

# How to develop a researchable question or a testable hypothesis

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## Abstract

Research can be defined as a systematic way to collect, analyse and interpret data in order to complete a work efficiently and appropriately, answer a question, invent a commodity or to test a hypothesis. Whatever the aim of the research its sole purpose is to find the best route to achieve the desired outcomes. To meet this aim and appropriately conduct the research you need a valid hypothesis. Therefore, developing a researchable question or a testable hypothesis is the first step forward in beginning research. For the student, academic or novice researcher it is important to determine how to come up with a researchable question or a testable hypothesis. Therefore, the chief aim of the present article is to provide a theoretical guideline that can be applied to most forms of academic research.

**Key words:** novice researcher, academic research, theoretical guideline researchable question, testable hypothesis

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## Introduction

Research has been the basis of human achievement to date, whether conducted formally or informally and is part of the thought process behind humanity's scientific, industrial and technological achievements. Its aim is to provide the required data for informed decision making and selecting the appropriate strategies or systems on the basis of such research.

In the modern era its applications include the sciences and social sciences, technology, engineering, geology, geophysics, food chemistry, indeed all human advances have likely been the subject of a hypothesis at some stage. For the academic or tertiary student, a well chosen research project is often the first opportunity to start your career and make your name in life and if you have a passion or great interest in a particular topic it can be the start of your lifetimes' work and your professional reputation.

## Research

Research can be defined as a systematic way to collect, analyse and interpret data in order to ask a question or to test a hypothesis. Therefore, developing a researchable question or a testable hypothesis is the first step in beginning research (1). It is worth mentioning that there are usually two types of academic research i.e. descriptive and analytic. The chief aim in descriptive research is just to answer a researchable question whilst the chief aim of analytic research is to test a hypothesis (2).

The most important difference between these two is related to the time of the research. Descriptive research gathers data on a subject or topic over a specific period, or cross section of time. This explains why cross sectional research can be another name for descriptive research. Analytic research is accomplished in a longitudinal view of time. It means all data gathered for a subject is at the very least in two specific periods of time and compared between those periods. This explains why longitudinal is another name for analytic research.

When you research a specific subject e.g. epidemiology of suicide, or even something more specific, e.g. epidemiology of self-immolation, you carry out a circle or a process of unlimited, but related descriptive and analytic research, as demonstrated in Figure 1. The starting point in this process is descriptive studies that not only are designed to answer the questions but also provide a platform for developing appropriate hypotheses that should be tested by analytic research over time.

For instance, you may start by asking a specific question e.g. "What is the prevalence of self-immolation around the world?" Answering this question (3) may lead to determine that there seems to be a "geographical belt of self-immolation in some Asian countries" (4). Now you can carry out analytic research to test this hypothesis so that: "Asiatic culture of these countries has no role in shaping this geographical belt." It is worth emphasizing the hypothesis should be stated as a null statement.

Given that advanced students are required to conduct research (5), it is important to determine how they can come up with a researchable question or a testable hypothesis? Therefore, the chief aim of the present article is to provide an appropriate guideline.

### How to develop a researchable question or a testable hypothesis

For the academic or PhD student in any scientific, industrial or technological field of study and who may not have a specific or required application or purpose, the task is more theoretical.

In order to develop a researchable question or a testable hypothesis a novice researcher should enter the process with three distinct steps which include:

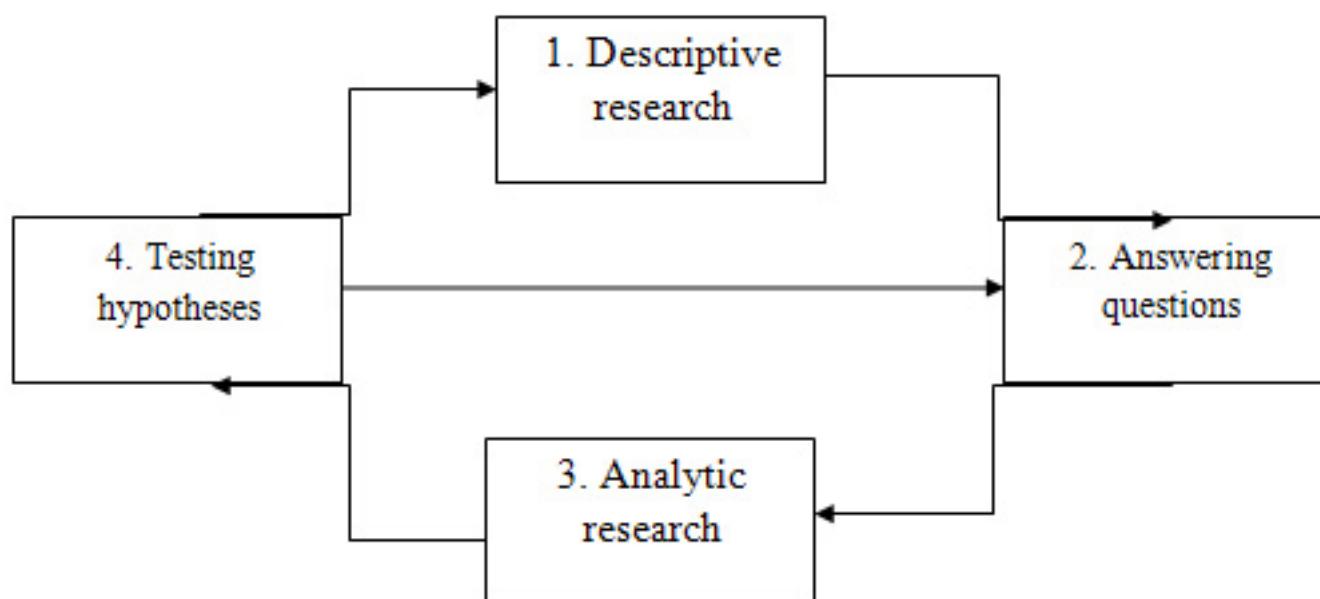
1. Developing a critical mind,
2. Putting yourself in the circumstances that develop ideas,
3. Doing comprehensive literature review to validate or formulate an idea into a researchable question or a testable hypothesis.

### Developing a critical mind

In order to develop a researchable question or a testable hypothesis you need a "critical mind". You should ask relevant and fundamental questions when confronting a new problem, a new situation, a new event, a new report, etc. You should not just watch, read, and listen without critical appraisal. Preferably the approach should not be just 'filling time' or 'meeting a requirement', but finding something totally worthwhile and necessary to research. Research projects are often the first opportunity to start your academic career and make your name in life and if you have a passion or great interest in a particular topic it can be the start of your lifetimes' work and your professional reputation.

For example, when you are watching a procedure you could ask: "Is there a better way to do that? (1)"

Figure 1. The relation between descriptive and analytic research



Likewise, when reading a new book (6) or a new research article (7) you may ask: "What is the purpose of this paper?" "Are the methods correct?", "Do the researchers come to a valid conclusion?" "Would it be possible to design a better research approach or hypothesis" "What are the implications of the results?" etc.

Putting yourself in the circumstances that develop ideas By having or developing a critical mind i.e. a mind that asks relevant and fundamental questions when confronting new situations, the next step is putting yourself in the circumstances that can develop these ideas. These may include:

1. Your daily life experiences. If you study or work, your daily life experiences may always bring you ideas from which you would be able to develop either researchable questions or testable hypotheses. Lectures and classroom discussions may be rich sources of generating ideas. Similarly, when you work as a trainee or a new worker in industry, a laboratory, clinic, hospitals, etc. you will have a unique environment where ideas may be applied or developed.

2. Critical appraisal of a new book or a new article in your area of interest may provide you with other rich sources of ideas. You should also be familiar with the most important journals in your area of interest. When you have found such an article or book reading the abstract should readily advise you if the work is interesting and informative (8).

3. Taking part in a seminar, symposium, congress, workshop or other scientific gatherings should provide other rich sources of new observations. This is the purpose of scientific gatherings. They also provide a venue for asking questions and discussion with those who have generated these ideas. Furthermore, scientific gatherings provide you with an excellent environment to network (9 & 10).

4. Mass media, internet, social media (11 & 12) may also provide you with rich sources of ideas, but it is important to be wary of interest groups peddling invalid or opinionative content (13).

### **Doing a comprehensive literature review to formulate or validate an idea into a researchable question or a testable hypothesis**

All 'new observations' however need to be supported by a comprehensive literature review (14). As there are very few 'new ideas' you may find that the topic has already been covered in part or fully. If you are committed to your idea then you can see if the previous research was valid or extensive enough, or if it leads to new research paths that should or could be further explored. Only by carrying out a thorough literature review will you be able to formulate your ideas into a researchable question or a testable hypothesis (Figure 1). This third step is also imperative since if you are embarking on new research without carrying out comprehensive literature review you may inadvertently commit research misconduct (15-18).

## Conclusion

In order to develop a researchable question or a testable hypothesis as a novice researcher you should enter a process with three distinct steps which include: developing a critical mind, putting yourself in the circumstances that lead to develop ideas and conducting a comprehensive literature review to formulate an idea into a researchable question or a testable hypothesis.

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