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### Scientific publication: A tool to enhance to quality of research

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#### Abstract

A scientific or research article or paper is a technical document that describes a significant experimental, theoretical or observational extension of current knowledge, or advances in the practical application of known principles. The aim of writing down this article is to provide complete information regarding the classical format and guidelines of scientific writing to aid in the development of effective technical writing skills.

**Keywords:** Research, research process, research problem, scientific writing, hypothesis

#### Introduction

Research can be defined as a scientific and systematic search for pertinent information on a specific topic. According to Clifford Woody, Research comprises defining and redefining problems, formulating hypothesis or suggested solutions, collecting, organising and evaluating data, making deductions and reaching conclusions at last carefully testing the conclusions to determine whether they fit the formulating hypothesis<sup>[1]</sup>.

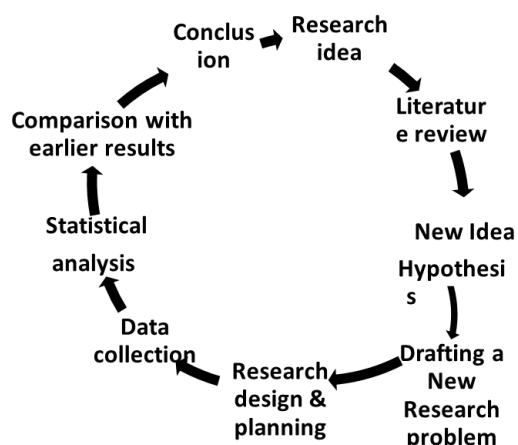
#### Research process

Research process consists of series of actions or steps necessary to effectively carry out research and the desired sequencing of these steps.

Research is a cyclic process.

- It consists of number of closely related activities that overlap continuously rather than following a strictly prescribed sequence.
- Due to cyclic nature of research: It is difficult to determine where to start and when to stop.
- Cyclic mechanism: part of “built-in error correction” machinery.

The flowchart below well illustrates the research process (Figure 1)



**Importance of the research problem**

Research problem is the heart of every research study and is the paramount to the success of the research effort. It is the axis around which the whole research effort revolves.

Sarantakos (1998) [2] emphasised that choosing a research question is one of the first steps, as “no research can be undertaken unless the research question is chosen & accurately defined”.

Leedy & Ormrod (2001) [3] stated that suitable research problems must address the following criterion, i.e the problem should:

- Address an important question worthy of consideration
- Advance the frontiers of knowledge e.g by leading to new ways of thinking, suggesting possible application or paving the way for further research in the field.
- Require the interpretation of data, i.e it is not enough just to collect and report data, the researcher is required to force the data to reveal their meaning.

**Identifying possible research problems**

Kumar (1996) [4] suggested that a researcher who is having difficulty selecting a research topic may be associated by considering the four P's around which research in any academic discipline or occupational field revolves:

- **People** (select individuals, organisations, groups or communities to examine certain issues, problems or establish prevalence of a phenomenon)
- **Problems** (examine issues, situations, associations, needs, population composition, profiles etc)
- **Programs** (examine contents, structure, outcomes, attributes, satisfaction, consumers, service providers etc)
- **Phenomena** (examine cause & effect relationships, the study of a phenomenon itself, etc)

The first “P” (people) identifies a population for a study & the other three provide the subject area for the study. Therefore, most research studies are a combination of at least two ‘P’.

**Assessing the research problem** [5]

Mayntz *et al* (1998) considered three major questions that need to be addressed when assessing & selecting a research topic:

**What can be studied in the research project?**

The research topic must be:

- Relevant
- Researchable
- Feasible
- Ethical

**What is the benefit to the researcher?**

This is based on the investigators personal interests (e.g extrinsic motivation such as impact on salary, prestige, promotions, advancement of knowledge and intrinsic motivations such as an intense personal interest in the research issue)

**What restrictions are there on the research?**

Such as practical, theoretical & personal restrictions:

- Financial restrictions
- Time restrictions
- Availability of assistants & experts
- Methodology restrictions

- Politics & personality
- The need for data

**Formulating a research problem** [6]

Sarantakos (1998) [2] noted that after a topic area has been selected, it must be prepared or formulated to establish how it may be approached methodologically.

- Kumar (1996) [4] stated that to formulate a problem requires considerable knowledge of the subject area & research methodology”. It is a complex process to formulate an idea into a research problem that is researchable. However, “a review of the relevant literature helps enormously in widening the knowledge base one must build before formulating a problem”. The following steps determines the way in which a problem is formulated: The type of study design that can be used
- The type of sampling strategy that can be employed
- The research instrument that can be used or developed
- The type of analysis that can be undertaken

**Formulating of hypothesis** [7]

“A Hypothesis is a logical supposition, a reasonable guess, an educated conjecture. It provides a tentative explanation for a phenomenon under question”

Hypothesis can be defined as tentative assumption made in order to draw out and test its logical or empirical consequences. It should be very specific.

**Role of hypothesis**

- To guide the researcher by delimiting the area of research.
- Focuses attention on the more important facets of the problem.
- Indicates the type of the data required & type of methods of data analysis to be used.

Kumar (1996) highlighted that hypothesis is important because it brings clarity, direction, specificity and focus to the study and tell the researcher what specific information is to be looked for.

**Constructing hypothesis**

Sarantakos (1998) noted that hypothesis are generally translations of research questions and can be in any form.

They generally have the following characteristics:

- A hypothesis should be simple, specific & conceptually clear.
- It should be capable of verification
- It should be related to the body of knowledge
- It should be operationalisable.

The purpose of research is to discover answers to questions through the application of scientific procedures. Writing a scientific paper is the most common way of communicating the results of research to other scientists and to health professionals. The format for writing a scientific paper for publication in biomedical journals has been standardized to provide a systematic and organized way to present the data.

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