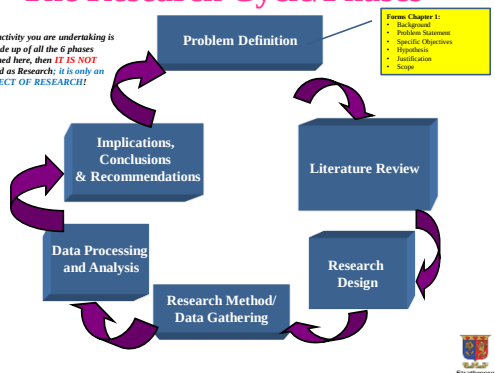
Phase 1 of Research- Problem Definition

The Research Cycle/Phases

N/B: If the activity you are undertaking is not made up of all the 6 phases mentioned here, then IT IS NOT considered as Research; it is only an ASPECT OF RESEARCH!



By the end of this topic, you should be able to:

1. Define *what is a Research Topic*, ***Research Problem, Research Question, Research Objective, and Research Hypothesis***.
2. Explain how the above definitions are linked together.
3. Identify ***factors to consider in selecting research problems***.
4. List the ***steps involved in formulating a research question***.

DEFINITIONS

1. *A Research Topic* is a brief description of the proposed area of study. *E.g. Athletes, Donald Trump, Education, Energy, Health, Internet, Immigration, Technology* etc.
2. A ***Research Problem*** a statement about *an area of concern*, a condition to be improved, a difficulty to be eliminated, or a troubling question that exists in scholarly literature, in theory, or in practice that points to the need for meaningful understanding and deliberate investigation. *For example: climate change.*
3. A ***Research Question*** provides an area to focus on regarding a research problem. *For example: How do ozone levels impact global temperature levels?*
4. A ***Research Hypothesis*** is the statement created by researchers when they speculate upon the outcome of a research or experiment. A research hypothesis is developed from the research question.
5. A ***Research Objective*** describes what we expect to achieve from undertaking a project.

The Table Below Illustrates How A Research Question Develops From A Research Topic To A Focused Question.

1. Research Topic	Technology	Organic Farming
2. Research Problem	Most farmers in Kenya are not adopting new technologies.	Conventional farming* may produce vegetables with pesticide residues leaving individuals susceptible to preventable diseases.
3. Research Question	Are Kenyan farmers unable to adopt new technologies because financial resources are limited?	Are fruits and vegetables grown on organic farms healthier than those grown on conventional farms?
4. Research Hypothesis	Farmers in the province are unable to adopt new technologies because financial resources are limited.	Fruits and Vegetables grown on organic farms have less pesticide residues than those grown on conventional farms.
5. Research Objective	To describe how financial resources influence farmers when deciding whether to adopt a new technology.	To estimate the pesticide residues of conventional farming on fruits and vegetables.

** The difference between **organic** and **conventional** farming is that conventional farming relies on chemical intervention to fight pests and weeds and provide plant nutrition. That means synthetic pesticides, herbicides, and fertilizers. Organic farming relies on natural principles like **biodiversity** and **composting** instead to produce healthy, abundant food.*

Research Without Hypotheses

- When carrying out **EXPLORATORY RESEARCH** our base knowledge of a subject may be so low that we cannot formulate meaningful hypotheses.
- Nonetheless, exploratory research should be guided by a clear sense of purpose.
- Instead of hypotheses, ***exploratory study should state its purpose, or research objectives*** as well as criteria by which the exploration will be judged successful.
- For example, if we are trying to encourage farmers to make use of compost, we may first need to know the social structure or social norms of the farming community before we can begin making meaningful hypotheses about which individuals will influence the decision and the factors they consider when making their decision.
- We can state that our exploratory study would have the purpose of generating hypotheses about personal characteristics which correlate with the adoption/rejection of composting, the composition of the decision-making unit, and the factors which influence the decision either to adopt or reject. Success would be measured in terms of generating testable hypotheses.

- **Potential problems** which can arise at different stages in the research process *when the research problem, questions and objectives are not clearly defined*. Some of the problems include:

In research design	Unclear objectives can lead to wrong choice of basic design – e.g. does the client need exploratory or descriptive research??, what type of data (see qualitative or quantitative below;) what sampling approach; what method of data collection?
Qualitative or quantitative	Clear objectives needed to be able to identify if qualitative or quantitative – or both – data are needed.
Sampling	Unclear objectives could lead to inappropriate sample design, problems with choice of sampling frame, issues in defining the population of interest etc.
Questionnaire/topic guide design	Questions should be relevant to the research objectives. Unclear objectives mean that important questions may be missed, that it may be difficult to understand or interpret or analyse or use the data collected.
Analysing data	Unclear objectives mean that data may not be analysed appropriately – research objectives will determine the variables which need to be explored.
Interpreting data	Research objectives will guide what is looked for in the information – unclear objectives will mean that inappropriate information is focused on.
Reporting results	Inappropriate objectives will mean that the researcher will be unable to give the client appropriate guidance. May be unable to provide appropriate information or, worse, give wrong info.

FACTORS TO CONSIDER IN SELECTING RESEARCH PROBLEMS

	Consideration Factor	Factor Description
1.	**Interest**	• The most important criterion in selecting a research problem. • The whole research process is normally time consuming and a lot of hard work is needed. If you choose a topic which does not greatly interest you, it would become difficult to keep up the motivation to write.
2.	**Expertise**	• Before selecting a research problem, you need to ensure that you met certain level of expertise in the area you are proposing. • Make use of the facts you learned during the study and of course your research supervisors will lend a hand as well. **** Remember, you need to do most of the work yourself.*
3.	**Data availability**	• If your research title needs collection of information (*journal*, *reports*, *proceedings*) before finalising the title, you need to make sure you have these materials available and in the relevant format.
4.	**Relevance**	• Always choose a topic that suits your interest and profession. Ensure that your study adds to the existing body of knowledge. Of course, this will help you to sustain interest throughout the research period.
5.	**Ethics**	• In formulating the research problem, you should consider some ethical issues as well. • Sometimes, during the research period, the study population might be adversely affected by some questions. • In ICT, some scenarios might occur especially research related information security, which might concern certain authorities. • Therefore, it is always good for you to identify ethics related issues during the research problem formulation

HOW TO FORMULATE RESEARCH QUESTIONS

- A good research question is essential to guide your research paper, project or thesis. It pinpoints exactly what you want to find out and gives your work a clear focus and purpose.

All research questions should be:

1. **Focused** on a single problem or issue
2. **Researchable** using primary and/or secondary sources
3. **Feasible** to answer within the timeframe and practical constraints
4. **Specific** enough to answer thoroughly
5. **Complex** enough to develop the answer over the space of a paper or thesis
6. **Relevant** to your field of study and/or society more broadly

How to write a research question

- The process of developing your research question follows several steps:
- Choose a broad topic
- Do some preliminary reading to find out about topical debates and issues.
- Narrow down a specific niche that you want to focus on
- Identify a practical or theoretical research problem that you will address
- When you have a clearly-defined problem, you need to formulate one or more questions. Think about exactly what you want to know and how it will contribute to resolving the problem.

Examples

Example research problem	Example research question(s)
The teachers at school X do not have the skills to recognize or properly guide gifted children in the classroom.	• What practical techniques can teachers at school X use to better identify and guide gifted children?
Under-30s increasingly engage in the "gig economy" instead of traditional full-time employment, but there is little research into young people's experiences of this type of work.	• What are the main factors that influence young people's decisions to engage in the gig economy? • What do workers perceive as its advantages and disadvantages? • Do age and education level have an effect on how people experience this type of work?

Types of research questions

- Both qualitative and quantitative research require research questions.
- The kind of question you use depends on what you want to find out about and the type of research you want to do. It will shape your research design.
- The table on the next slide shows some of the most common types of research questions. Bear in mind that many academic research questions will be more complex than these examples, often combining two or more types.

Research question type	Formulation of the Research Question
Descriptive research	*What are the characteristics of X?*
Comparative research	*What are the differences and similarities between X and Y?*
Correlational research	*What is the relationship between variable X and variable Y?*
Exploratory research	*What are the main factors in X? What is the role of Y in Z?*
Explanatory research	*Does X have an effect on Y? What is the impact of Y on Z? What are the causes of X?*
Evaluation research	*What are the advantages and disadvantages of X? How well does Y work? How effective or desirable is Z?*
Action research	*How can X be achieved? What are the most effective strategies to improve Y?*

What makes a STRONG research question?

1. The question is ***Focused and Researchable***	
CRITERIA	**EXPLANATION**
• Focuses on a single topic and problem	Your central research question should follow from your research problem to keep your work focused. If you have multiple questions, they should all clearly relate to this central aim.
• Answerable using primary or secondary data	You must be able to find an answer by collecting quantitative and/or qualitative data, or by reading scholarly sources on the topic to develop an argument. If such data is impossible to access, you will have to rethink your question and ask something more concrete.
• Does not ask for a subjective value judgement	Avoid subjective words like good, bad, better and worse, as these do not give clear criteria for answering the question. If your question is evaluating something, use terms with more measurable definitions. •Is X or Y a better policy? •How effective are X and Y policies at reducing rates of Z?
• Does not ask why	Why questions are usually too open to serve as good research questions. There are often so many possible causes that a research project cannot give a thorough answer. Try asking what or how questions instead. •Why does X occur? •What are the main factors contributing to X? •How is X influenced by Y?

Example of a Focused Research Question

- A good research question should be ***focused on a single topic*** or on several closely related ideas.
- If it isn't, you won't end up with a good research.
- If a question is too general or doesn't stay on one topic, you can fix it by deciding which part of the topic you want to research.

Bad: Does medication help alleviate attention deficit hyperactivity disorder (ADHD) symptoms? And do kids need more exercise?

Good: How effective are the various types of medication in treating elementary students with ADHD?

Instead of covering both ADHD medication and exercise as topics, the good question focuses on medication only. It's also more specific about the age of the students. The answer to this question will provide a good research.

2. The question is ***Feasible and Specific.***	
CRITERIA	**EXPLANATION**
• ***Answerable*** within practical constraints	Make sure you have enough time and resources to do the research required to answer the question. If you think you might struggle to gain access to enough data, consider narrowing down the question to be more specific.
• Uses ***specific, well-defined concepts***	All the terms you use in the research question should have clear meanings. Avoid vague language and broad ideas, and be clear about *what*, *who*, *where* and *when* your question addresses. •What effect does social media have on people's minds? •What effect does daily use of Twitter have on the attention span of under-16s?
• ***Does not ask for a conclusive solution***, policy, or course of action	Research is about informing, not instructing. Even if your project is focused on a practical problem, it should aim to improve understanding and suggest possibilities rather than asking for a ready-made solution. •What should the government do about low voter turnout? •What are the most effective communication strategies for increasing voter turnout among under-30s?

Example of a Feasible and Specific Research Questions

FEASIBLE RESEARCH QUESTION

- It's possible to ask a really interesting question and not be able to find the answer.
- Don't forget that your reason for asking this question is to come up with a really great answer - one on which you'll be able to build a paper or project.
- If you can't answer it, you can't write a paper or do the research .

Bad Ques: Is there a higher power in the universe?

Good Ques: What factors affect people's belief in a higher power?

You can keep the same topic but change the question to be something you have the ability to answer within the time period and using the resources available to you.

SPECIFIC RESEARCH QUESTION

- As you write your question, make it as specific as possible.
- This will give you a more detailed answer - one that is strong enough to be the topic of your project or paper.

Bad Ques: How do artificial sweeteners affect people?

Good Ques: How does **Stevia** affect women between the ages of 20-30 who suffer from migraines?

By specifying which artificial sweetener and which age bracket of women, the question is easier to answer with facts. These facts help form a strong, focused thesis and they also lend support to your work.

3. The question is ***Relevant and Original.***	
CRITERIA	**EXPLANATION**
• Addresses a problem relevant to your field or discipline	The research question should be developed based on initial reading around your topic, and it should focus on addressing a problem or gap in the existing knowledge.
• Contributes to a topical social or academic debate	The question should aim to contribute to an existing debate — ideally one that is current in your field or in society at large. It should produce knowledge that future researchers or practitioners can build on.
• Has not already been answered	You don't have to ask something groundbreaking that nobody has ever thought of before, but the question should have some aspect of originality (for example, by focusing on a specific location or taking a new angle on a long-running debate).

Example of a Relevant and Original Research Question

- If you ask a question that's already been answered a thousand times before, you're only doing research that someone else has already done. This doesn't provide you with good research. Instead, ask a question with an original slant to it.

Bad Research Ques: What are the advantages and disadvantages of cell phone use in schools?

Good Research: How does restricting cell phone use in school affect student social interaction?

Many people have studied the topic of cell phone use in schools, and it's easy to find information about the advantages and disadvantages.

A more interesting perspective on the same topic is to examine how the restriction of cell phones affects students' interactions with one another.

4. The question is ***Complex and Arguable***	
CRITERIA	**EXPLANATION**
• Cannot be answered with *yes* or *no*	Closed *yes*/*no* questions are too simple to work as good research questions — they don't provide enough scope for investigation and discussion. •Has there been an increase in homelessness in the UK in the past ten years? •How have economic and political factors affected patterns of homelessness in Kenya over the past ten years?
• Cannot be answered with easily found facts and figures	If you can answer the question through a Google search or by reading a single book or article, it is probably not complex enough. A good research question requires original data, synthesis of multiple sources, interpretation and/or argument to provide an answer.
• Provides scope for debate and deliberation	The answer to the question should not just be a simple statement of fact: there needs to be space for you to discuss and interpret what you found. This is especially important in an essay or research paper, where the answer to your question often takes the form of an argumentative thesis statement.

Example of a Complex and Arguable Research Question

- A simple question gets a simple answer. And a simple answer will not be enough information for research. How you ask the question is important.
- Avoid questions that can be answered with "yes" or "no" or a single word or phrase.

Bad Research Ques: Does owning a pet improve quality of life for older people?

Good Research Ques: In what ways does owning a pet improve quality of life for older people?

The "bad" question the answer is a simple "yes" or "no." However, when you ask about the specific ways a pet can improve the quality of life for its owner, you get a much more detailed and interesting answer. This type of answer allows you create a thesis statement.

Method 2:
Step 1: Can the Topic Be Researched?

- Below are two exercises designed to improve your ability to select a good research question.
  Think about whether the question would make a good research question, then click for feedback.

1. **Do the economies that result from a trash-burning plant outweigh the environmental costs?**
2. **Does Pizza Inn or Debonairs make a better pizza?**
3. **Is there a link between hours of television viewing and violent behavior in children aged 8-14?**

ANSWERS:

1. **This question is researchable.** You'd have to sift through a lot of information, both pro and con, valid and invalid, in order to choose the best information to answer the research question and support your own point of view, but the point is that there is at least enough information to sift through.
2. **This question is not researchable.** As worded, it has no concrete meaning. What does "better" mean? Better in terms of nutrition? Better tasting? Better value? Fewer calories? Better for making you happy? This question could become researchable only if you define its terms.
3. **This question is researchable.** You'd have to sift through a lot of information, both pro and con, valid and invalid, in order to choose the best information to answer the research question and support your own point of view, but the point is that there is at least enough information to sift through.

Method 2: Step 2:
Is the Question Too Broad or Too Narrow?

- For each of the questions below, choose what you think is the best research question out of the three (*i.e. neither too broad nor too narrow*).

Question A: What marketing strategies does the Coca-Cola company currently apply?

Question B: What is the Coca-Cola company's future marketing plan?

Question C: What marketing strategies has the Coca-Cola company used in the past?

ANSWERS

- **Question A is the best research question.**
  Your research to answer this question may include observation of print, television and radio advertisements as well as research into various current marketing theories and strategies. Both types of research are "do-able," and the question is focused enough to yield a fully-developed research paper.
- **Question B is very broad as well as being un-researchable**
  It's unlikely that Coca-Cola personnel will reveal their marketing plan.
- **Question C may be too broad as well.**
  "The past" covers a lot of time, especially since the Coca-Cola company was incorporated in 1919.