. Authors of complex studies should heed the advice previously put forth by Angell & Relman (1989). If the results of a single complex study are best presented as a 'cohesive' single whole, they should not be partitioned into individual papers. Furthermore, if there is any doubt as to whether a paper submitted for publication represents fragmented data, authors should enclose other papers (published or unpublished) that might be part of the paper under consideration (Kassirer & Angell, 1995)

12. Because some instances of plagiarism, self-plagiarism, and even some writing practices that might otherwise be acceptable (e.g., extensive paraphrasing or quoting of key elements of a book) can constitute copyright infringement, authors are strongly encouraged to become familiar with basic elements of copyright law.

13. While there are some situations where text recycling is an acceptable practice, it may not be so in other situations. Authors are urged to adhere to the spirit of ethical writing and avoid reusing their own previously published text, unless it is

done in a manner consistent with standard scholarly conventions (e.g., by using of quotations and proper paraphrasing).

14. Authors are strongly urged to double-check their citations. Specifically, authors should always ensure that each reference notation appearing in the body of the manuscript corresponds to the correct citation listed in the reference section and that each source listed in the reference section has been cited at some point in the manuscript. In addition, authors should also ensure that all elements of a citation (e.g., spelling of authors' names, volume number of journal, pagination) are derived directly from the original paper, rather than from a citation that appears on a secondary source. Finally, authors should ensure that credit is given to those authors who first reported the phenomenon being studied.

15. The references used in a paper should only be those that are directly related to its contents. The intentional inclusion of references of questionable relevance for purposes of manipulating a journal's or a paper's impact factor or a paper's chances of acceptance is an unacceptable practice.

16. Authors should follow a simple rule: Strive to obtain the actual published paper. When the published paper cannot be obtained, cite the specific version of the material being used, whether it is conference presentation, abstract, or an unpublished manuscript.

17. Generally, when describing others' work, do not rely on a secondary summary of that work. It is a deceptive practice, reflects poor scholarly standards, and can lead to a flawed description of the work described.

18. If an author must rely on a secondary source (e.g., textbook) to describe the contents of a primary source (e.g., an empirical journal article), s/he should consult

writing manuals used in her discipline to follow the proper convention to do so. Above all, always indicate the actual source of the information being reported.

19. When borrowing heavily from a source, authors should always craft their writing in a way that makes clear to readers which ideas are their own and which are derived from the source being consulted.

20. When appropriate, authors have an ethical responsibility to report evidence that runs contrary to their point of view. In addition, evidence that we use in support of our position must be methodologically sound. When citing supporting studies that suffer from methodological, statistical, or other types of shortcomings, such flaws must be pointed out to the reader.

21. Authors have an ethical obligation to report all aspects of the study that may impact the independent replicability of their research.

22. Researchers have an ethical responsibility to report the results of their studies according to their a priori plans. Any post hoc manipulations that may alter the results initially obtained, such as the elimination of outliers or the use of alternative statistical techniques, must be clearly described along with an acceptable rationale for using such techniques.

23. Authorship determination should be discussed prior to commencing a research collaboration and should be based on established guidelines, such as those of the International Committee of Medical Journal Editors.

24. Only those individuals who have made substantive contributions to a project merit authorship in a paper.

25. Faculty-student collaborations should follow the same criteria to establish authorship. Mentors must exercise great care to neither award authorship to

students whose contributions do not merit it, nor to deny authorship and due credit to the work of students.

26. Academic or professional ghost authorship in the sciences is ethically unacceptable.

27. Authors must become aware of possible conflicts of interest in their own research and to make every effort to disclose those situations (e.g., stock ownership, consulting agreements to the sponsoring organization) that may pose actual or potential conflicts of interest."

*In recognizing the importance of educating aspiring scientists in the responsible conduct of research (RCR), the Office of Research Integrity (ORI), began sponsoring in 2002 the creation of instructional resources to address this pressing need. The present guide on avoiding plagiarism and other inappropriate writing practices was created, in part, to meet this need. Its purpose is to help students, as well as professionals, identify and prevent such practices and to develop an awareness of ethical writing. This guide is one of the many products stemming from ORI's educational initiatives in the RCR.

DISSERTATION

UNIT V

CITATIONS & REFERENCES

1.0. Introduction:

Citations are the notations in the text of a paper that identify the source of our claims, other research and theories mentioned in the paper. Depending on the style of writing used these are typically represented as numbers in parentheses or in superscript (e.g., AMA) or as last names with dates (e.g., APA). The list of references is always found at the end of a paper and these contain sufficient detail for readers to track down copies of these works (e.g., names of the authors, titles of articles or books, journal title, volume number, pagination and year of publication).

References provide a crucial service in scholarly and scientific writing for they allow the reader to explore in more detail a given line of thinking or evidence. For these reasons, it is important that authors strive for accuracy when listing references in manuscripts. Unfortunately, it appears that authors do not always give the proper level of attention to citations and reference sections. In fact, the available evidence suggests that a disproportionate

number of errors occur in reference sections even in some of the most prestigious biomedical journals (e.g., Siebers and Holt, 2000).

Another area of concern is the failure to cite the author who first reports the phenomenon being studied. Apparently, some authors instead cite later studies that better substantiate the original observation. However, as Zigmond and Fischer (2002) note, failure to cite the original report denies the individual who made the initial discovery his/her due credit.

Authors are strongly urged to double-check their citations. Specifically, authors should always ensure that each reference notation appearing in the body of the manuscript corresponds to the correct citation listed in the reference section and vice versa and that each source listed in the reference section has been cited at some point in the manuscript. In addition, authors should also ensure that all elements of a citation (e.g., spelling of authors' names, volume number of journal, pagination) are derived directly from the original paper, rather than from a citation that appears on a secondary source. Finally, authors should ensure that credit is given to those authors who first reported the phenomenon being studied.

The references used in a paper should only be those that are directly related to its contents. The intentional inclusion of references of questionable relevance for purposes of manipulating a journal's or a paper's impact factor or a paper's chances of acceptance is an unacceptable practice.

Relying on an abstract or a preliminary version of a paper while citing the published version

At the beginning of this instructional resource we identified clarity, conciseness, accuracy, and integrity as essential elements of scientific writing. Unfortunately, the latter two concepts are sometimes overlooked with certain citation practices. Consider what can happen in the following scenario. A researcher needs to conduct a literature review for a manuscript that he is preparing for submission to a biomedical journal. She begins her search by accessing the PubMed database and typing topic-relevant terms in the search field. The search yields several useful abstracts and the researcher proceeds to track down the various journal articles. Unfortunately, one key article is not available on-line. It is not carried by her institution's library, nor is it available at nearby libraries as it has been published as a technical report in a nontraditional journal with very limited circulation. Pressed for time, the researcher decides, instead, to rely on material from the abstract for the literature review and includes the journal article citation in the reference section. However, she fails to indicate that she relied on the abstract and not the actual journal article.

Another variation of this problem occurs when the researcher cites the published version of the paper, but actually relies on the contents of an earlier version that was published in the proceedings of a conference, or the

preliminary version that was distributed at the conference presentation itself. These behaviors violate the requisites of accuracy and integrity.

The main problem with relying on versions other than the published paper is that important elements of these earlier versions may be different from their counterparts in the published version of the paper. Such changes are typically due to the peer review process, editorial changes, or errors that are spotted and corrected by the author between the time the paper is presented at a conference and the time that it is subsequently published. In some cases, the published version will contain additional data and/or interpretations that are substantially different or perhaps even contrary to those of earlier versions. For example, a conference paper describing experimental data may, in its published form, may contain additional data from a new experimental condition that was run in response to referees' suggestions. Data from the new condition can place the earlier data in a new perspective possibly leading to new interpretations. Again, with respect to abstracts, relying on such summaries can be problematic because abstracts typically do not provide sufficient details about the paper's contribution (i.e., Taylor, 2002). In addition, because of their condensed form, abstracts cannot provide essential details about a study's methodology, and results. Moreover, we note that in some databases there may be instances in which individuals other than the author/s of the journal article write the article's abstract. As a result, subtle misrepresentations are more likely to occur. Writing guidelines, such as the Uniform Requirements for Manuscripts Submitted to Biomedical Journals, discourage the use of abstracts as references.

2.0. The MLA Style citation: English and other Humanities:

In English and other humanities classes, you may be asked to use the MLA (Modern Language Association) system for documenting sources, which is set forth in the MLA Handbook for Writers of Research Papers, 7th ed. (New York: MLA, 2009).

MLA recommends in-text citations that refer readers to a list of works cited. An in-text citation names the author of the source, often in a signal phrase, and gives a page number in parentheses. At the end of the paper, a list of works cited provides publication information about the source; the list is alphabetized by authors' last names (or by titles for works without authors).

MLA in-text citations:

MLA in-text citations are made with a combination of signal phrases and parenthetical references. A signal phrase introduces information taken from a source (a quotation, summary, paraphrase, or fact); usually the signal phrase includes the author's name. The parenthetical reference comes after the cited material, often at the end of the sentence. It includes at least a page number (except for unpaginated sources, such as those found online).

The guidelines presented here are consistent with advice given in the MLA Handbook for Writers of Research Papers, 7th ed. (2009).

2.0.1. IN-TEXT CITATION

Kwon points out that the Fourth Amendment does not give employees any protections from employers' "unreasonable searches and seizures" (6).

Readers can look up the author's last name in the alphabetized list of works cited, where they will learn the work's title and other publication information. If readers decide to consult the source, the page number will take them straight to the passage that has been cited.

I. Basic Rules for Print and Online Sources

The MLA system of in-text citations, which depends heavily on authors' names and page numbers, was created with print sources in mind. Although many online sources have unclear authorship and lack page numbers, the basic rules are the same for both print and online sources.

The models in this section (items 1–5) show how the MLA system usually works and explain what to do if your source has no author or page numbers.

1. **Author named in a single phrase:**

   Ordinarily, introduce the material being cited with a signal phrase that includes the author's name. In addition to preparing

readers for the source, the signal phrase allows you to keep the parenthetical citation brief.

Frederick Lane reports that employers do not necessarily have to use software to monitor how their employees use the Web: employers can “use a hidden video camera pointed at an employee’s monitor” and even position a camera ”so that a number of monitors [can] be viewed at the same time” (147).

The signal phrase — Frederick Lane reports — names the author; the parenthetical citation gives the page number of the book in which the quoted words may be found.
Notice that the period follows the parenthetical citation. When a quotation ends with a question mark or an exclamation point, leave the end punctuation inside the quotation mark and add a period at the end of your sentence: “. . .?” (8).

2. **Author named in parentheses:**

If a signal phrase does not name the author, put the author’s last name in parentheses along with the page number. Use no punctuation between the name and the page number.

Companies can monitor employees’ every keystroke without legal penalty, but they may have to combat low morale as a result (Lane 129).

3. **Author unknown:**

   Either use the complete title in a signal phrase or use a short form of the title in parentheses. Titles of books are italicized; titles of articles are put in quotation marks.

   A popular keystroke logging program operates invisibly on workers' computers yet provides supervisors with details of the workers' online activities ("Automatically").

   TIP: Before assuming that a Web source has no author, do some detective work. Often the author's name is available but is not easy to find. For example, it may appear at the end of the page, in tiny print. Or it may appear on another page of the site, such as the home page.

   NOTE: If a source has no author and is sponsored by a corporation or government agency, name the corporation or agency as the author (see items 8 and 17).

4. **Page number unknown:**

   Do not include the page number if a work lacks page numbers, as is the case with many Web sources. Even if a printout from a Web site shows page numbers, treat the source as unpaginated in the in-text citation because not all printouts give the same page numbers. (When the pages of a Web source are stable, as in PDF files, supply a page number in your in-text citation.)

As a 2005 study by Salary.com and America Online indicates, the Internet ranked as the top choice among employees for ways of wasting time on the job; it beat talking with co-workers—the second most popular method—by a margin of nearly two to one (Frauenheim).

If a source has numbered paragraphs or sections, use "par." (or "pars.") or "sec." (or "secs.") in the parentheses: (Smith, par. 4). Notice that a comma follows the author's name in this case.

5. **One page source:**

If the source is one page long, MLA allows (but does not require) you to omit the page number. Many instructors will want you to supply the page number because without it readers may not know where your citation ends or, worse, may not realize that you have provided a citation at all.

   a) **No page number in citation**

      Anush Yegyazarian reports that in 2000 the National Labor Relations Board's Office of the General Counsel helped win restitution for two workers who had been dismissed because their employers were displeased by the employees' e-mails about work-related issues. The

case points to the ongoing struggle to define what constitutes protected speech in the workplace.

b) Page number in citation:

Anush Yegyazarian reports that in 2000 the National Labor Relations Board's Office of the General Counsel helped win restitution for two workers who had been dismissed because their employers were displeased by the employees' e-mails about work-related issues (62). The case points to the ongoing struggle to define what constitutes protected speech in the workplace.

II. Variations in the basic rules

This section describes the MLA guidelines for handling a variety of situations not covered by the basic rules in items 1–5. These rules for in-text citations are the same for both print and online sources.

6. Two or three authors:

Name the authors in a signal phrase, as in the following example, or include their last names in the parenthetical reference: (Kizza and Ssanyu 2).

Kizza and Ssanyu note that “employee monitoring is a dependable, capable, and very affordable process of electronically or otherwise recording all employee activities at work” and elsewhere (2).

When three authors are named in the parentheses, separate the names with commas: (Alton, Davies, and Rice 56).

7. **Four or more authors:**

Name all of the authors or include only the first author’s name followed by “et al.” (Latin for “and others”). The format you use should match the format in your works cited entry (see item item 3).

The study was extended for two years, and only after results were reviewed by an independent panel did the researchers publish their findings (Blaine et al. 35).

8. **Organization as author:**

When the author is a corporation or an organization, name that author either in the signal phrase or in the parentheses. (For a government agency as author, see item 17)

According to a 2001 survey of human resources managers by the American Management Association, more than three-

quarters of the responding companies reported disciplining employees for "misuse or personal use of office telecommunications equipment" (2).

In the list of works cited, the American Management Association is treated as the author and alphabetized under A. When you give the organization name in parentheses, abbreviate common words in the name: "Assn.," "Dept.," "Natl.," "Soc.," and so on.

In a 2001 survey of human resources managers, more than three-quarters of the responding companies reported disciplining employees for "misuse or personal use of office telecommunications equipment" (Amer. Management Assn. 2).

9. **Authors with the same last name:**

If your list of works cited includes works by two or more authors with the same last name, include the author's first name in the signal phrase or first initial in the parentheses.

Estimates of the frequency with which employers monitor employees' use of the Internet each day vary widely (A. Jones 15).

10. Two or more works by the same author:

Mention the title of the work in the signal phrase or include a short version of the title in the parentheses.

The American Management Association and ePolicy Institute have tracked employers' practices in monitoring employees' e-mail use. The groups' 2003 survey found that one-third of companies had a policy of keeping and reviewing employees' e-mail messages ("2003 E-mail" 2); in 2005, more than 55% of companies engaged in e-mail monitoring ("2005 Electronic" 1).

Titles of articles and other short works are placed in quotation marks; titles of books are italicized.
In the rare case when both the author's name and a short title must be given in parentheses, separate them with a comma.

A 2004 survey found that 20% of employers responding had employees' e-mail "subpoenaed in the course of a lawsuit or regulatory investigation," up 7% from the previous year (Amer. Management Assn. and ePolicy Inst., "2004 Workplace" 1).

11. Two or more works in one citation:

To cite more than one source in the parentheses, give the citations in alphabetical order and separate them with a semicolon.

The effects of sleep deprivation among college students have been well documented (Cahill 42; Leduc 114; Vasquez 73).

Multiple citations can be distracting, so you should not overuse the technique. If you want to alert readers to several sources that discuss a particular topic, consider using an information note instead.

12. Repeated citations from the same source:

When you are writing about a single work of fiction, you do not need to include the author's name each time you quote from or paraphrase the work. After you mention the author's name at the beginning of your paper, you may include just the page number in your parenthetical citations.

In Susan Glaspell's short story "A Jury of Her Peers," two women accompany their husbands and a county attorney to an isolated house where a farmer named John Wright has been choked to death in his bed with a rope. The chief suspect is Wright's wife, Minnie, who is in jail awaiting trial. The sheriff's wife, Mrs. Peters, has come along to gather some personal items for Minnie, and Mrs. Hale has joined her. Early in the story, Mrs. Hale sympathizes with Minnie and objects to the way the male investigators are "snoopin' round and criticizin'" her kitchen (200). In contrast, Mrs. Peters shows

respect for the law, saying that the men are doing “no more than their duty” (201).

In a second citation from the same nonfiction source in one paragraph, you may omit the author’s name in the signal phrase as long as it is clear that you are still referring to the same source.

13. Encyclopedia or dictionary entry:

Unless an encyclopedia or a dictionary has an author, it will be alphabetized in the list of works cited under the word or entry that you consulted (see item 18). Either in your text or in your parenthetical citation, mention the word or entry. No page number is required, since readers can easily look up the word or entry.

The word crocodile has a surprisingly complex etymology (“Crocodile”).

14. Multivolume work:

If your paper cites more than one volume of a multivolume work, indicate in the parentheses the volume you are referring to, followed by a colon and the page number.

In his studies of gifted children, Terman describes a pattern of accelerated language acquisition (2: 279).

If you cite only one volume of a multivolume work, you will include the volume number in the list of works cited and will not need to include it in the parentheses. (See the second example in item 17.)

15. Entire work:

Use the author's name in a signal phrase or a parenthetical citation. There is no need to use a page number.

Lane explores the evolution of surveillance in the workplace.

16. Selection in an anthology:

Put the name of the author of the selection (not the editor of the anthology) in the signal phrase or the parentheses.

In "Love Is a Fallacy," the narrator's logical teachings disintegrate when Polly declares that she should date Petey because "[h]e's got a raccoon coat" (Shulman 379).

In the list of works cited, the work is alphabetized under Shulman, not under the name of the editor of the anthology.

Shulman, Max. “Love Is a Fallacy.” Current Issues and Enduring Questions. Ed. Sylvan Barnet and Hugo Bedau. 8th ed. Boston: Bedford, 2008. 371-79. Print.

17. Government document:

When a government agency is the author, you will alphabetize it in the list of works cited under the name of the government, such as United States or Great Britain (see item 73). For this reason, you must name the government as well as the agency in your in-text citation.

Online monitoring by the United States Department of the Interior over a one-week period found that employees’ use of “sexually explicit and gambling websites . . . accounted for over 24 hours of Internet use” and that “computer users spent over 2,004 hours accessing game and auction sites” during the same period (3).

18. Historical document:

For a historical document, such as the United States Constitution or the Canadian Charter of Rights and Freedoms, provide the document title, neither italicized nor in quotation marks, along with relevant article and section numbers. In parenthetical citations, use common abbreviations such as “art.”

and “sec.” and abbreviations of well-known titles (US Const., art. 1, sec. 2).

While the United States Constitution provides for the formation of new states (art. 4, sec. 3), it does not explicitly allow or prohibit the secession of states.

For other historical documents, cite as you would any other work, by the first element in the works cited entry (see item 74).

19. Legal Source:

For legislative acts (laws) and court cases, name the act or case either in a signal phrase or in parentheses. Italicize the names of cases but not the names of acts.

The Jones Act of 1917 granted US citizenship to Puerto Ricans.

In 1857, Chief Justice Roger B. Taney declared in Dred Scott v. Sandford that blacks, whether enslaved or free, could not be citizens of the United States.

20. Visual such as photograph, map or chart:

To cite a visual that has a figure number in the source, use the abbreviation “fig.” and the number in place of a page number in

your parenthetical citation: (Manning, fig. 4). Spell out the word “figure” if you refer to it in your text.

To cite a visual that does not have a figure number in a print source, use the visual’s title or a general description in your text and cite the author and page number as for any other source.

For a visual that is not contained in a source such as a book or periodical, identify the visual in your text and then cite it using the first element in the works cited entry: the photographer’s or artist’s name or the title of the work. (See item 69.)

Photographs such as Woman Aircraft Worker (Bransby) and Women Welders (Parks) demonstrate the US government’s attempt to document the contributions of women on the home front during World War II.

21. E-Mail, letter, or personal interview cite:

e-mail messages, personal letters, and personal interviews by the name listed in the works cited entry, as for any other source. Identify the type of source in your text if you feel it is necessary. (See item 53 and items 83 and 84.)

22. Website or other electronic source:

Your in-text citation for an electronic source should follow the same guidelines as for other sources. If the source lacks page numbers but has numbered paragraphs, sections, or divisions,

use those numbers with the appropriate abbreviation in your in-text citation: “par.,” “sec.,” “ch.,” “pt.,” and so on. Do not add such numbers if the source itself does not use them. In that case, simply give the author or title in your in-text citation.

Julian Hawthorne points out profound differences between his father and Ralph Waldo Emerson but concludes that, in their lives and their writing, “together they met the needs of nearly all that is worthy in human nature” (ch. 4).

23. Indirect source (source quoted in another source):

When a writer’s or a speaker’s quoted words appear in a source written by someone else, begin the parenthetical citation with the abbreviation “qtd. in.”

Researchers Botan and McCreadie point out that “workers are objects of information collection without participating in the process of exchanging the information . . .” (qtd. in Kizza and Ssanyu 14).

III. Literary works and sacred texts

24. Literary work without parts or line numbers:

Many literary works, such as most short stories and many novels and plays, do not have parts or line numbers. In such cases, simply cite the page number.

At the end of Kate Chopin's "The Story of an Hour," Mrs. Mallard drops dead upon learning that her husband is alive. In the final irony of the story, doctors report that she has died of a "joy that kills" (25).

25. Verse play or poem:

For verse plays, give act, scene, and line numbers that can be located in any edition of the work. Use arabic numerals and separate the numbers with periods.

In Shakespeare's King Lear, Gloucester, blinded for suspected treason, learns a profound lesson from his tragic experience: "A man may see how this world goes / with no eyes" (4.6.148-49).

For a poem, cite the part, stanza, and line numbers, if it has them, separated by periods.

The Green Knight claims to approach King Arthur's court "because the praise of you, prince, is puffed so high, / And your manor and your men are considered so magnificent" (1.12.258-59).

For poems that are not divided into numbered parts or stanzas, use line numbers. For a first reference, use the word "lines": (lines 5-8). Thereafter use just the numbers: (12-13).

26. Novel with numbered divisions:

When a novel has numbered divisions, put the page number first, followed by a semicolon, and then the book, part, or chapter in which the passage may be found. Use abbreviations such as "pt." and "ch."

One of Kingsolver's narrators, teenager Rachel, pushes her vocabulary beyond its limits. For example, Rachel complains that being forced to live in the Congo with her missionary family is "a sheer tapestry of justice" because her chances of finding a boyfriend are "dull and void" (117; bk. 2, ch. 10).

27. Sacred text:

When citing a sacred text such as the Bible or the Qur'an, name the edition you are using in your works cited entry (see item 19). In your parenthetical citation, give the book, chapter, and verse (or their equivalent), separated by periods. Common abbreviations for books of the Bible are acceptable.

Consider the words of Solomon: "If your enemy is hungry, give him bread to eat; and if he is thirsty, give him water to drink" (Oxford Annotated Bible, Prov. 25.21).

The title of a sacred work is italicized when it refers to a specific edition of the work, as in the preceding example. If you refer to the book in a general sense in your text, neither italicize it nor put it in quotation marks: “The Bible and the Qur’an provide allegories that help readers understand how to lead a moral life.”

3.0. MLA manuscript format:

The following guidelines are consistent with advice given in the MLA Handbook for Writers of Research Papers, 7th ed. (New York: MLA, 2009), and with typical requirements for student papers.

1) Formatting the paper

Papers written in MLA style should be formatted as follows.

- **Materials and Font:** Use good-quality 8½″ × 11″ white paper. Avoid a font that is unusual or hard to read.

- **Title and identification:** MLA does not require a title page. On the first page of your paper, place your name, your instructor’s name, the course title, and the date on separate lines against the left margin. Then center your

title. If your instructor requires a title page, ask for formatting guidelines. A format similar to this one may be acceptable.

- **Pagination:** Put the page number preceded by your last name in the upper right corner of each page, one-half inch below the top edge. Use Arabic numerals (1, 2, 3, and so on).

- **Margins, line spacing, and paragraph indents:** Leave margins of one inch on all sides of the page. Left-align the text.

  Double-space throughout the paper. Do not add extra space above or below the title of the paper or between paragraphs.

  Indent the first line of each paragraph one-half inch from the left margin.

- **Capitalization and italics:** In titles of works, capitalize all words except articles (a, an, the), prepositions (to, from, between, and so on), coordinating conjunctions (and, but, or, nor, for, so, yet), and the to in infinitives — unless they are the first or last word of the title or subtitle. Follow these guidelines in your paper even if the title appears in all capital or all lowercase letters in the source.

In the text of an MLA paper, when a complete sentence follows a colon, lowercase the first word following the colon unless the sentence is a well-known expression or principle.

Italicize the titles of books and other long works, such as Web sites. Use quotation marks around the titles of periodical articles, short stories, poems, and other short works. (Some instructors may prefer underlining for the titles of long works. Be consistent throughout your paper.)

- **Long quotations:** When a quotation is longer than four typed lines of prose or three lines of verse, set it off from the text by indenting the entire quotation one inch from the left margin. Double-space the indented quotation, and do not add extra space above or below it.

  Quotation marks are not needed when a quotation has been set off from the text by indenting. Click here for an example.

- **Web addresses:** When a Web address (URL) mentioned in the text of your paper must be divided at the end of a line, break it only after a slash and do not insert a hyphen. See the MLA rules on dividing Web addresses in your list of works cited.

- **Headings:** MLA neither encourages nor discourages the use of headings and provides no guidelines for their use. If you would like to insert headings in a long essay or research paper, check first with your instructor.

- **Visuals:** MLA classifies visuals as tables and figures (figures include graphs, charts, maps, photographs, and drawings). Label each table with an arabic numeral ("Table 1," "Table 2," and so on) and provide a clear caption that identifies the subject. Capitalize the caption as you would a title; do not italicize the label and caption or place them in quotation marks. The label and caption should appear on separate lines above the table, flush with the left margin.

  For a table that you have borrowed or adapted, give the source below the table in a note like the following:
  Source: David N. Greenfield and Richard A. Davis; "Lost in Cyberspace: The Web @ Work"; CyberPsychology and Behavior 5.4 (2002): 349; print.

  For each figure, place the figure number (using the abbreviation "Fig.") and a caption below the figure, flush left. Capitalize the caption as you would a sentence; include source information following the caption. (When referring to the figure in your paper, use the abbreviation

"fig." in parenthetical citations; otherwise spell out the word.) Click here for an example of a figure in a paper.

Place visuals in the text, as close as possible to the sentences that relate to them, unless your instructor prefers them in an appendix.

2) Preparing the list of works cited

Begin the list of works cited on a new page at the end of the paper. Center the title Works Cited about one inch from the top of the page. Double-space throughout.

- **Alphabetizing the list:** Alphabetize the list by the last names of the authors (or editors); if a work has no author or editor, alphabetize by the first word of the title other than A, An, or The.

  If your list includes two or more works by the same author, use the author's name for the first entry only. For subsequent entries, use three hyphens followed by a period. List the titles in alphabetical order.

- **Indenting:** Do not indent the first line of each works cited entry, but indent any additional lines one-half inch. This technique highlights the names of the authors, making it easy for readers to scan the alphabetized list.

- **Web addresses:** If you need to include a Web address (URL) in a works cited entry, do not insert a hyphen when dividing it at the end of a line. Break the URL only after a slash. Insert angle brackets around the URL. If your word processing program automatically turns Web addresses into links (by underlining them and changing the color), turn off this feature.

Note: For a complete list of works cited and its basic format please refer to the latest guidelines given in the *MLA Handbook for Writers of Research Papers, 7th ed. (2009).*