

Selecting a topic for research

Research

–Search for knowledge.

–Search for answers.

–Research may be defined as:

systematic collection, analysis (using scientific methods) and *interpretation of data* to answer a certain question or solve a problem.

▶ When conducting research, it is crucial to follow scientific steps to obtain meaningful answers

▶ Steps when conducting Scientific Research

Selection of area.

Selection of topic.

Crude research question.

What is a Research Problem?

- A problem to be investigated.
- A question to be answered.
- A situation that needs to be changed or addressed.
- These problems consist of:
 - Areas of concern
 - Difficulties to be eliminated
 - Conditions to be improved
 - Questions seeking answers

Selection of Research Topic (Problem)

Webster's 7th New Collegiate Dictionary defines research problem as:

- A question raised for inquiry, consideration or solution
- An intricate unsettled question

In educational research, the research problem is typically posed as a question.

What do we do with a questions (topics)?

- ▶ Ignore them
- ▶ Talk about them
- ▶ Try to solve them----Research
- ▶ Selection of Research topic

▶ **Based on:**

- **researcher's: Specialty and subspecialty [e.g: Biochemistry, Enzymology; Botany, Zoology; Mathematics; Pharmacology; Nutrition; Pediatrics etc]**
- **Interest**
- **Scientific background**
- **Experience**
 - **Availability of experienced supervisors in the area**
 - **Need for research in this area**
 - **Available resources [interest of funding body]**

▶ **Research question?**

The investigator must make sure that:

- ▶ There is a research question
- ▶ The question is clear and specific
- ▶ It reflects the objectives of the study
- ▶ It has no answer by common sense
- ▶ It has no answer in the **LITERATURE**
- ▶ Finding an answer to the question will solve or at least help in solving the problem to be studied.

▶ **What to consider when Selecting a Research Problem?**

- ▶ How does one find topics to research?
- ▶ Become a scholar in an area of specialization
- ▶ Read, listen, discuss and think critically
- ▶ Follow up on ideas that stem from present research
- ▶ Explore areas of dissatisfaction
- ▶ Researcher should be interest in the topic!
- ▶ It is always easy to work on any thing if one likes the topic and has a personal interest in finding the answers.
- ▶ Research may mean long working hours, experimental failures, unexpected results; unless one are interested, one will not be able to work enough to get meaningful results and will not enjoy the work.
- ▶ Importance of the research topic?
- ▶ **Is the topic important?**

- ▶ Will it provide beneficial answers?
- ▶ Will it benefit the patients, community, health care system, agriculture, animal kingdom, etc?
- ▶ Will it be able to provide financial benefit?
- ▶ Will it be able to provide answers or equipments, drugs, treatment methods, etc that may be patented.
- ▶ Will it help in achieving knowledge based economy?
- ▶ "How patents helped innovation?"
 - Patents helped scientists protect their innovative ideas
 - Patents provide incentive for innovation
 - Patents help innovation reach the common man
 - Patents help scientists build on existing innovation
- ▶ *Everyone who deals with science must know about patents and its procedures, be it a researcher, a scientist or a professor.*
- ▶ Triple helix model of Knowledge-based economy
- ▶ e.g Priority of the Research Topic
 - The characteristics of the problem (topic):
 - Impact on health:
 - Magnitude
 - Seriousness
 - Preventability
 - Curability
 - New drugs, their side effects; sensitivity;
 - Available interventions
 - Proposed solutions
- ▶ Is the study feasible?
 - *Available Time. How long do we have?*
 - Do you really want to do a longitudinal study that will take 3 years to complete for a MS thesis?
 - How *difficult* is it? Are data available?
 - How much will it *cost*?
 - Are the equipments available?
 - Are there sufficient subjects for the study?
 - Is there an expert who can guide in this research?

- ▶ Is it ethical to study?
- ▶ **Make sure the topic is *ethical* to study— No harm to anyone during the research.**
- ▶ **e.g. not ethical:**
 - **What is the effect of electric shock on our body?**
 - **What will happen if we eat cyanide?**
 - **What is the effect of starvation on the blood parameters in a baby?**
 - **What will happen if we don't treat a person suffering from cancer?**
- ▶ All research on humans require ethical approval
- ▶ Make sure there your topic will be able to obtain ethical approval from the ethical committee.
- ▶ Discuss with a committee member before starting to work on the research proposal.
- ▶ Is the topic new?
- ▶ **A new topic is more interesting to work on.**
- ▶ **New topics can be published more easily if the work is well done.**
- ▶ **However there is some value in repeating previous research.**
- ▶ **Some previous results have to be confirmed.**
- ▶ Is the question you are trying to answer clear?
- ▶ **One should be absolutely sure what one is looking for and what questions need to be answered.**
- ▶ **If the question is not clear, what will be the answer**
- ▶ **Make sure the research question is *clear*.**
- ▶ Try not to select a research topic just for the sake of research
- ▶ Try not to do research just for the sake of research, but do research which will provide beneficial answers.
- ▶ Collaborative research–Benefits
- ▶ After selection of the topic: Write Clear Questions
- ▶ Don't use words open to interpretation
- ▶ Be very specific
- ▶ It is measurable
- ▶ Steps in "Zeroing In" on a Problem

- ▶ Identify a broad area that interests you
- ▶ Read the literature
- ▶ Narrow the area to 2 or 3 topics
- ▶ Thoroughly examine the literature on the 2-3 topics
- ▶ Select a single problem from 2-3 topics
- ▶ Refining the Topic
- ▶ The topic has to be “clarified”!
 - The topic needs to be reworded so that it states clearly and unambiguously the matter to be investigated, the variables to be investigated, and participants, if any, that will be involved.
- ▶ Refining the Topic
- ▶ A series of research questions or one or more hypotheses, or both, should be stated.
 - Experimental, quasi-experimental, correlational and ex post facto often have hypotheses
 - Historical, descriptive and ethnographic research often have questions
- ▶ Such questions and hypotheses orient the study, add cohesiveness, and are essential in helping solve the problem.
- ▶ Learn more about the research topic
- ▶ “Literature Review”
- ▶ For any research, survey of the literature is essential to determine what has been done, what needs to be done, what is already known, what questions need to be answered.
- ▶ “...a literature review is a survey process.
- ▶ Where scientific articles, books, medical journals, dissertations and other sources relevant to a particular issue, area of research, or theory, provide a description, summary, and critical evaluation of each work.”
- ▶ Research Goal & Objectives
- ▶ The goal (aim) and objectives must be stated at the very beginning of the study, since they will guide the investigator during the process of formulating research questions and hypothesis.
- ▶ They will also help in the prioritization process.
- ▶ They will enable the reader or consumer of the work to judge whether the investigator had achieved these objectives or not.

- ▶ Research Objectives
- ▶ The research objectives should be:
 - Closely related to the research question
 - Covering all aspects of the problem
 - Very specific
 - Ordered in a logical sequence
 - Stated in action verbs that could be evaluated e.g. to describe, to identify, to measure, to compare, etc.
 - Achievable, taking into consideration the available resources and time
 - Mutually exclusive, with no repetitions or overlaps
- ▶ Goals
- ▶ It describes the aim of the work in broad terms
- ▶ Objectives
- ▶ These are more specific and relate directly to research question. They may be divided into two types:
 - Primary objectives → (bound to be achieved)
 - Secondary objectives → (by the way)
- ▶ SMART Objectives
- ▶ S Specific
- ▶ M Measurable
- ▶ A Achievable
- ▶ R Relevant
- ▶ T Time-bound
- ▶ Research Hypothesis
- ▶ “Research hypothesis is a statement of the research question in a measurable form”
- ▶ Research Hypothesis (cont.)

- ▶ A hypothesis can be defined as a prediction or explanation of the relationship between one or more independent variables (PREDISPOSING/RISK FACTORS) and one dependent variable (OUTCOME/CONDITION/DISEASE).
- ▶ A hypothesis, in other words, translates the problem statement into a precise, clear prediction of expected outcomes.
- ▶ It must be emphasized that hypotheses are not meant to be haphazard guesses, but should reflect the depth of knowledge, imagination and experience of the investigator.
- ▶ Research Hypothesis (cont.)
- ▶ Null hypothesis
- ▶ Alternative hypothesis
- ▶ Example 1: (KAP Study)
- ▶ Area: Family medicine
- ▶ Topic: communicable diseases– hepatitis
- ▶ Goal: to contribute to the reduction of hepatitis in Qatar through studying public perceptions about the disease
- ▶ Objective: To assess the awareness, knowledge, and attitudes of the general public towards hepatitis in Qatar
- ▶ Example 2: (Interventional Study)
- ▶ Research area: cardiology
- ▶ Research topic: ischemic heart disease (IHD)
- ▶ Goal: to contribute to prevention of IHD
- ▶ Primary objective: to determine the effect of reducing LDL on the occurrence of MI
- ▶ Secondary objective: to describe the side effects of lowering LDL
- ▶ Research question: does hypocholesterolemic agent “A” decrease the risk of MI?
- ▶ Research hypothesis: the risk of MI among patients treated with hypocholesterolemic agent “A” is lower than the risk among controls not treated with hypocholesterolemic agents

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