Indira Gandhi National Open University
School of Continuing Education

MFNP-012
Dissertation

DISSERTATION

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INTRODUCTION

The Course MFNP-012 - Dissertation - is an *original*, *rigorous* research work carried out with substantial *independence* by the MSc. students of the Dietetics and Food Service Management Programme launched by IGNOU. It is worth 8 credits (240 study hours) of study.

The MSc. Dissertation is intended to be the demonstration of research expertise and the mastery of knowledge of current practices and theoretical frameworks of dietetics and food service management education. It is intended to be the field-based experience of the programme (MSc. (DFSM) intended to prepare students to conduct original research in the teaching and learning of nutrition, dietetics and related areas.

The *Dissertation Guidelines* prepared as part of the MFNP-012 course is the governing document regarding the dissertation process and the form and substance of dissertation documents. For matters regarding the dissertation that are not covered in the Dissertation Guidelines, students should follow the advice of their programme incharge and the dissertation counselor.

The research work you carry out as part of this course will represents a significant extrapolation from a base of solid experience or knowledge in the area of concentration. In a significant way, the dissertation will advance knowledge, improve professional practice or contribute to your understanding in the field of study.

Your Dissertation should establish that you are capable of an intellectual and scholarly endeavor that contributes new information to the dietetics/nutrition education knowledge base. The Dissertation is an indication that you as a student have an ability to pose a question of intellectual merit and are able to pursue methods of scientific inquiry.

As part of the dissertation work you would be expected to carry out various activities. A checklist of the activities, to be undertaken in the order presented, is enumerated herewith for your reference.

Dissertation Checklist

1) ***Consult the Programme Incharge for Assignment of Dissertation Guide/ Counselor***: The first thing you do is to contact the programme study centre incharge. The programme incharge shall make arrangements to provide suitable counselos/guides to students (on one to one basis) for undertaking the research work. Student may also identify the counselor from the programme study centre or an expert from outside (with relevant research and subject background) whom they want to use for their Thesis/Dissertation. Under such circumstances, consult with the programme incharge for allotment. In case of an expert considered from outside, the student would make the necessary arrangements to provide the bio-data of the expert to the programme incharge who would ensure the qualifications / experience / expertise of the guide meets the requirement of the programme (an supervisor/ guide/counselor must have a Doctoral degree in the area of nutrition, dietetics, health or the relevant area. In case of a Masters degree the supervisor must have relevant research experience for a specified time). In case of doubt the programme incharge may forward the outside dissertation guide/counselor biodata to the Programme Coordinator at IGNOU headquarters for advice.

2) ***Consult with Dissertation Guide/Counselor:*** Once the dissertation counselor is assigned, the student in consultation with the counselor shall decide on the area of research and the specific topic for the dissertation. The student should discuss the proposed topic with this guide/advisor and refine as necessary.

3) ***Select an Area of Study and relevant Topic:*** The student should identify a research area and the specific topic for research and define the problem or point of interest to be addressed.

4) ***Review Literature:*** The student should review the literature available related to the topic of the dissertation and consult with the counselor/guide concerning the chosen topic including the method of approach and ways to evaluate the results.

5) ***Prepare and Submit Thesis/Dissertation Proposal:*** The student should submit a Dissertation proposal to the counselor by the given deadline (with information to the programme incharge). The student will be notified of what changes are necessary before final approval will be granted by the counselor.

6) ***Conduct the Study:*** Only after receiving the dissertation approval (from the counselor), the student may proceed to develop the dissertation, conduct it and begin writing.

7) ***Communicate Regularly with your Dissertation Counselor/Guide:*** Share your experiences, report on the data collected, report the difficulties/problems encountered to the counselor. Discuss the data analysis and other issues. Give them copies of your chapters as they are completed for review and comment.

8) ***Submit First Draft:*** Submit the entire first draft to the counselor for review and feedback. Please be sure your draft is in proper style and format, and has been carefully proofread for spelling, grammar, punctuation and format. Make the necessary changes as suggested.

9) ***Submit the Final Manuscript***: Submit the first bound copy of the word-processed, printed dissertation to the programme incharge for necessary action. Make sure you have got your counselor's and programme incharge signatures at the relevant places.

10) ***Evaluation by Outside Expert:*** Dissertations will be evaluated in the order received. The dissertation will be sent to an expert for evaluation and conduct of viva-voce (oral defence).

Before you get down to study this manual and subsequently planning your research work, we strongly recommend that you review the important terminologies described in the next section "Understanding the Technical Terms". Understanding of these terminologies will guide you in designing, planning your research study.

UNDERSTANDING THE TECHNICAL TERMS

Here is a description of certain terminologies used in research work. Read them carefully before you get down to planning for your research work

Descriptive Study: A study that focuses on a particular situation or set of situations, reports on important aspects observed, and attempts to determine the interrelationships among them. Generally, in a descriptive study, the emphasis is on estimation rather than testing. Some of the quantities you might want to estimate are:

1) the prevalence of a disease,
2) the natural history of a disease.
3) the resources required to treat the disease.
4) attitudes and perceptions about the disease.

Experimental Design: In the scientific method, an *experiment*, is a set of actions and observations, performed in the context of solving a particular problem or question, to support or falsify a hypothesis or research concerning phenomena. In an experiment, we deliberately change one or more process variables (or factors) in order to observe the effect the changes have on one or more response variables. Most experimental studies allocate and compare treatments between individual subjects and/or population groups.

To put it is simple words experimental design is a research design in which the researcher has control over the selection of participants in the study, and these participants are randomly assigned to treatment and control groups. For examples we could undertake a coronary heart disease prevention project. Office executives may be invited to participate in this project. Office executives could be assigned to two groups - one receiving a programme of screening for coronary risk factors and nutrition education and the other left alone. Subsequent disease incidence can be then compared between the groups.

Correlation Study: Correlation studies, as the phrase implies, look at co-relations between variables. For example, a researcher looking at body shape might correlate the height and weight of a number of people. What would the relationship between these two variables look like? Another example would be a researcher looking at anaemia incidence and might correlate underweight, hookworm infestation, poor dietary practices of a specific vulnerable group to anaemia incidence.

Observational Study: In order to study the relationships among variables, observational studies are performed. Unlike controlled experimental designs where only certain variables are allowed to vary (at prespecified levels), in observational studies the variables are observed and recorded. Often some of the variables are controlled as much as possible. Consider a long term study on a drug involving humans where a variable that needs to be controlled is diet. The diet guidelines are set but these will probably be broken from time to time (or maybe often) by some of the human subjects. Thus through an observation study the diet pattern can be assessed and recorded. In observational studies, cause and effect are hard (often impossible) to establish. But associations and predictabilities among variables can be investigated.

Other examples can be the study of hospital records to see if they indicate that the incidence of a disease is related to season and/or blood groups etc. A sample survey, which is used to gain peoples' attitudes towards food, is also a type of observational study.

Intervention Study: In an intervention study, the subjects are selected from one population with a particular characteristic present; then, immediately after baseline, the total study group is split up into a group that receives the intervention and a group that does not receive that intervention (control group). The comparison of the outcomes of the two groups at the end of the study period is an evaluation of the intervention.

Interventions have the intention to improve the condition of an individual or a group of individuals. Some examples of intervention studies in public nutrition research are studies that evaluate the impact of a program: (a) to promote a healthier lifestyle (avoiding smoking, reducing alcohol drinking, increasing physical activity, etc.), (b) to prevent HIV-transmission, (c) to promote healthy child feeding practices and so on.

Cohort Study: A cohort is a group of people who share a common characteristic or experience within a defined time period (e.g., are born, leave school, lose their job, are exposed to a drug or a vaccine, etc.).

Cohort study is an epidemiology study that observes a large group of people over a period of time. Within the cohort, morbidity or mortality rates can be calculated for group members with different exposures. For example one could study the morbidity data among children suffering from anaemia.

Another example of an epidemiologic question that can be answered by the use of a cohort study is: does exposure to X (say, hookworm infestation) correlate with outcome Y (say, anaemia)? Such a study would enroll a group of individuals having hookworm infestation and a group of individuals without the hookworm infestation (the unexposed group) and follow them for a set period of time and note differences in the incidence of anaemia between the groups at the end of this time. In this example, a statistically significant increase in the incidence of anaemia in the infested group as compared to the non-infested group is evidence in favor of the hypothesis.

Cohort study could also be an observational study in which outcomes in a group of patients that received an intervention are compared with outcomes in a similar group ie, the cohort, either contemporary or historical, of patients that did not receive the intervention.

Exploratory Study: Also known as "inductive" or "theory-building". In this kind of study, we don't begin with a theory. Instead, we collect data that, after analysis, we will use to develop a theory. After we develop the theory, we might then design a study to test the theory.

Longitudinal Study: A longitudinal study is a correlational research study that involves observations of the same items over long periods of time, often many decades. A longitudinal study for example would follows patients over an extended period of time to look at changes in individuals. Information is collected on a regular basis and studied by research scientists to find new ways to track disease and predict who will respond to different treatment.

Cross-sectional Study: Cross-sectional analysis is the alternative to longitudinal studies. It form a class of research methods that involve observation of some

subset of a population of items all at the same time. In fact, it is a descriptive study in which disease and exposure status are measured simultaneously in a given population. This type of data can be used to assess the prevalence of acute or chronic conditions in a population.

Qualitative Research (study): It is data that is usually not in the form of numbers. Qualitative research is an inductive approach, and its goal is to gain a deeper understanding of a person's or group's experience, belief, attitude etc. There is no intervention, or control group used in qualitative research. It is naturalistic so that field researchers know what to ask and can change their line of questioning depending on the participant and his/ her response. Focus group meetings are an example of qualitative research.

Case study: To refer to a work as a case study might mean: a) that its method is qualitative, b) that the research is ethnographic, clinical, participant-observation, or otherwise "in the field" c) that the research is characterized by process-tracing, d) that the research investigates the properties of a single case, or e) a single phenomenon, instance, or example. To illustrate, a case study may be a detailed account of a food establishment, industry, person, or project over a given amount of time. The content within a case study may include information about establishment objectives, strategies, challenges, results, recommendations, and more.

Retrospective Study: A retrospective study is a study that looks backwards in time. For example, we try to figure out whether people that are suffering from say chronic degenerative disease(s) were low birth weight babies. A retrospective study is fast. But the condition is that the backward data related to the subjects should be available. Then we just have to tabulate all the results. The one problem is that it's hard to obtain such data.

Prospective Study: In contrast, to retrospective, prospective study looks forward in time**.** For example, we select a group of subjects and sit around and watch them for a decade. A prospective study is slow. Unless you are studying a rapidly fatal disease, you have to wait years or even decades to accumulate sufficient data to draw any strong conclusions.

On the other hand, live subjects make for a more informative interview.

Simple Random Sampling: Samples in which every possible sample of size *n*, that is, every combination of *n* items from the number in the population, is equally likely to be part of the sample.

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Stratified Sampling: Stratified sampling is a method of sampling from a population. In this method, a random sample of specified size is drawn from each stratum of a population. Stratification being the process of grouping members of the population into relatively homogeneous subgroups before sampling.

Cluster Sampling: A multi-stage sampling scheme in which the population is first divided into clusters, then a sample of these clusters is chosen via simple random sampling, and then a simple random sample of population elements is selected within the chosen clusters. This differs from stratified sampling in that in stratified sampling, all strata are sampled, whereas in cluster sampling we take a sample of clusters, not all clusters.

DISSERTATION: AN OVERVIEW

Let us start by reviewing some things, which may seem obvious.

The dissertation is a lengthy, formal, systematic, usually extensive written discourse, especially one written by a candidate for a Doctoral or the Masters degree at a university. The MFNP 012 Course - Dissertation - is part of the requirement for a MSc. degree in Dietetics and Food Service Management offered by IGNOU. MSc. candidates will complete a dissertation that will be rigorous investigations of research questions related to the teaching and learning of nutrition, dietetics and food service management.

The dissertation is a technical work, a piece of individual research which presents an argument and used to document and set forth proof of one's thesis. What do we mean by *thesis*? One's thesis is a *claim* — a hypothesis, a proposition , a conjecture, a theorem etc. To illustrate, a thesis can be that process/strategy X is more effective than Strategy Y or Strategy X is a better way to do Task Y than any previously known method etc. You would realize that every research has a thesis, which is different from another.

The dissertation, describes, in detail, how one proves the hypothesis (or, rarely, disproves the claim and shows other important results). In fact, the dissertation is a formal, stylized document used to argue the thesis. It is a piece of work that will define you as an independent researcher.

The dissertation, therefore, is an opportunity to take a topic that interests you and carry out your own research i.e. expands the frontiers of knowledge. We expect a structured, coherent and well-presented piece of writing that:

— shows evidence of independent research using appropriate methodology,

— shows evidence of primary/secondary reading,

— shows that you can locate the particular issue you have studied in the context of wider debates, making reference to the relevant literature,

— shows evidence of being able to structure and support arguments, and

— shows evidence of engagement with relevant conceptual and theoretical frameworks.

Remember, all researchers need to communicate discoveries; the MSc. dissertation provides training for communication with other researchers/ scientists. The end product i.e. the dissertation report will demonstrate your data collection skills, your analytical skills, and your ability to identify and apply appropriate methodologies, your ability to apply theoretical concepts and knowledge of appropriate literature and your ability to integrate theoretical, empirical and methodological material.

All this sounds quite technical and a bit tough. Is It! Do not panic, we will guide you and take you through this entire exercise with much ease and comfort.

So where do we begin? The dissertation work should follow in sequence the steps of the research process. These are enumerated herewith.

Essential Steps in Research

The steps involved in research are enumerated herewith.

1) *Selection of the subject, field, theme, topic and the specific problem of the research*: This first step sounds simple, but is the most crucial basic step i.e.

selection of the subject for research. This is a key decision, and needs to be given considerable thought. How to decide on the research subject and/or topic? Obviously, it goes without saying that you would like to research on a topic that deals with issues linked with nutrition, dietetics, food service management, food safety, therapeutic nutrition, public nutrition, food technology etc. which is a part of the study of the Masters Programme in Dietetics and Food Service Management. You may go a bit further and explore issues linked with nutritional biochemistry, physiology and nutrition etc. Some examples of the types of research that you as a student might undertake (in the area of nutrition, dietetics) are as follows.

- Experimental designs and corelational studies that depend on empirical research methods and materials.
- Observational and/or descriptive studies which can be related to and lend support to theoretical issues.
- Intervention studies that attempts to offer intellectual insight to issues of human nutrition/ health and disease,
- Exploration and analysis of disease/deficiency conditions, programmes, strategies, institutions, and individuals that contribute to contemporary issues related to policy planning.

Some current/recent/topical research areas are also included in Table 1 for your perusal and consideration Once the broad area/field has been identified, you can move on to identify the specific research problem or topic of research (within the broad area). How? Ideas for topics may come from many sources: a core course, readings and review of journals, books and other references, your job, a discussion with your counselor(s), a discussion with a colleague at your job, or a discussion with a fellow student. The more you read the literature, the easier topic selection will be. Most importantly, select a topic that you can do in the time that is available and meets the requirements of the course/programme.

Table 1: Few Current/Recent/Topical Research Areas

1) *Nutrition, Body Composition, Physical Activity and Metabolism*: Studies to focus on:
   - Adequacy of energy intake
   - Assessment of energy needs specific to our population
   - Food intake and energy balance in obese and underweight individuals.
   - Basal Metabolic Rate of Indian population etc.
2) *Community and Public Health Nutrition* : Topics to focus on:
   - investigation of lifestyle risk factors for chronic diseases,
   - the examination of social and economic factors and current policy directions in relation to the dietary patterns and food security of Indians,
3) *Functional Foods and Nutriceuticals* (elucidate the role of these foods in the prevention and treatment of chronic diseases such as cancer, cardiovascular disease, diabetes, osteoporosis and obesity. Current emphasis is on phytoestrogen-rich foods such as flaxseed, soy and sesame seeds, as well as ginseng, lycopene and tomato products, tea, dietary fiber and low glycemic index foods).

4) *Infant, Child Health and Nutrition*: Issues linked with:

- infant feeding practices,
- breast feeding practices,
- complementary feeding and care practices for infants and young children,
- nutrition and growth in infants, young children and adolescent,
- development of appropriate growth references for our population specially for low birth weight (LBW),
- assessment of under nutrition among 1-5 year old children using the NCHS and the new MGRS standards/reference value,
- assessment of nutritional status of children (1 - 5 years) and adolescent in rural, urban and slum areas,
- issues linked with childhood obesity etc.

5) *Maternal Nutrition and Health*: Studies to focus on:

- maternal nutrition and pregnancy outcome
- nutritional/health status of pregnant women
- lactation counseling support for hospital and home-based deliveries

6) *Vitamin and Mineral Metabolism:* Studies can be conducted on:

- approaches/strategies to prevent micronutrient deficiencies
- studies focused on different stages of the life cycle with emphasis on developing strategies to prevent iron deficiency anemia in infants, children and pregnant women and/or strategies for prevention of vitamin A deficiency and iodine deficiency,
- assessment of iron/folate status and understanding the factors affecting folate status of women, infants and young children,
- with respect to aging, studies on the role of vitamin D and calcium in the prevention of osteoporosis and fragility fracture etc.)

7) *Nutrition and Health status of the Elderly*: (focus on assessment of nutritional/health status of elderly)

8) *Food safety Issues:* Studies linked with:

- food safety practices of consumers,
- plant and personnel hygiene in food service establishments
- safety of street foods
- bacteriological contamination during cold storage of food,
- consumer handling of ready -to-eat foods and home refrigeration practices,
- Food labeling- HACCP - Food Safety Assurance System.

9. *Quantity Cooking*: Studies based on:- portion size estimation aids

- food preference and nutrition
- new product development

- worker productivity and labour cost analysis
- food cost analysis etc.

10) *Nutrition and Health Education: Studies to focus on:*
- effective nutrition education for disadvantaged populations,- evaluation of nutrition/health programmes/strategies etc.)
- effectiveness of nutrition education (particularly by the use of multimedia) on health and eating habits

11) *Therapeutic Clinical Nutrition*: Research to focus on:
- dietetic professional development
- determinants of obesity, lipid metabolism, and diet-endocrine interrelationships
- diabetes and cardiovascular diseases - effects of plant foods and food components, herbs and botanicals, and drugs, and their effects in prevention and treatment of diabetes and cardiovascular disease. For example, almonds and implication for weight loss and cardiovascular diseases, effect of diets enriched in almonds on insulin action in adults with type 2 diabetes, essential fatty acids and effect on lipid profile etc.)
- role of nutrition in chronic disease care (i.e. in renal diseases, metabolic disorders etc)
- the study of the impact of lifestyle management and technology on chronic disease prevention and management etc.

12) *Food Science*: Research to focus on:
- physicochemical changes during deep-fat frying,
- organoleptic evaluation of foods,
- effect of food processing on nutrients, appearance, taste and acceptability of food etc.

2) *General survey of the pertinent literature, field to understand the problem of the research:* To assess the level of theory and research that have been developed in the field of study i.e. to find out what is already known and further what remains to be investigated in the specific topic of study (you have identified), examine the literature i.e. the course material, textbooks, latest journals (in the area of nutrition, health, dietetics), review articles, monographs, other writings, documents, nutrition bulletins etc. or perhaps browse through the internet. This will give you a good insight into the current researched topic (within the broad subject identified by you). Dialogue and discussions with the dissertation counselor/guide (allotted to you by the programme coordinator of the programme study centres where you are attached) would further help you narrow down on the topic of research and framing the research questions.

Once the topic has been finalized, what to do next? Read and find out.

3) *Definition of the problem, including differentiating, defining and classifying its components:* The development and refinement of the research question/ topic that identifies and investigates a knowledge gap in the related literature

is what is required. This would require determining the parameters required to be studied towards the solution of the problem, choosing the methodology to study the parameters, standardizing the methodology and testing its suitability for the specific problem, designing the experiment, field study or survey with appropriate statistical background. Once the various components have been defined, next step involves data collection as highlighted next.

4) *Collecting the data and information* and *systematic classification*, tabulation, presentation, analysis and interpretation of the collected data.

5) *Reporting the data* in the form of a dissertation report.

We have in our discussion above broadly highlighted the process you would go through while carrying out your proposed research work. Having decided on the research topic and defined a clear research question or set of questions, together with appropriate methods of seeking answers; you now need to convey your plan of research clearly in a research proposal. What is a research proposal? The next section focuses on this aspect.

PREPARING THE RESEARCH PROPOSAL

You start the research by preparing a research proposal. The proposal is the blue -print of your future work - and without early investigation and planning the chances are that the fieldwork will be ill considered and inappropriate. So work on the proposal very diligently. Where do we begin?

Let us start by first understanding what is a research proposal and the need for this document.

Research proposal is a plan, stock of ideas, offers proposed for implementing your research work. Put in simple words, the proposal is a description of what you hope to achieve and how you intend to go about it. The goal of a research proposal is to present and justify a research idea you have and to present the practical ways in which you think this research should be conducted. This exercise in fact is planning for your research work.

The research proposals must address the following questions:

— What you plan to accomplish, why you want to do it?

— How does the proposed research relate to the need, present interests?

— What difference will your study make to the discipline, the subjects, the nation, the world, or whatever the appropriate categories are?

— What has already been done in the area of your research study?

— How do you plan to do it i.e. how you are going to do it?

— How much will it cost, and how much time will it take?

— How will the results be evaluated?

In fact, the research proposal serves a number of purposes. Among them:

— it serve as a *planning tool* for the researcher.

— it *convince* others that your research is worth undertaking.

— it enable you to *demonstrate expertise and competency* in your particular area of study, and

— it may *serve as a contract* between the researcher and the funders (if applying for any funding to undertake the project).

Thus, you would notice that the research proposal is intended to convince others that you have a worthwhile research project and that you have the competence and the work-plan to complete it.

You will benefit by consulting two persons at an early stage in the planning of the proposal: the *programme coordinator* who will endorse your plan for staff and facility commitment (i.e. allot a research guide/counselor to you for carrying out the research, provide for any facility so required) and the *research guide/ counselor* who shall guide you in preparing the proposal, *approve your proposal* and eventually *supervise your work* and activities linked with the research.

So then, how do we go about to plan and prepare a research proposal? Let us find out.

Developing a Research Proposal: Basic Considerations

The proposal should be 5-6 double-spaced pages in length, and should set forth a description of the your plans. Here is a simple guide on how to prepare a proposal. We begin with a review of the typical parts of a research proposal. These parts are highlighted in Box 1.

Box 1	Typical parts of a research proposal
• Title • Introduction (including Statement of Problem, Purpose of Research, and Significance of Research) • Background (including Literature Survey) • Methodology (Description of Proposed Research) • List of References	

Let us review these parts and focus on proposal writing, next. We begin by first highlighting the points to be considered while writing the title of your study in the proposal.

Title

The titles of your study should be comprehensive enough to indicate the nature of the proposed work. But, it should also be concise and brief. Think of an informative but catchy title.

Note: Avoid words in the title that add nothing to a reader's understanding, such as "Studies on...," "Investigations...," or "Research on Some Problems in...." etc.

Introduction

The introduction of your proposal should begin with a capsule statement of what is being proposed and then should proceed to introduce the subject/area/topic under study. Thus the introduction should be comprehensible and give enough background to enable any reader/expert to place your particular research problem in a context of common knowledge and should show how its solution will advance the field or be important for some other work. Be careful not to overstate, but do not neglect to state very specifically what the importance of your research is.

The introduction typically begins with a general statement of the problem area, with a focus on a specific research problem, to be followed by the rational or justification for the proposed study. The introduction in your proposal should cover the following elements:

1) State the research problem, which is often referred to as the ***purpose of the study***.
2) Provide the context and set the stage for your research question in such a way as to show its necessity and ***importance***.
3) Present the ***rationale of your proposed study*** and clearly indicate why it is worth doing (in the context of has the study been done before? Will the study benefit advance understanding or influence policy? etc.)

4) Briefly describe the major ***issues and sub-problems to be addressed*** by your research.

5) Identify the key independent and dependent variables of your research/ experiment. Alternatively, specify the phenomenon you want to study.

6) State your ***objectives***, ***hypothesis or theory or thesis***, if any.

7) Set the delimitation or boundaries of your proposed research in order to provide a clear focus.

Remember, a good proposal begins with a clear idea of the goals/objectives/ hypothesis of the project. *Objectives/Hypotheses are what you intend to examine in any fieldwork.* They are based upon the literature review - which will provide support for the things you are expecting to find (the hypotheses) in the situation you are studying. In addition, you will of course expect to find new things relevant to the specific problem. This will be your contribution to knowledge - and provides the basis for any conclusions and / or recommendations.

General objective or what we may also refer to, as the *working hypothesis* is a broad statement of what you expect to find - based upon a preliminary study of the literature in all its many forms e.g. academic journals, texts, newspapers and magazines, the trade press etc. This should come at the proposal stage (but repeated in the finished dissertation).

The *specific objectives* or the *supporting hypotheses* are more detailed statements - based upon a thorough analysis and understanding of a wide range of literature sources. Usually, these statements are supported individually by reference to, and a development of, the relevant literature (helpfully, this can be tabulated). They are the foundation upon which any fieldwork is based, and they underpin the questions to be explored in the primary research.

Once the introduction is in place, the next step in writing your proposal is to prove that your particular piece of research has not been done yet. This section is usually called *Literature Review.* Let us get to know how to develop this section.

Background (including Literature Review)

Literature review is a critical summary of research on a topic of interest, generally prepared to put a research problem in context or to identify gaps and weaknesses in prior studies so as to justify a new investigation.

Sometimes, you will notice that the literature review is incorporated into the introduction section. But the literature review serves several important functions. These are:

1) Ensures that you are not “reinventing the wheel”.

2) Gives credits to those who have laid the groundwork for your research.

3) Demonstrates your knowledge of the research problem.

4) Demonstrates your understanding of the theoretical and research issues related to your research question.

5) Shows your ability to critically evaluate relevant literature information.

6) Indicates your ability to integrate and synthesize the existing literature.

7) Provides new theoretical insights or develops a new model as the conceptual framework for your research.

8) Convinces your reader that your proposed research will make a significant and substantial contribution to the literature (i.e., resolving an important theoretical issue or filling a major gap in the literature).

Note while presenting the literature review, avoid being repetitive and verbose, cite influential papers and recent developments, present a critical evaluation of the cited papers. Very often students' literature reviews suffer from the following problems: citing irrelevant or trivial references, depending on secondary sources, lacking focus, unity and coherence, lacking organization and structure. This should be avoided.

Here are a few tips on how to organize your literature review. There can be different ways to organize your literature review. Make use of subheadings to bring order and coherence to your review. For example, having established the importance of your research area and its current state of development, you may devote several subsections on related issues as required.

There are many sources from where you can locate the literature. These include:

— the university or the programme study centre library,

— other universities and colleges departmental library,

— dissertations submitted by other research scholars in this specific area ,

— general libraries, such as the NML (National Medical Library), New Delhi, including those run by other countries such as British Council and USIS,

— services offered by INSDOC, DELNET and other such services which provide at a nominal cost copies of articles published in research journals,

— personal collection of researchers in the field (for e.g. your dissertation guide and other fellow scholars etc.).

Having reviewed the literature related to the topic, and documented it, we approach now one of the most difficult parts of writing a research proposal i.e. the methodology.

Methodology (Description of Proposed Research)

The Method section is very important because it indicates how you plan to tackle your research problem. It will provide your work plan and describe the activities necessary for the completion of your project.

The method section typically consists of the following sections:

1) *Design* - The research design is the investigators overall strategy for answering the research question. The choice of the design will be the first decision you will make about how the study will be performed. Is it a quantitative or qualitative study, is it an intervention or descriptive study, is it cross-sectional/longitudinal study, is it prospective/retrospective study, is it true experiment/quasi-experiment study. What kind of design have you chosen?

2) *Subjects or participants* - Who will take part in the study? What would be the sample size? How will the subjects be recruited? What would be the inclusion/exclusion criteria for selection of subjects? What kind of sampling procedure (simple random, stratified random, cluster sampling etc.) will you use? What would be the method of assignment to study group etc? You decide on these aspects.

3) *Instruments* - What kind of measuring instruments, devices or questionnaires or tools do you use to collect data? Why do you choose them? Are they valid and reliable? Your proposal will highlight the techniques/instruments you plan to develop and use for collection of data.

4) *Procedure* - How do you plan to carry out your study? What activities are involved? How long does it take for example how long will be the intervention period, what would be the total study duration etc? The proposal will elaborate on these issues.

Very often the method section also includes the *statistical considerations* such as *sample size determination* as already mentioned above and also *data analysis techniques/procedures*. Obviously *you do not have results at the proposal stage.* However, you need to have some idea about what kind of data you will be collecting, and what statistical procedures will be used in order to answer your research question or test you hypothesis. Present this information under the heading ***data analysis***.

Ethical considerations, if any, are also included here in the method section of the research proposal.

The guiding principle for writing the Method section in the proposal is that it should contain sufficient information for the reader to determine whether methodology is sound.

Once our methodology has been finalized, we are ready with a blue print to start our research work. The final section of the research proposal deals with references.

List of References

It is important that at the end of the proposal you list the references, literature or a bibliography you have reviewed so far in developing your proposal i.e. your plan for the research work. This section will contain an alphabetic list of all source material to which reference has been made in the proposal.

Now keeping these guideline(s) in mind prepare your proposal. Obviously you would prepare this document (proposal) in consultation with your counselor/ research guide, but you may interact and call upon other experts/specialists too working in the area if so desired. This will help you plan and prepare a sound and doable research proposal. Remember, your research is only as good as your proposal. An ill-conceived proposal dooms the project even if it somehow gets through the approval from your counselor/guide. A high quality proposal, on the other hand, not only promises success for the project, (as each and every step has been meticulously planned beforehand) but also impresses your guide and subsequently the dissertation evaluator about your potential as a researcher.

Note: The research proposal should be written in concise sentences, in future tense, because it pertains to the work you intend to do.

The example presented herewith will help you understand the concept better.

Example: The proposal should read as …… the present study is designed to assess the impact of XYZ on ABC. To do so we *shall* analyze XXX by *developing* ZZZ. Study *will* be carried out in SSS. FFF subjects *will* participate in the study and the study duration *will be* MMM. Questionnaires *would be* developed and field-tested etc.

Now based on the information presented so far, get down to preparing the research proposal (in consultation with the counselor allotted to you by the programme incharge of the programme study centres where you are attached). *By the time of the Proposal you should have a clear idea of the primary research you would conduct - and the anticipated study needs to be clearly explicated.*

Document your plan in the format presented at ***Annexure 1*** (Research Proposal Format). Please limit the size of the proposal to 5-*6 pages*. A *sample research proposal* is given at ***Annexure 2*** for your consideration.

Once the proposal is finalized, get the project proposal approved by the counselor and start work on your dissertation research work.

For your dissertation, you will complete a series of assignments/work activities as specified in the proposal that will culminate in a 100 - 150 page final argumentative research report, *typewritten text written in English*, plus the bibliography and appendices and a formal oral presentation (viva-voce). We will learn more about the viva-voce in a little while from now. But, first let us review the components of the dissertation report.

THE DISSERTATION REPORT: BASIC COMPONENTS

Reporting is an important component of the investigative process. The research report i.e. the dissertation is a document that you shall prepare at the end of your research work, to communicate the findings and other features of your research work. It is a detailed, accurate, and cohesive account of the investigation (undertaken by you) accomplished to solve a problem and reveal new knowledge. It is written in the *past tense* (unlike the proposal which was in future tense) and indicates what you have accomplished in executing the investigation. Your report must be logically organized, complete, and objectively written. Present the sequence of ideas and concepts in a clear, straightforward, and orderly manner.

Very often reports are organized into different sections as Introduction, Material and Method, Result and Discussion and this format is referred to as the IMRAD system (or IMRaD), the acronym of these four sections. Research reports and dissertations thus have basic certain components. These components are highlighted in Box 2. Prepare your report based on these components.

Box 2	Dissertation Format

The dissertation generally consists of:

Title

Abstract

Introduction

Section 1: Review of Literature

Section 2: Methods

Section 3: Results

Section 4: Discussions

Section 5: Summary and Conclusions

Section 6: Recommendations

Bibliography

Appendices

Let us review these components in some details; especially how they can be effectively written while you prepare your dissertation.

Title

As already mentioned earlier in the project proposal stage, the title of the dissertation should be clear, concise and adequately descriptive of the content of the report. The following general guidelines may be kept in mind while constructing a title for the dissertation:

- Use a meaningful title that is to the point
- It should be catchy enough to grab the attention of the reader.
- All words, except the articles (i.e. a and an) and prepositions (in, of, from, to, with regards to, at etc) of the title should be capitalized

- Avoid the use of abbreviations, chemical formulae, trademark name, jargon etc. in the title.

Abstract

An abstract is a short (*one page or less*) summary of the research work including the research question, the rationale for the study, the hypothesis (if any), the method and the findings and major conclusions drawn by the researcher from the research undertaken.

It is important to recognize that an abstract intents to help the reader understand the content of a report without having to read through the entire body of the report.

Remember while writing the abstract, ensure that your abstract answer three basic questions. These are:

1) *What is the question being researched*; what is this paper about? (Include general problem, objective and scope of the study).
2) *What research method did you use*? (Descriptions of the method may include the design, procedures, the sample and any instruments that you used).
3) *What did you find*? (Summary of the results, only the most significant results)

An abstract usually also contains key words related to the research in the study. But make sure it should not contain any reference to bibliography, table, figures etc.

Remember, the abstract should be written in short and concise sentences, in past tense, and in passive voice, as far as possible, because it pertains to a work done.

Do not confuse the term 'abstract' with the term 'summary'. Summary is given at the end, after the discussion as explained later in this section. It is much more elaborate than an abstract, since it will deal with more than one section of the dissertation, and it would have to be in numbered paragraph, sections etc. running into more than one page. We will learn more about this later in this report.

Next let us review points to consider while writing the introduction.

Introduction

The introduction introduces the specific subject of research to the reader. The main purpose of the introduction is to provide the necessary background or context for your research problem and justify the choice of the topic and to state clearly the objectives or hypothesis of the investigation undertaken by you.

To begin with, you should present a relatively broad background/idea of the topic of your investigation. In this process, information from pertinent primary literature and other technical sources may be cited. A very brief review, limited to influential studies, findings that relate directly to your study, may be included, to provide some sort of orientation to the reader (who may or may not be familiar) to what is known and what is not, related to the topic of investigation, thus identifying the general 'gap' in the literature.

Having presented the broad background, next the introduction should focus or narrow down to the specific problem that is being investigated. With the help of suitable references, citation from primary literature, the need for studying, investigating and solving the specific problem should be justifiably presented.

Finally, the general/*specific objectives* or hypothesis of your investigation and the material of investigation should be stated clearly but briefly. *Research objective(s)* is a clear statement of the specific purposes of the study, which identifies the key study variables and their possible interrelationships and the nature of the population of interest. Research objectives/questions can be *general* in nature, and/or *specific* enough to narrow down the focus of your research as we have already highlighted earlier in the proposal stage. The objectives/ hypothesis framed earlier at the proposal stage should be repeated in the finished dissertation.

After the introduction, including the objectives of the research study, we start with the major sections of the report. We begin with the review of literature. The next section focuses on how to present a good review of literature.

Literature Review

As already mentioned earlier (under the research proposal guidelines), the literature review is a critical summary of research on the topic of interest, generally prepared by you to put your research problem in context or to identify gaps and weaknesses in prior studies so as to justify your investigation. It involves a systematic survey of publications relevant to the selected field of study.

As you may have realized by now that the process of literature review begins even before the stage of defining the research topic or problem and in fact continues till the submission/publication of the report. While writing your proposal, you would have already carried out an extensive and thorough examination of literature i.e. the articles in nutrition, health, dietetic journal(s), textbooks, monographs, bulletins and other writings, which deal with your specific research area. This review would have helped you then and now help you in presenting a summative review/critique of your research problem, in the report, with respect to:

— level of research, knowledge that has been developed in the field of study and thus present what is already known and what remains to be investigated in the specific area of research,

— understanding and stating the basic definitions, concepts, principles, variables etc,

— identifying and adopting the research design, analytical methods, tools, techniques, instruments etc. for the research, and

— orientation to the limitations, problems, difficulties encountered by other researchers, and thus avoiding the obstacles and ensuring efficient utilization of resources.

There are different ways to organize your literature review. Make use of subheadings to bring order and coherence to your review. For example, having established the importance of your research area and its current state of development, you may devote several subsections on related issues, concepts etc.

The review of literature should be quite extensive, exhaustive and detailed. Remember, the choice of research topic, research objectives/questions and methodology should spring forth from your literature review. Further, the literature review will be useful, while discussing your results and drawing valid inferences from your results.

Methods

This section is primarily designed to show that based upon your knowledge of the literature you have a relevant and realistic approach to how your objectives / working hypotheses / propositions could be explored and tested.

Put in simple words, the material section in your report will deal with defining, detailing the material, methods, procedures, techniques, instruments etc. used to carry out the study. The purpose of this section is to provide necessary details related to the process involved, describe the activities and your work plan during the research. This would help any reviewer, examiner to ascertain that your methodology was/is appropriate and applicable and at the same time provide accurate information to any other researcher to repeat the experiment.

In our discussion above we have mentioned about procedures, techniques, methods, instruments etc. to be detailed in the Method section. What do these terms indicate? Let us find out.

Method is a systematic means and orderly arrangement of parts or steps to accomplish an end. It explains how the procedure(s) is to be carried out.

A *procedure* is a way of doing a thing i.e. it is a set of established norms or methods for conducting research. In other words it is a particular course of action intended to achieve a result

A *technique* is a well-defined procedure used to accomplish a specific activity or task. More than one technique may be available for accomplishing a specific activity or task. Selection of the technique should be based on research approach, available tools, etc.

Protocol refers to the step-by-step course of action planned for each technique, experiment etc.

Research *design* is a plan of what data to gather, from whom, how and when to collect the data, and how to analyze the data obtained.

An *instrument* here refers to selected measuring or observing devices such as tools, scales, questionnaires etc. to be employed in each of the methods.

Your method section should be described in details. The following are some general suggestions in writing the method section:

1) Normally it is written in past tense (i.e. the study *was carried out* at ABS……..), since it is recording of the work already done,

2) This section may be titled as 'Material and Methods' too since both material and methods are described herein. However, several headings, sub-sections may be created within this section.

3) Research *design* should clearly describe the type of study design (i.e. descriptive or observational or experimental or intervention study) used, what data(s) was gathered, from whom, how and when. *Graphical representation* of the study design would add to the presentation.

4) Justify the methods chosen. Mention any possible problems that were encountered in obtaining data and how you overcome them. Present the different approaches to data collection e.g. face to face, small group (focus group), post, telephone, e-mail, observational etc. you adopted.

5) In dissertations involving *laboratory work* involving material such as media, chemicals, reagents etc. technical specifications, quantities, sources, method of preparation and use should be given. In case of experimental material such as animals, microorganism etc. these should be identified and the source of these material should be given.

6) While describing the *technique(s)*, the standard protocol and the measurements (for e.g. quantity measurement of reagents to be given in L, mL, mg, g etc.) should be specified citing appropriate references/standards.

7) Any technique that has been developed and standardized by you in the laboratory or a standard technique, which has been radically modified or adapted for use in your study, should be described with sufficient details.

8) While describing the *instruments*, detailed procedure related to identification, development and use of the devices, tools, questionnaires, intervention strategy etc. should be provided. Preliminary work (such as any pilot studies, pre-testing etc) and activities related to standardizing/finalizing/validating the instrument (such as post-test, validating studies etc.), if carried out should be described in detail. The report could include the graphical/pictorial representation of the instrument/tool for e.g. the nutrition education intervention package etc. developed. A sample of these instruments (such as questionnaires, scales etc.) could be attached in the method section or alternatively in the Annexure at the end of the dissertation report.

9) In field-based research studies, it is important to include details regarding the setting of the study, location of the field, how the samples were preserved and transported from the field (for e.g. in case of hemoglobin estimation of subjects, how were the samples collected and transported to the laboratory). Depiction of the field of study in the form of an appropriate layout plan/ map may be considered.

10) Subject profile and characteristics (in terms of age, social class, religion, education and what ever applicable) should be included. Information related to subjects, participants who took part in the study - how they were recruited, what was the sampling procedure (i.e. simple random, stratified random, cluster sampling etc.), how they were assigned to the study group etc. - need to be clearly spelled out. The statistical formula used for deciding the sample size should also be included.

11) Details with respect to p*rocedure* - How did you carry out the study? What activities were involved? What was the duration of the intervention/ experiment etc? What was the total study duration? - should be elaborated in the report.

12) Routine methods used for statistical analysis of data (for e.g. arithmetic mean, standard deviation, t-test, ANOVA, correlation, multiple regression or any other advance technique etc.) may be mentioned. If any software package was used for data analysis (for e.g. SPSS, Nutritive value calculation software etc.) they should be cited with appropriate reference.

13) Ethical considerations linked with the study, if applicable (for example while working with human subjects, individual or parent consent required) need to be mentioned.

The guidelines presented above were quite exhaustive. Note, good methodology can be described by the "two Cs": clear and clean. While writing the method

section make sure that your presentation of the methods follow some logical sequence. A good methodology describes clearly and fully (a) the design or strategic plan for making the research question operational; (b) the sample and sampling method; (c) the instruments and/or materials, as appropriate, (d) the procedures for data collection; and (e) the statistical analysis. Further as a researcher ensure that (a) there is no confounding in the sample variables (e.g., controlling for socioeconomic status, education, age etc.), (b) the sampling technique is appropriate, (c) the instruments and/or materials (if applicable) are reliable and valid, and (d) the statistical procedures are sophisticated enough to examine the data and are appropriately applied.

Note the logical sequence followed in the methodology must be consistent with that followed in the result section of your report. Next we shall focus on issues to be considered while writing the result section.

Results

This section presents the findings of your investigation, possibly using text, tables and figures. Concentrate on selecting and presenting the significant results in a logical and clear way. Include the sample size and resulting sample size after cleaning the data or removing ambiguity in the data. If sample size was substantially different enough to change your probability level, add that information. Include any exploratory research results that you tested as well.

Here are a few general guidelines to guide you while writing the Results:

1. Present the findings, results of your investigation with accuracy, brevity and clarity

2. Record the results in past tense (e.g. XXX *participated* in the study and data *was* collected from YYY subjects…….)

3. Do not present any raw data in this section, but only processed, summarized, discriminatorily selected data, in the form of text, table or figures. (For example do not include the individual subject responses as obtained in the questionnaire, form (which may be 30, 50 or 100's) etc., but summarize this entire data and record).

4. If the data is qualitative (e.g. response of focus group meetings, observational data etc.) they may be presented descriptively with utmost clarity in the text. The text however, may also be used to describe and highlight certain important aspects/data given in the table, figure, but avoid redundancy of results i.e. data shown in tables or figures should not be repeated unnecessarily in the text. To illustrate the results of statistical analysis of the data may be presented in the tabular form, but we need to give only the summary value and significance in the text.

5. The reader often "gets the picture" of a study through tables and figures. The heart of the study is often found in these compact sources, so you should give them special care. Good tables and figures are those that (a) are structured, (b) are clear and stand alone with captions, and (c) supplement rather than duplicate information in the text.

6. Figures refer to graphs, diagrams, charts, illustrations or any other pictorial/ graphical representation used to present your data. The best use of Figure is in reporting trend analysis using a line graph (e.g. if were to study the growth

pattern of children over time) or comparing the several treatment/intervention levels using bar diagrams, or expressing quantitative data through pie charts etc.

7. Construct tables to quickly explain the statistical results you have obtained. Provide all the information necessary for any reader to properly review and evaluate the data in the table. To illustrate, give information related to sample size, clearly define or state the headings/sub-headings for the rows and column (within the data), give the name of the test, level of significance etc.

8. All the Tables, figures should be separately and serially numbered (i.e. Figure 1, Figure 2…….; Table 1, Table 2…… etc.) and appropriately cited in the text. They are numbered and placed (immediately after and as close as possible) in the same sequence in which they are first cited in the text.

9. Do not include the same data in both a table and a Figure. It is best to present the data in a Table unless there is visual information that can be best represented through a Figure.

10. Table and Figures should include the legend (i.e. the caption) that explains the information that is being presented. The title should be clear, concise and self explanatory without need to refer to the text. Note, the Table legend appears above it, while the legend for a figure appears below it.

Do consider these points while writing the result section. Next we move to the discussion section.

Discussions

It is important to convince the reader of the potential impact of your research work. This is done through the discussion section. The discussion is a concise summary of the research questions, methodology, and results. It explains in some detail what it all means from a narrow perspective, it explains how this research has provided new knowledge, if any, or how it has broken new ground or opened new areas of inquiry and/or also how it confines and adds to the established knowledge. This is the one section where it is appropriate to speculate a little and explain your interpretations of the findings.

The discussion section, you will realize, is the most challenging section to write. To write a meaningful discussion, we must be thoroughly familiar with the pertinent literature, up-to-date and have good academic insight and mastery of relevant subject/topic/concept/idea under investigation.

Let us consider a few guidelines, which will help us, write the discussion

1) Begin your discussion section with an overview of the findings, put in more or less plain English and placed within the context of the original problem statement and the expected findings.

2) Next, present a consideration of the fine points: puzzling features in your data, inconsistent or unexpected findings, and occasionally mulling about what might have happened if the study had been slightly different. Note, any unexpected results or problems encountered during the research work must find a place in the discussion, because they may be important. Try to provide possible explanations.

3) Compare your results and interpretations to other studies citing references from the primary literature (i.e. literature review which you undertook), i.e. show how your data confine or contrast with the previously published work.

4) The Discussion section must try to justify how your results have contributed to the existing knowledge and professional practice. Discuss the theoretical and practical application of the results with some notion of the broader implications of the findings.

5) Present the discussion in paragraphs, dealing with different aspects/variables studied. You may use headings for different paragraphs, as applicable. This would be useful to overcome the problem of discontinuity.

The discussion section is followed by the summary and conclusions.

Summary and Conclusions

In the 'Summary and Conclusion' section of your report, interpret, examine, and qualify the results of your investigation and draw inferences from them.

In the Conclusions section, clearly state the conclusions of the study based on the analysis performed and results achieved. Indicate by the evidence or logical development the extent to which the specified objectives have been accomplished. If the research has been guided by hypotheses, make a statement as to whether the data supported or rejected these hypotheses. Discuss alternative explanations for the findings, if appropriate. Delineate strengths, weaknesses, and limitations of the study.

In the Summary section present a summary of the entire paper, written so that it could serve as a stand-alone document. It should be about four or five pages in length.

Recommendations

The recommendation section is the last section in the report, which should provide some practical recommendations for researchers and scholars, such as recommendations for further research or for change in research methods or theoretical concepts or how the research should be done differently, that spring from your research and results. As appropriate, present recommendations for change in academic practice, professional practice, or organizational procedures, practices, and behavior.

With the recommendations our report is more or less complete. But do not forget to include the bibliography and the appendices.

Bibliography

Bibliography is a list of references/publication/citations, usually arranged by author, date or subject, consulted in the composition of a report, book, article, or assignment. Your bibliography/reference list should appear at the end of your report (after the recommendations section0. You would include in the bibliography the alphabetical list of all material i.e. writings/publications/citations used or consulted in preparing your study and the report. Each source you cite in the repot (in-text citation) must appear in your reference list/bibliography; likewise, each entry in the reference list must be cited in your text. Follow the author-date method of *in-text citation*. This means that the author's last name and the year of publication for the source should appear in the text, E.g., (Dua, 1998), and a complete reference should appear in the bibliography at the end of the report.

Bibliography/Reference list entries should be alphabetized by the last name of the first author of each work.

What is the purpose of giving the bibliography? Some reasons include:

- To provide the information necessary for a reader to locate and retrieve any source you cite in the body of the report.
- To acknowledge and give credit to sources of words, ideas, diagrams, illustrations, quotations borrowed, or any materials summarized or paraphrased.
- To show that you are respectfully borrowing other people's ideas, not stealing them, i.e. to prove that you are not plagiarizing.
- To offer additional information to your readers who may wish to further pursue your topic.
- To give readers an opportunity to check out your sources for accuracy. An honest bibliography inspires reader confidence in your writing.

Therefore there is no doubt that the bibliography is an important component of the dissertation report. Let us then next consider how to present the bibliography. Interestingly you may present the bibliography in different ways – MLA and APA system. APA (American Psychological Association) is most commonly used to cite sources within the social sciences. MLA (Modern Language Association) style is most commonly used to write papers and cite sources within the liberal arts and humanities.

Here are some guidelines for you to follow while preparing your bibliography.

The bibliography must include the following:

Author name

Give the last name followed by the initials of the author(s).

For example: Oliver PA, Martin M, and Jordan JG

Title, sub-title of the material (article, paper, chapter etc.)

a) ITALICIZE or UNDERLINE the title and subtitle of a book, magazine, journal, periodical, newspaper, or encyclopedia, e.g., Qualitative Research: What do we know about teaching good nutrition? Sports Illustrated, New York Times, Encyclopedia Britannica.

b) DO NOT UNDERLINE the title and subtitle of an article in a magazine, journal, periodical, newspaper, or encyclopedia.

c) CAPITALIZE the first word of the title, the first word of the subtitle, as well as all important words except for articles, prepositions, and conjunctions,

d) Use LOWER CASE letters for conjunctions such as *and, because, but,* and *however*; for prepositions such as *in, on, of, for*, and *to*; as well as for articles: *a, an,* and *the*, unless they occur at the beginning of a title or subtitle, or are being used emphatically,

e) Separate the title from its subtitle with a COLON *(:), e.g. Qualitative Research:*

What do we know about teaching good nutrition?

Place of Publication (for books only)

Note: Use only the name of a city or a town. It is not necessary to indicate the Place of Publication when citing articles from major encyclopedias, magazines, journals, or newspapers. Use "n.p." to indicate that no place of publication is given.

Publisher (for book only)

a) Be sure you writing down the name of the Publisher, NOT the Printer.

b) If a book has more than one publisher, not one publisher with multiple places of publication, list the publishers in the order given each with its corresponding year of publication

Date of Publication

a) For a book, use the *copyright year* as the date of publication,

b) Use the most recent Copyright year if two or more years are listed, e.g., ©1988, 1990, 2005. Use 2005.

c) If you cannot find a publication date anywhere in the book, use "n.d." to indicate there is "No Date" listed for this publication.

d) For a weekly or daily publication use *date, month,* and *year*, e.g.: Newsweek 16 Oct. 2006.

Page Numbers

a) Page numbers are not needed for a book, unless the citation comes from an article or essay in an anthology, i.e. a collection of works by different authors.

b) If there is no page number given, use "n. pag."

Here are a few examples of how you could present the bibliography.

A) ***Standard Format for a Book:***

Author. Title: Subtitle. City or Town: Publisher, Year of Publication.

Example:

Ajzen I, Fishbein M. Understanding Attitudes and Predicting Social Behaviour. Englewood Cliffs, NJ: Prentice-Hall, 1980.

B) ***Standard Format for a Journal, Magazine, Periodical, or Newspaper Article:***

Author. "Title: Subtitle of Article." Title of Magazine, Journal, or Newspaper. Day, Month, and Year of Publication: Page Number(s).

Example of a journal article:

Achterberg CL. Factors that Affect Learner Readiness. J Am Diet Ass; 1988: 1426-28.

List of Appendices

Show the title of appendices in the order they are first mentioned. The numbering of each appendix is taken from the section in which it is first mentioned. For example, if an appendix is derived from work covered in section 3.3. The appendix should be numbered 'Appendix 3.3.'

Appendices take material that does not have to be in the main body of the report, but that nevertheless is significant for an understanding or development of arguments in the report. The appendices themselves appear as the penultimate section of the report, and it is useful to accompany each appendix with a couple of sentences explaining their purpose.

Now you have the entire dissertation format spelled out for you. While preparing the manuscript certain other points need to be considered. These are elaborated next.

PREPARING THE DISSERTATION MANUSCRIPT

Carefully write and prepare your dissertation report. Perhaps the best way to understand how the dissertation should look would be to examine the reports of several dozen dissertations that have already been accepted. Your programme centre library or other University libraries may have a collection of them. This is a good approach to see how an entire dissertation is structured and presented.

Besides the components described in the section above, your report would also include some additional information, resources, and matter, which is a basic requirement for dissertation reports. These basic requirements and basic format of dissertation report is presented in Box 3.

Box 3	Dissertation Format

The structure of the dissertation report includes:

Front Matter (which includes)

- **Title** (on the first page along with your name and academic affiliation)
- **Certificate of Authenticity/Original Work**
- **Acknowledgements**
- **List of Contents**
- **List of Tables and Figures**
- **Abbreviations Used**
- **Abstract**
- **Introduction**

Chapter 1: Review of Literature

Chapter 2: Methods

Chapter 3: Results

Chapter 4: Discussions

Chapter 5: Summary and Conclusions

Chapter 6: Recommendations

Bibliography

Appendices

As you may have noticed in Box 3 the report contains the *front matter*, which includes the title page, certificates, acknowledgements, list of content, list of tables, figures in addition to the abstract and the introduction.

We shall now review these aspects to be included as the front matter of the report.

Title Page

A sample of what the first page i.e. the title page of the dissertation should include is given at ***Annexure 3*** (Sample Title Page). Accordingly prepare the document.

Certificate of Authenticity/Original Work

While submitting your research work for evaluation, it is important for you to certify that the present piece of work is your original work. The purpose behind this exercise is that you, the researcher, should take the responsibility of defending

the content of the report, which you have undertaken under the guidance/ supervision of the counselor/programme incharge of the programme study centre. The supervisor too should authenticate that the work is original and carried out by the researchers under his/her supervision.

The authenticity Certificate should include the declaration as included in the sample certificate given in ***Annexure 4*** at the end of the booklet.

Table of Contents

The Table of Contents contains the numbering and headings of Sections and sub-sections included in your report together with the relevant (starting) page number, which must be accurate. Use the structure given before each unit in your theory course as a guide. You may also refer to ***Annexure 5*** for a sample of how the table of contents should look like.

List of Tables and Figures

The report must include a list of tables and figures in the order in which they appear, again with accurate page numbers. The list of tables and figures at the beginning of the report should be headed in the format given herewith. Make sure you also number each table and figure properly. The number is taken from the section from which the table or figure appears.

If more than one table appears for one concept, distinguish each table from the others by using an alphabetical suffix. To illustrate, if there are three tables to classify growth standards in section 1.2, this would be distinguished as Table 1.2(a)., Table 1.2(b)., and Table 1.2(c). The same would also apply to Figures (i.e. diagrams).

A sample of the list of figures and list of tables is given at ***Annexure 6*** and ***7,*** respectively.

Abbreviations Used

A list of abbreviations may be appropriate if the report contains abbreviated terms that the readers may not be familiar with. Present the abbreviations in alphabetical order.

After the abbreviations the abstract and the introduction would follow. These sections and the remaining sections will be presented in the manner already emphasized earlier. Given next are some guidelines on how to prepre the manuscript. Read these guidelines carefully before preparing the manuscript of the dissertation report.

MANUSCRIPT PREPARATION

The report should be typed/word processed and presented on ***A4 paper with either one-and-a-half or double spacing between the lines***. The references and appendices can be *single-spaced*. Each page in the main report should be numbered with page numbers at the foot of the page.

You report may be double sided (type on both sides of the paper)- in which case watch the margins. There should be a margin of at least 1.5 inches (4cm) on the left hand side of the page and top, right and bottom margins should be 1.25 inches (3cm). The right margin should be unjustified to aid readability.

The main text should be in a font size more or less like this: *12 point Times New Roman and/or 11 point Arial.*

Use ***bolding*** for emphasis within the text and ***for main section headings***.

Colour printing may be used for charts, pictures etc, but clarity is more important than colour or fancy graphics.

Once the report is ready, review the dissertation report for *style, spelling*, and *grammar* before submitting it for evaluation. You are responsible for the accuracy of the finished work so after it has been completed you should use the spell-checker to catch any typographical and spelling errors. You should also proofread it. Try reading your masterpiece aloud. Does it make sense, is it clear, concise, accurate?

Certainly these tips would help you in preparing a good report. Finally a word about manuscript binding

MANUSCRIPT BINDING AND DISTRIBUTION

After the counselor has approved the final draft of the manuscript, the student will make arrangements, at their own expense, for preparing 2 bound copies of the dissertation. One copy (duly authenticated by the student, counselor and the programme incharge) will be submitted by the student in the programme study centre for necessary action.

The second copy the student would like to keep as a personal copy. In addition, if so desired by the counselor, the student may have to prepare a *third* copy.

Some information related to dissertation report evaluation is highlighted next.

DISSERTATION ASSESSMENT

The dissertation assessment is planned at two levels – *internal and external assessment*. These two levels of assessment are elaborated herewith.

Internal Assessment

While preparing your dissertation report, you would be guided and supervised by the academic counselor/supervisor. The internal assessment of the work carried out by you (in terms of preparing the proposal, conducting the research and preparing the report) would thus be the responsibility of the academic counselor/ supervisor allotted to you. This constitutes the *internal continuous assessment*. This internal assessment would carry *40% weightage* (out of 100 marks). Out of this, the proposal is worth 50% of the total marks awarded for the internal assessment by the counselor.

Here are a few guidelines related to proposal submission:

- Ø Submission of the proposal will normally be required by a certain time period/ date (as specified by the programme incharge at the programme study centre).
- Ø Proposals should be submitted to the counselor (with information to the programme incharge).
- Ø It should be noted that a later hand-in date would only be agreed in exceptional circumstances (specified by the programme incharge).

The proposal will be marked and returned by the academic counselor/supervisor – within a specified time period and also guided by a standard marking scheme. The aim of the written comments and the marking scheme is to provide clear feedback and guidance on the direction that should be taken with the dissertation in order to achieve a better mark.

If a student does not submit a proposal by the due date a zero mark will be awarded and the student will have to resubmit the proposal as per the next schedule planned for the dissertation work.

External Assessment

Once your report is ready and checked by your counselor for content, accuracy, clarity of presentation, and accomplishments, it would be signed by the counselor and the programme incharge, authenticating your work (Refer to Annexure 3). You may then submit the dissertation report to the programme incharge for further necessary action.

The report would be evaluated by an expert selected from a panel of eminent experts identified by the university (in the relevant area of study) for evaluation. The external assessment carries 60% weightage (out of 100 marks), which would include small weightage (20 marks) for viva voce(oral defence).

Viva-Voce: The Oral Defense

The oral defense is the formal presentation of the dissertation to the evaluator. The oral defence will be conducted at the programme study centre or any other place specified by the programme incharge and/or the Regional Director, IGNOU. Viva-voce would carry 30% weightage (20 marks). During the oral defense, the student will present and discuss the questions that were investigated, the methods

in which the questions were examined, and the results, interpretations, and conclusions. The oral defense would be characterized by a question and answer format with inquiries coming from the evaluator only. The oral defense will be open to the counselor (supervising the concerned student), the programme incharge of the programme study centre and the representative from the Regional centre, IGNOU.

Presentation Notes

You may choose to make a presentation of your dissertation to the evaluator. You may prepare a powerpoint presentation or transperencies related to your dissertation for presentation.

Your powerpoint and/or transperancy presentation should be 12-15 minutes in length maximum and should include the highlights of your research. Most of the presentation should focus on the results and discussion and recommendations, but it is also necessary to set it up with an introduction (brief) and discussion of the literature review (brief), research questions and hypotheses (brief, but thorough) and methodology (brief, but thorough). It is also necessary to have back up transparencies in case the electronics fizzle out, as they often do during presentaitons. Make sure you know the material before presenting it and avoid the temptation to simply read the slides as they flash on the screen. Keep the information on the slides understandable and not cluttered.

After the oral defense is completed, the evaluator will ask the student to leave the room so that a brief deliberation may take place involving the counselor and the programme incharge. If the content of the dissertation and the questions asked during the oral defense are completed to the satisfaction of the evaluator (in the presence of the counselor, programme incharge and or representative from the Regional Centre, (if possible)), the evaluator will indicate his/her approval by marking the dissertation and signing the Signature Page of the grade card provided by the University.

If the evaluator finds the research work NOT up to the standard desired, the evaluator may request minor/major changes and/or corrections to the dissertation manuscript. All instructions and requests to the student for subsequent modifications are made through the programme incharge. The dissertation counselor will have the responsibility to have the student make the requested changes for the final copy and resubmit the report for re-evaluation.

ANNEXURE 1

Research Proposal FORMAT

The project proposal should be prepared according to the format described herewith. The proposal should specifically address each section in the order presented using the subheadings **exactly** as they appear and should be no longer than **five typed, one and a half-spaced pages**. Page margins (top, bottom, left and right) should be at least 1.0".

1) **Title** of the Study

2) **Introduction** (begin with a capsule statement of what is being proposed and then proceed to introduce the subject/area/topic under study including the following aspects)

   - ***Purpose/Objective***. State the purpose of the project in a concise introductory paragraph. Describe **exactly** what you hope to determine or produce or achieve.
   - ***Research project Need/Significance***. Provide a convincing argument that the proposed research work will make an important contribution to the field of study or area.
   - ***Research Potential***. Provide an explanation of 1) what difference will your research make to the discipline, the subjects, the nation's nutritional and health status etc. 2) how this project will contribute to the advancement of knowledge in this area, and 3) the possible policy implications, based on the activities of the project.

3) **Project Background**. Provide an adequate review of the pertinent previous work (either by you or others) so that it is clear how the proposed project fits into the current state of knowledge or research work.(This may be apart of the introduction itself)

4) **Methods**. Provide a description of the research project activities under the following heads; making it clear how these activities will allow you to reach the purpose described in Item 2 above.

   - Study Design
   - Subjects (size, selection, recruitment etc.)
   - Instruments/Techniques/Tools for data collection
   - Procedure and activities involved
   - Statistical considerations (statistical procedures to be used in order to answer the research question or test the hypothesis.
   - Ethical considerations, if any

5) **List of References**

Submit the proposal for approval by the counselor.

…….

Counselor Signature

Name, Designation

ANNEXURE 2: SAMPLE PROJECT PROPOSAL

TITLE: Iron Deficiency In Young Children: An Exploratory Study

Introduction and Background

Iron deficiency anaemia due to delayed weaning associated with infrequent breast feeding, prolonged reliance on liquid food (cows milk) and late introduction of iron-rich food has been described in Asian infants in inner city population in United Kingdom (Grindulis et al. 1986, Jones 1987, Duggan et al. 1992). Studies show anaemia is frequent during the second year of life (Goel et al. 1978, Grindulis et al. 1986). More than a third of British Asian babies may be iron deficient (Grindulis et al. 1986, Ehrhardt 1986).

Ehrhardt (1986) reported that this was also found in a quarter of European children in Bradford and recommended that a community based programme on the lines of stop ricket campaign should be implemented. Iron deficiency anaemia is associated with developmental delays and behavioural disorders in children; and developmental performance rapidly improves when it is corrected (Aukett et al. 1982, Lozoff et al. 1991).

In view of the high incidence of anaemia, the importance of diagnosing and treating iron deficiency in children has been recognised. A programme of routine screening coupled with realistic preventive intervention has been suggested (James et al. 1989). General prophylaxis, as a preventive strategy is attractive but its implementation presents a number of problems. The link between iron deficiency and infant feeding practices perhaps suggest that preventive nutrition education may be a preferable option.

For education to be effective, it must be based on individuals existing belief systems. Belief systems are the stable determinants of attitudes and social pressures (Fishbein and Ajzen 1980). The theory of reasoned action developed by Fishbein and Ajzen offers a coherent framework within which to measure and relate beliefs, attitudes and behaviour. Two theoretical linked construct, attitude and subjective norm (social pressure) are central to the prediction of the intention to perform a specific behaviour in this model.

Guided by the Fishbein and Ajzen model the present study is designed to determine and understand beliefs that underlie the attitude and social construct influencing infant feeding behaviour of mothers. This information will serve as the basis for designing an educational programme to improve infant feeding practices.

The study will be conducted in three parts.

1) Nutrient intake of infants will be investigated specifically in relation to iron status. Iron deficiency in childhood is usually due to dietary insufficiency of iron. Infants feeding practices that delay weaning and rely on a high cow's milk intake are frequently identified as predicting iron deficiency in infants aged six months and above (MAFF 1992, Duggan et al. 1992). The observation of occult gastrointestinal bleeding in infants (Anyon et al. 1971, Fomon et al. 1981, Sadowitz et al. 1983) associated with the use of pasteurised cow's milk, led to a general recommendation that fresh cow's milk be avoided during the first twelve months of life. But, is the ingestion of fresh cow's milk by older infants associated with intestinal blood loss sufficient to produce a significant effect on the iron status? At present, less

information is available about gastrointestinal losses of iron when cow's milk is used with older infants. Of the few controlled studies (Zeigler et al. 1990, Fuchs et al. 1993) that have examined blood loss, only one has reported increase gastrointestinal losses in infants aged five to eight months. The first part of the study is, therefore, designed to investigate the hypothesis that:

- cows milk ingestion is associated with significant blood loss into the gut by older infants (aged 9 and 14 months), and
- satisfactory haematological indices are maintained by infants fed cows milk as compared to those avoiding cows milk (feeding formula or follow-on milk).

2. The nutrition knowledge, attitude and infant feeding behaviour of mothers will be assessed to provide the imperical basis for designing an educational programme to improve infant feeding practices. Valid and reliable instruments will be developed for assessing nutrition knowledge,attitudes of mothers based on a series of pilot studies.

Importance Of The Study

The study provides an opportunity to investigate the role of cows milk in predicting iron deficiency in older children/toddlers. The possible effect on iron status of microscopic blood loss from the gut, which has been reported in young infants fed raw cows' milk, has not been evaluated in older infants. The cause of iron deficiency in older infants may in fact, be related to inadequate iron intake or absorption and not excessive gastrointestinal blood loss. The present study attempts to investigate this hypothesis. Moreover, in recent years, increasing prominence is given to recommendation by manufacturers (based on very little scientific evidence) of iron supplemented follow-on milk for ethnic minorities at risk of iron deficiency. Considering the uncertain bioavailability of iron from these milks and also the cost factor, there is a need to evaluate, what contribution iron supplemented milk will make (if any) in improving the iron status of older infants.

For promoting good nutrition and healthy infant feeding practices among Asian mothers, there appears to be a need for relevant educational material/advice. The knowledge, beliefs and attitudes surrounding infant feeding behaviour need to be identified and addressed. The study is designed to meet this objective. The measures and the development process adopted as part of the study would yield a nutrition education programme which will be culturally appropriate. The programme will be useful to all health workers involved with promoting good infant feeding practices among ethnic mothers.

Research Objectives

The overall objectives of the study are:

- to determine iron deficiency in children
- to assess nutrition knowledge, attitude and behaviour of mothers regarding infant feeding practices
- to investigate the nutrient intake of infants in relation to their iron status, and
- to determine the impact of feeding whole cow's milk on gastrointestinal bleeding in older infants.

Methodology

Setting: The study will be conducted in a deprived inner city practice at Barkerend health centre, Bradford. The subjects (mothers/children) will be selected from among women and the infants/toddlers attending health clinic at the surgery. Investigation will be undertaken on children whose parents have given a written consent to the investigation.

The study design and methodology for the two parts of the study is presented here.

Part I

Subjects: Prior to the study, a survey will be undertaken to identify the following:

– women and/or families known/willing to feed fresh whole cow's milk to the infants

– women known/willing to feed formula milk (providing no fresh cow's milk or milk products which might contain fresh cow's milk protein)

– women known/willing to feed follow-on milk.

Study design: The infants will be enrolled in the study at nine months of age. They will be assigned to either of the three groups according to parental preference:

Group 1 - Whole cow's milk-fed group

Group 2 - Follow-on milk fed group

Group 3 - Formula milk-fed group

A study group will comprise of 25 infants in each of the three groups.

Trial period: The trial period will begin around nine months of age and end at 15 months of age. The decision regarding the amount of milk and/or formula to be fed and the kind and amount of other supplementary foods to be given to the infants will be left to the mothers.

During the study, the infants will be managed in a clinic

- At the time of enrolment, the mothers will be interviewed to obtain background information regarding food intake and feeding practices (i.e. whether breast fed and/or formula fed, how long breast fed, age of introduction of solid foods, nature of food given etc.) and history of any illness.
- The infants will be weighed and measured at enrolment, at 12 months and at the end of the study. Gain in weight and length will be measured according to age interval. The day on which measurement of length and/or weight are made will be used as the first day of the interval for recording food and/or dietary intake.
- The diet of the infant will be monitored by diet history/inventory. The food and calorie intake will be recorded from nine months through 15 months. A 4-5 day weighed intake of infants (involving mothers) will be taken using PETRA dietary balance within each age interval (nine through 12 months and 13 through 15 months). An interval history will also be obtained through questionnaire regarding: food intake, feeding related symptoms - diarrhoea, colic, constipation, spitting-up, vomiting, unwillingness to eat etc.

- Faecal samples will be obtained at enrolment and at weekly intervals during the trial period. Mothers will be provided wooden spatula and labelled wide-mouthed containers for storing stool specimen. They will be requested to scrape faeces off nappies into the container. Stools will be tested for blood with paper impregnated with Guaic (Hemoccult Test). Haemoglobin concentration in stools will be determined quantitatively.

- At enrolment (nine months) and at the end of the study (15 months), blood samples will be taken. Haemoglobin concentration, serum ferritin levels will be analysed.

Part II

Subjects: Mothers of children aged 14-30 months will be invited to take part in the study.

Study design: For all subjects, nutrition knowledge will be assessed by a questionnaire specifically designed for the study. The questionnaire will test the general knowledge of mothers regarding infant nutrition, food composition, misconception about food and the application of principles of nutrition. The questionnaire will be designed in a multiple choice format.

Attitudes regarding infant feeding practices will be assessed by a questionnaire. The questionnaire will be designed according to the Fishbein and Ajzen, Expectancy Value Model.

Data Analysis

The nutrition knowledge, attitude and infant feeding practices of mothers will be assessed. Pearson correlation coefficient will be used to investigate the degree of association between the variables. Step-wise multiple regression will be used to examine the joint relationship between a number of independent variables.

Statistical analysis of difference in mean values between the various feeding groups will be done using analysis of variance. Data will be analysed to determine whether:

- cow's milk feeding induces intestinal bleeding in older infants
- satisfactory haematological indices are maintained by infants fed cow's milk (as compared to those avoiding cow's milk)

The combined data on body size and gain in weight and length of infants fed cow's milk will be analysed in relation to data from formula-fed and follow-on milk fed group of infants.

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ANNEXURE 3

Sample Title Page

.....

.....

(Dissertation Title)

XYZ

……..

(Name of the Candidate)

Enrollment No

(A report submitted to IGNOU in partial fulfilment of the requirement for the Degree of Master's of Science in Dietetics and Food Service Management)

School of Continuing Education

Indira Gandhi National Open University

New Delhi

ANNEXURE 4: Authentication Certificate Sample Page

Present the authentication certificate in the format given herewith.

Authentication Certificate

STUDENT CERTIFICATE

The work embodied in this dissertation entitled "…… …… …… ……"
has been carried out by me under the supervision of …….

(give the name of the counselor)

This work is original and has not been submitted by me for the award of any other degree to this or any other University.

Date: …….

Place*:* ***(Signature and Name of the Candidate)***

CERTIFICATE OF DISSERTATION COUNSELOR

I/We certify that the canditate Mr/Ms./Mrs. …… …… has planned and conducted the research study entitled "……" under my/our guidance and supervision and that the report submitted herewith is a bonafide work done by the canditate in ……. from …….. to ……..

Date: …….

Place*:* ***(Signature and Name, Designation of the Counselor(s))***

…….

Signature of Programme Incharge

(Give name and the address of the Programme Incharge)

ANNEXURE 5:

Please format your *Table of Contents* as follows.

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ANNEXURE 6: List of Figures Sample Page

Please format your *List of Figures* as follows.

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ANNEXURE 7: List of Tables Sample Page

Please format your *List of Figures* as follows.

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