Research Methodology

Lecture 4

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Formulating a Research Problem

- The aim of this lecture is to detail the process of formulating a research problem, even though the specific procedure that you are likely to adopt depends upon:
- Your expertise in research methodology;
- Your knowledge of the subject area;
- Your understanding of the issues to be examined;
- The extent to which the focus of your study is predetermined; and
- Your own orientation to the research methodology - quantitative, qualitative or mixed.

Research Problem

- Any issue, problem or question that becomes the basis of your enquiry. It is what you want to find out about during your research endeavor.
- As a new researcher it might seem easy to formulate a problem but it requires considerable knowledge of both the subject area and research methodology.
- Once you examine a question more closely you will soon realize the complexity of formulating an idea into a problem which is researchable.

- In initial stages of research it helps you to clarify your ideas, establish the theoretical roots of your study and develop your research methodology.
- Later in the process, the literature review serves to enhance and consolidate your knowledge base in your subject area and helps you to examine your findings.

- Since an important responsibility in research is to compare your findings with those of others, it is here that the literature review plays an extremely important role.
- It is essential for the problem you formulate to be able to withstand scrutiny in terms of the procedures required to be undertaken.
- Hence you should spend considerable time in thinking it through.

Subject Area

- Any academic or practice field in which you are conducting your study is called the subject or study area.
- Example: Health, Education, Psychology, Science, Engineering, Technology, etc.

The Importance of Formulating a Research Problem

- The formulation of a research problem is the first and most important step of the research process.
- It is like the identification of a destination before undertaking a journey. In the absence of a destination, it is impossible to identify the shortest or indeed any - route.
- Similarly, in the absence of a clear research problem, a clear and economical plan is impossible.

- In other way, a research problem is like the foundation of a building. The type and design of the building are dependent upon the foundation.
- If the foundation is well designed and strong you can expect the building to be also. The research problem serves as the foundation of a research study: if it is well formulated, you can expect a good study to follow.

- A research problem may take a number of forms, from the very simple to the very complex.
- The way you formulate a problem determines almost every step that follows:
  - The type of study design that can be used;
  - The type of sampling strategy that can be employed;
  - The research tools and techniques that can be used or developed; and
  - The type of analysis that can be undertaken.

Sources of Research Problem

- Most of the research revolves around the four Ps: people, problems, programs and phenomena.
- In fact, a closer look at any academic or occupational field will show that most research revolves around these four Ps.
- The emphasis on a particular 'P' may vary from study to study but generally, in practice, most research studies are based upon a combination of at least two Ps.

- You may select a group of individuals (a group of individuals, or a community as such - people) to examine the existence of certain issues or problems relating to their lives, to ascertain their attitude towards an issue (problem), to establish the existence of a regularity or occurrence (phenomenon) or to evaluate the effectiveness of an intervention (programme).
- Your focus may be on the study of an issue, an association or a phenomenon for example, the relationship between unemployment and street crime, smoking and cancer, or academic achievement and home environment, carried out on the basis of information collected from individuals, groups, communities or organizations.

- The emphasis in these studies is on exploring, discovering or establishing associations or causation.
- Similarly, you can study different aspects of a programme: its effectiveness, its structure, the need for it, consumers' satisfaction with it, and so on.
- In order to ascertain these you collect information from people.

Choosing A Research Topic

- Every research study has two aspects: people provide you with the 'study population', while the problem, programme or phenomenon furnishes the 'subject area' about which information is collected.
- You can study a problem, a programme or a phenomenon in any academic field or from any professional perspective.
- For example, you can measure the effectiveness of a programme in the field of health, education, social work, industrial management, public health, nursing, health promotion, or you can look at a problem from a health, business or welfare perspective.

- Examine your own academic discipline or professional field in the context of the four Ps in order to identify anything that looks interesting.
- For example, in technology field there are an enormous number of issues, situations and associations within each subfields that you could examine.
- Issues relating to the AI influence, Data Security and Privacy, Automation, Cybersecurity threats, Backup issues all provide you with a range of research problems.

- Similarly, in education there are several issues: students' satisfaction with a teacher, attributes of a good teacher, the impact of the home environment on the educational achievement of students and the supervisory needs of postgraduate students in higher education.
- Any other academic or occupational field such as marketing research, social work, community psychology or tourism can similarly be dissected into subfields and examined for a potential research problem.

Considerations in selecting a research problem

- When selecting a research problem or topic there are a number of considerations to keep in mind which will help to ensure that your study will be manageable and that you remain motivated:
  - Interest
  - Magnitude
  - Measurement of concepts
  - Level of expertise
  - Relevance
  - Availability of data
  - Ethical issues

Interest

- This should be the most important consideration in selecting a research problem.
- A research endeavor is usually time-consuming and involves hard work and possibly unforeseen problems.
- If you select a topic which does not greatly interest you, it could become extremely difficult to sustain the required motivation and put in enough time and energy to complete it.

Magnitude

- You should have sufficient knowledge about the research process to be able to visualize the work involved in completing the proposed study.
- Narrow the topic down to something manageable, specific and clear.
- It is extremely important to select a topic that you can manage within the time and with the resources at your disposal.
- Even if you are undertaking a descriptive study, you need to consider its magnitude carefully.

Measurement of Concept

- If you are using a concept in your study (in quantitative studies), make sure you are clear about its indicators and their measurement.
- For example, if you plan to measure the effectiveness of a health promotion programme or a programme to rehabilitate asylum seekers in a country or random breath testing programme, you must be clear as to what determines effectiveness and how it will be measured.
- Do not use concepts in your research problem that you are not sure how to measure.

Level of Expertise

- Make sure you have an adequate level of expertise for the task you are proposing.
- Allow for the fact that you will learn during the study and may receive help from your research supervisor and others, but remember that you need to do most of the work yourself.

Relevance

- Select a topic that is of relevance to you as a professional.
- Ensure that your study adds to the existing body of knowledge, bridges current gaps or is useful in policy formulation.
- This will help you to sustain interest in the study.

Availability of Data

- If your topic entails collection of information from secondary sources (office records, client records, census or other already published reports, etc.) make sure that this data is available and in the format you want before finalizing your topic.

Ethical Issues

- Another important consideration in formulating a research problem is the ethical issues involved.
- In the course of conducting a research study, the study population may be adversely affected by some of the questions (directly or indirectly); deprived of an intervention; expected to share sensitive and private information; or expected to be simply experimental.
- How ethical issues can affect the study population and how ethical problems can be overcome should be thoroughly examined at the problem formulation stage.

Concept

- In defining a research problem or the study population you may use certain words that are difficult to measure as such and/or the understanding of which may vary from person to person.
- These words are called concepts. In order to measure them they need to be converted into indicators (not always) and then variables. words like satisfaction, impact, young, old happy are concepts as their understanding would vary from person to person.

STEPS IN FORMULATING A RESEARCH PROBLEM

- The process of formulating a research problem consists of a number of steps.
- Working through these steps presupposes a reasonable level of knowledge in the broad subject area within which the study is to be undertaken and the research methodology itself.
- A brief review of the relevant literature helps enormously in broadening this knowledge base. Without such knowledge it is difficult to understand a subject area clearly and adequately.

- Following steps will prove to be of immense help in deciding what you want to find out about. They will help you to select and narrow down a subject area that could become the basis of a research problem for your study.
  - Identify a broad field or subject area of interest to you
  - Dissect the broad area into subareas
  - Select what is of most interest to you
  - Raise research questions
  - Formulate objectives
  - Assess your objectives
  - Double-check

Identify a broad field or subject area of interest to you

- Ask yourself, 'what is it that really interests you as a professional?'
- It is a good idea to think about the field in which you would like to work after graduation.
- This will help you to find an interesting topic, and one which may be of use to you in the future.

Dissect the broad area into subareas

- At the outset, you will realize that all the broad areas have many aspect.
- For example, there are many aspects and issues in the area of data analysis.
- The more you think or read about an area the more subareas you will identify.
- In preparing your list of subareas you should also consult others who have some knowledge of the area and the literature in your subject area.
- Once you have developed an exhaustive list of the subareas from various sources, you can proceed to the next stage where you select what will become the basis of your enquiry.

Select what is of most interest to you

- It is neither advisable nor feasible to study all subareas. From your list, select issues, questions or subareas about which you are passionate.
- Your interest should be the most important determinant for selection.
- One way to decide what interests you most is to start with a process of elimination.

Raise Research Questions

- At this step ask yourself, 'What is it that I want to find out about in this subarea?'
- Make a list of whatever questions come to mind relating to your chosen subarea and if you think there are too many to be manageable, go through the same process of elimination as in step 3.

Formulate Objectives

- The main objectives and subobjectives now need to be formulated, based on research questions.
- Research questions are obviously that questions. Objectives transform these questions into behavioral aims by using action-oriented phrases such as 'to find out', 'to determine', 'to ascertain' and 'to examine'.
- Some researchers prefer to reverse the process; that is, they start from objectives and formulate research questions from them.

Assess Objectives

- Now examine objectives to ascertain the feasibility of achieving them through research endeavor.
- Consider them in the light of the time, resources (financial and human) and technical expertise at disposal.

Double-Check

- Go back and give final consideration to whether or not you are sufficiently interested in the study, and have adequate resources to undertake it.
- Ask yourself, 'Am I really enthusiastic about this study?, and 'Do I really have enough resources to undertake it?' Answer these questions thoughtfully and realistically.
- If your answer to one of them is 'no', reassess your objectives.

Study population

- Every study in the social sciences has two aspects: study population and study area (subject area). The people you want to find out about are collectively known as the study population or simply population.
- In Computer Science ?

Operational Definition

- When you define concepts used by you either in your research problem or in the study population in a measurable form, they are called working or operational definitions.