

Introduction to PhD Research Proposal Writing

Dr. Solomon Derese
Department of Chemistry
University of Nairobi, Kenya
sderese@uonbai.ac.ke

Your PhD research proposal should answer three questions;

- What**
- ...is the fundamental problem?
 - ...is your idea?
 - ...is its relationship to the field?
 - ...is its novelty?

- Why**
- ...is it important?
 - ...is it likely to succeed?
 - ...will anyone care?

- How**
- ...are you planning on tackling the problem?
 - ...are you planning on disseminating the results?

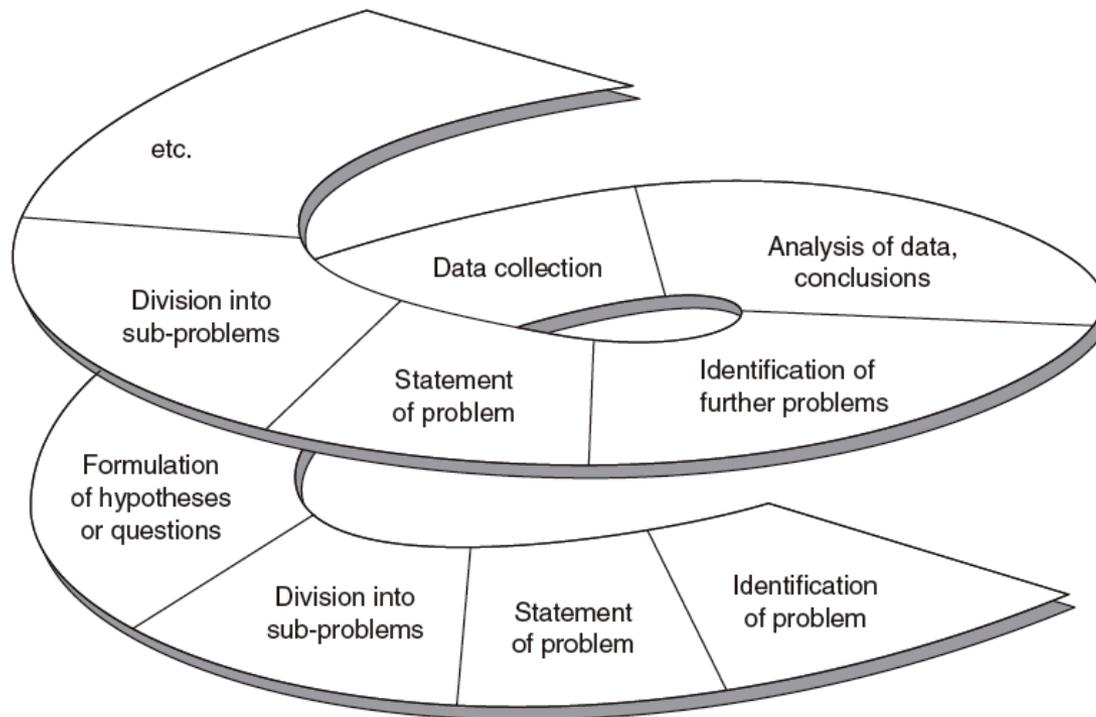
What is Research?

The Oxford Encyclopaedic English Dictionary defines research as:

- a) the systematic investigation into the study of materials, sources etc. in order to establish facts and reach **new** conclusions.
- b) an endeavour to discover new or collate old facts etc. by the **scientific study** of a subject or by a course of **critical** investigation.

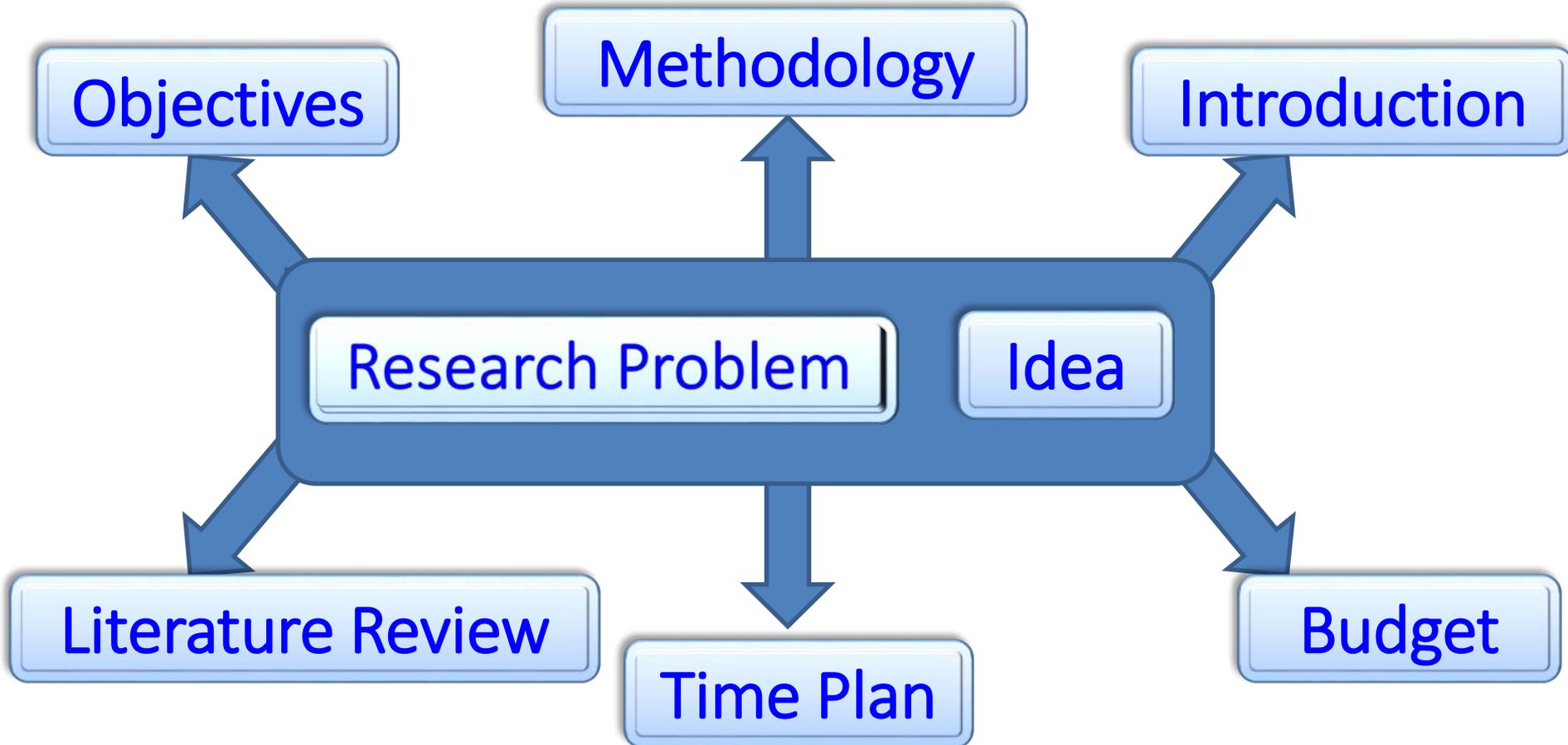
Cyclical Nature of Research

Research is cyclical and is not a one-time act – static, self-contained, and an end in itself ... research creates more problems than it resolves.



The research process

Basic components of a research proposal



In most cases, your DAAD research proposal will need to include the following:

- Table of Contents
- Abstract
- Introduction into the General Topic
- Problem Statement and Justification of the Research Project
- Hypothesis and Objectives of the Study
- Literature Review
- Research Methodology
- Data Collection, Analysis and Evaluation of Data
- Expected Results and Output of the Study
- Bibliography
- Appendix, e.g. Tables, Graphs, Questionnaires etc.
- Financial Budget and Timetable

Writing A Research Proposal

What is a Research Proposal?

A research proposal is a document that:

- Outlines a research problem (research topic)
- States its associated research questions
- Summarizes the prior literature related to the topic
- Specifies the procedure to be followed in answering the research questions.

The purpose of your proposal is to sell your research idea by showing that you have **thought it through** very carefully and have devised a **good strategy** to address the questions of the study.

Identifying a Research Study

Area: Identify the field of research where you have expertise or proficiency.

Topic: Identify a specific topic of interest in this area of expertise. This reflects the problem to be solved.

Research Questions: Identify the questions whose answers will guide solving the problem.

Objectives: Identify the goals associated with each of the research questions.

Activities: Identify the things that will need to be done to meet each of the objectives of the research.

General

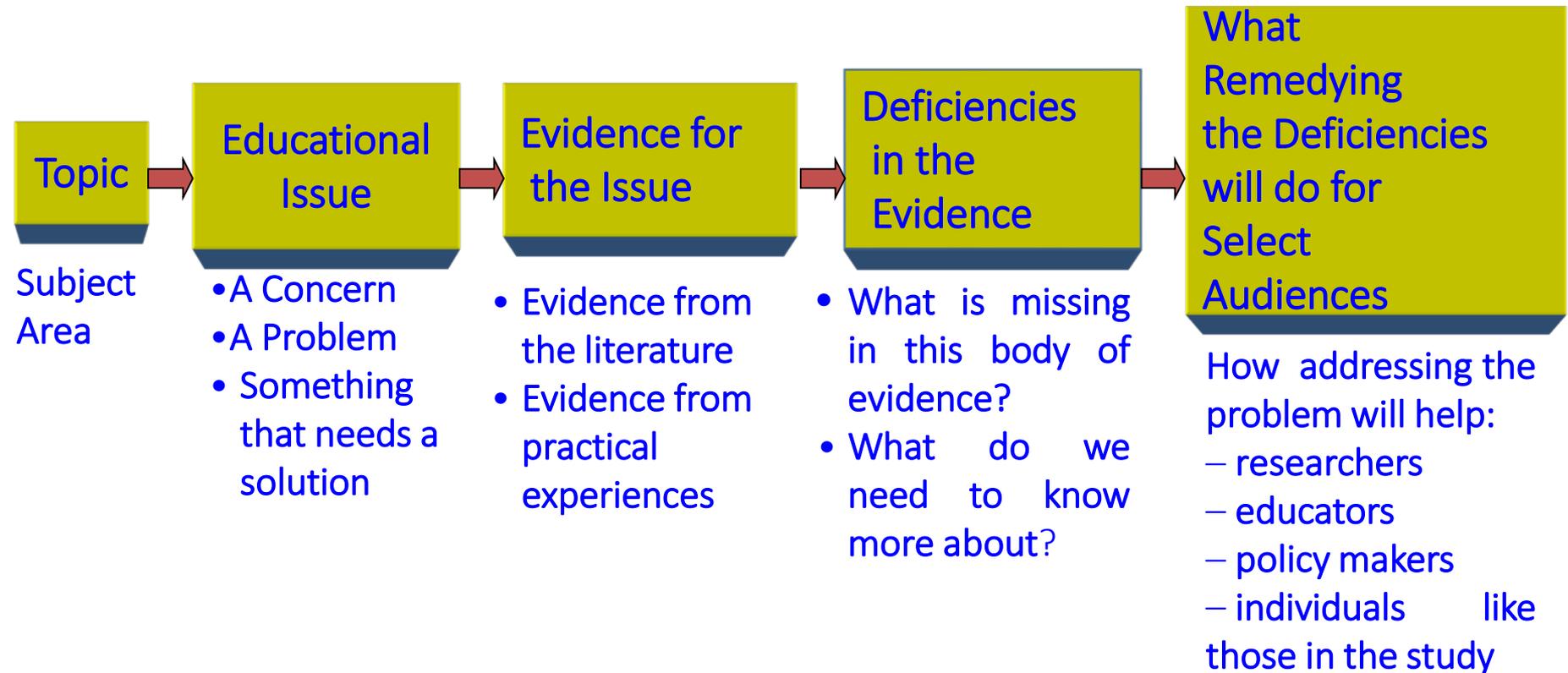


Specific

This provides the conceptual framework that guides the proposal writing process.

Guiding Principles in Identifying a Research Study

Flow of Ideas



What is an Abstract and What is its value?

An abstract is a **summary** of the proposal.

It is the single most important element of the proposal since:

- It **speaks** for the proposal when it is separated from it.
- It provides the reader with a **first impression** of the proposed research.
- As a summary, it frequently provides the reader of the proposed study.

Some proposal reviewers read only the abstract, and most rely on it to give them an initial quick overview of the proposal and later to refresh their memory of the project's main points.

What is the structure of an Abstract?

To capture the essence of your proposal, the abstract should **summarize all the elements of the proposal**, except the references, work plan and budget.

- ❑ It starts by describing the background (the knowledge field where your research takes place and the key issues that offer opportunities for scientific or technological innovations that you intend to explore).
- ❑ It then presents briefly your research statement and your proposed research objectives and approach.
- ❑ It concludes with the expected outcome and the anticipated implications of such results on the advancement of scientific knowledge.

At what point do you write an Abstract?

Although it often appears at the beginning of the proposal, the abstract should be written last, as a concise summary (approximately 250 - 300 words) of the proposal.



Your Abstract should leave a lasting impression

Introduction

motivate
a novice
about your
research idea

What is the purpose of the introduction?

The Introduction provides a brief **rationale** for why the proposed study is worth pursuing.

- ❑ It provides the **background** information on the study
- ❑ It explains why other people should care about it (establishes its **importance**)
- ❑ It outlines what you plan to do and reveals what you plan to achieve (explains its **significance**).

Restrict the introduction to topics relevant to the study that help explain your research topic e.g. A scientist may explain how cancer cells reproduce to help readers understand why a chemical might inhibit growth of cancerous cells.

What is the outline of the introduction?

The introduction serves to familiarize the reader with the topic of the proposal.

- It begins with background information with a statement of what is being proposed that serves to introduce the subject to someone unfamiliar with the topic.
- It also provides a **brief** summary of the literature on research related to the problem being investigated.
- It should briefly outline the objectives of the project and provide enough background to enable the reader to place this particular research problem in the context of common knowledge.

Literature Review

If I have seen further it is by standing on the shoulders of Giants. **(Isaac Newton).**

Literature Review - An Overview

- It provides the reader with a **comprehensive review** of the literature related to the problem under investigation. The review of related literature should greatly expand upon the background information already incorporated in the introduction section.
- It should be **selective** and **critical**. It should only discuss relevant studies and provide a fair evaluation of them.
- If no studies of your specific topic exist, look for parallel or broader ones.
- Since the literature review may be lengthy, it is essential to **divide into sections and subsections** as needed to logically organize the information presented.

What is the purpose of the literature review?

The key objective of the literature review is to demonstrate that your research will fill **an important gap in the current research** on this subject.

It serves to answer the questions:

- What research has **already been done** in your field and what is **your understanding** of the findings?
- What do you think is **missing**?
- How has previous research not explained the questions that your **study seeks to address**?

By evaluating your research idea against the larger context of what has been explored, the literature review allows you to demonstrate that your work is original and innovative.

The Essential elements of literature review

- The literature review should be accompanied by comprehensive references, which you list at the end of the proposal.
- You should follow very strictly the appropriate referencing conventions and make sure that no document referred to in the body of the proposal is missing in the final list of references.
- The choice of referencing conventions may depend on the specific field where your research is located.

Research Problem

The Research Problem - Overview

The research problem section broadly ties together:

- ❑ Statement of the Problem/research question/hypothesis
- ❑ Research Objectives
- ❑ Significance of the Study

Defining a research problem allows for the **formulation** of a **research question** to be answered or **hypothesis** to be tested.

Try to convince the reader that:

- First, the research question has not yet been answered satisfactorily (literature review !!)
- Second, the answer would contribute to science and/or society

Statement of the Problem

The statement of the problem provides the **focus** and **direction** of the study.

- Recall that a problem can be something to be explained, to be further understood or to be addressed.
- A good statement of the problem **clearly defines the problem**, states the concepts to be related in the study and **identifies a feasible solution** to the problem.
- By clearly stating the concepts to be related, a well-written problem statement helps to identify the variables to be investigated in the study.

The following examples illustrate commonly used formats for statements of the problem.

- 1) This study will compare, contrast, investigate, describe, determine, examine, develop, clarify or evaluate the issue being studied.
- 2) The purpose of this study will be to determine the physical characteristics that explain the difference between male and female fish and identify those features that differ significantly between the two genders.
- 3) This study is designed to investigate graduate students' perceptions regarding the difficulty of coursework at UoK and determine which courses provide the most challenge.

The Research Question - Definition and Purpose

A research question is a **clear, focused and arguable** question around which you plan to center your research.

A **research question** can be answered directly through the analysis of data.

Example

Topic: The role of diet on student performance

Research Question: Is there a **relationship** between the **diet** and **student** performance in class?

Research Question vs Hypothesis

- A *research question* is associated with the problem statement and can be answered directly through the analysis of data, but a *hypothesis* is the researcher's best guess to the answer of the research question.
- Hypotheses are generated from specific theories, but research questions are often attempts to refute/validate various theories through the testing of their associated hypotheses.

Example:

Research Question: Is there a relationship between the diet and student performance in class?

Hypothesis: A diet of fish and ugali enhances student performance in class.

Research Problem - Research Objectives

Research objectives outline the **specific goals** the study plans to achieve when completed.

The research objectives are usually divided into:

- i. General objective/broad objective or overall objective
- ii. Specific objectives

The general (broad) objective or goal and specific objectives are not the same and should be dealt with separately.

The general objective defines the contribution of the project in a bigger context thereby defining the purpose of the project.

Example: To identify natural fungi for sewage treatment

General Objective vs Specific Objectives

- The general objective is a goal that the project hopes to achieve.
- The specific objective is a specific result that the project aims to achieve within a given time frame.

Examples:

General Objective:

To identify antimalarial principles from *Erythrina* species of Kenya.

Specific Objectives:

- (i) Identify antiplasmodial principles from *Erythrina burtii*
- (ii) Evaluate the antimalarial activity of these principles

Research Problem - Specific Objectives

Specific objectives are statements of precise outcomes that can be measured in support of the project's general objective.

Properly written specific objectives should be SMART

- Specific
- Measurable
- Achievable
- Realistic
- Timely

Keep the specific objectives simple.

Research Problem - Specific Objectives

Specific objectives are usually captured as an itemized list.

Examples of properly stringed specific objectives:

The specific objectives of this research are to:

1. Assess the correlation of levels of pesticides with rain season
2. Evaluate the antiplasmodial activity of water extracts of *Capparis spinosa* of the family Capparaceae.
3. Identify the plant metabolites of Kenyan *Erythrina burtii*
4. Develop a rapid diagnostic tool for malaria.

Specific objective should not sound like an activity. Activities is what methods are for.

Research Problem - Specific Objectives

Examples of poorly stringed specific objectives:

The specific objectives of this research are to:

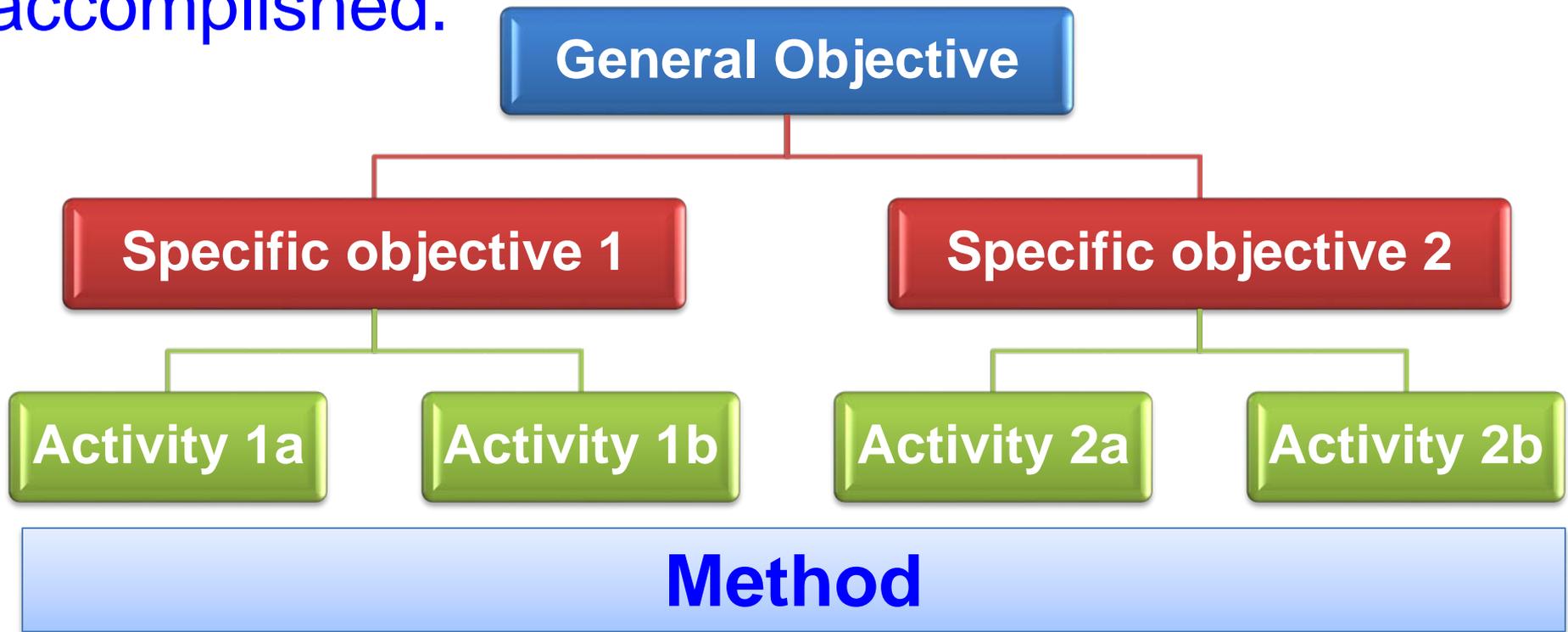
1. Measure the changes of pesticides with rainfall season
2. Bioassay the extracts of plants of the family Capparaceae.
3. Isolate the plant metabolites of Kenyan *Erythrina* species
4. Prepare a tool for malaria assay.

Note that all the specific objectives above are stringed to read like an activity.

The outcome of many activities is a goal (objective)

Terminological Hierarchy - Objectives

Keep the processes associated with each objective as simple as possible so that one can clearly see how each objective will be accomplished.



Justification or Significance of the Study

- This section explains the potential value of the study and findings to science or society. It also identifies the target audience of the study and how the results will benefit them.
- Justification explains the ways the study will add to the scholarly knowledge in the field, how it improve the practice or policy.

Exploration: The mere fact that nobody has looked at the problem is not sufficient justification for studying the problem.

Research Methods

It should contain sufficient detail for readers to replicate the work done and obtain similar results.

Research Methods - What does this cover?

- This provides a description of the exact (specific) actions, plan, or strategy to be used to answer the research questions.
- Methodology of a project spells out in specific steps and procedures how the research will be undertaken.
- The methods section will be the longest section of the technical narrative and will present a description of the work to be done in accomplishing the project objectives.
- Link each of the specific objectives to the methods so as to account for all activities of the project.

Research Methods - What does this cover?

- This also outlines the apparatus, instruments and procedures to be used to answer the research questions.
- *The Research Methods should be detailed enough to let the reader decide whether the methods you intend to use are adequate for the research at hand.*
- It should go beyond the mere listing of research tasks, by asserting why you assume that the methods or methodologies you have chosen represent the best available approaches for your project.

References

Always give credit to where it is due

What is the accepted format for citation?

In this section you list all the references you made throughout the research proposal, making sure that you comply with the referencing conventions or citation styles that have been established for your specific field.

Observe the following general requirements:

- Reference list must include all work cited in the text
- All references should be relevant and up-to-date
- All references listed must be cited in the text
- List references in alphabetical order

DO NOT Plagiarize

Definition: Plagiarizing is failing to indicate the source in scholarly writing.

A form of academic misconduct.

You are obliged, as an ethical obligation to other writers and as a defense for yourself, to acknowledge borrowing you take from other sources, even if you do not copy the exact words used in the original.

What does Plagiarism includes?

- Quoting material without acknowledging the source
- Borrowing someone else's ideas, concepts, results and conclusions and passing as your own without acknowledging them – even if these ideas have been substantially reworded.
- Summarizing and paraphrasing another's work with out acknowledging the source.

The rules apply to both textual and visual information.

Budget



You need some “seed money” to grow a “money plant”

Work Plan



What is the value of the work plan

- The work plan presents the timelines of various activities the researcher plans to do (literature to explore in depth, experiments to carry out, tests to accomplish) and the specific milestones of the project.
- The plan should also anticipate the conferences and journals to which the work in progress is expected to be submitted along the way, and schedule it in a *Goals for Publication section of the work plan*.