

Course : Research statistics

Lecturer : Pr. Saliha CHELLI

Level : Master 1

Part one : Basics of research

Lecture : 2

Research questions & Hypotheses

1. Research questions

Research in general is based on specific questions to be answered as asserted by DÖrneiy (2007, p. 73) “Most research texts suggest that the proper way to do research involves first generating one or more questions and then choosing the design, the method and the instrument that allow the researcher to find answers to these questions”. This shows that formulating questions is a crucial step in research as they orient the whole steps in the investigation; however, many students struggle to ask the appropriate ones.

After the completion and digestion of the literature review, the next step is to ask research questions. Their role is to translate the research purpose into specific research questions that the planned study aims to answer (DÖrneiy, 2007, p.73)). That will not only help you ensure that you know what you are going to research, but also enable you to communicate your ideas to others and guide you in the research process.

A research question is a way of expressing your interest in a problem or phenomenon. You may have one or more than one questions, depending on the complexity and breadth of the proposed work. Good research questions provide orientation to the research methodology that can achieve the research purpose (DÖrneiy, 2007, p.73). As research questions allow the researcher to further narrow down the purpose of his/her study, the first thing to do is to refer to it to ensure that they are tightly related. Narrowing, clarifying and even redefining research questions are essential to the research process (O’Leary, 2004). Good research questions need to be:

- interesting in the sense that they address current issues;
- relevant in relation to the aim;
- sufficiently narrow (specific) so that they can be answered.

Broad questions can be difficult if not impossible to be addressed without breaking them into specific answerable questions.

- Clear and focused

Remember that :

- The research ideas need to be current, we should check whether the research questions have not been answered in the literature, or have only partially been answered and require further additional research.

- Most questions come from a reading of the literature and an understanding of the history of current issues. Extensive reading and analysis of existing research can lead to the identification of gaps that may strike a reader as important.
- We can develop research questions through suggestions made by other researchers, but the researcher must make sure that others have not conducted such studies.
- The first step in the process is to consult the university library. Another way of locating relevant information is through a web-based search.
- On other occasions, ideas for research might stem from observing learners either in or out of a classroom context or through some general feeling or curiosity.

2. How to structure quantitative/ qualitative research questions

Structuring research questions is of great importance as they guide the research you are going to undertake. Structuring quantitative research questions differs from qualitative ones. In asking a quantitative research question, you need to determine if you intend to describe data, compare differences among groups, assess a relationship and if a variable predicts another or effects another. To be able to ask appropriate questions, you need to identify the type and number of variables which can be nominal, ordinal, interval or ratio, and also whether the variables are dependent or both independent and dependent. This makes things easy for you to structure the types of quantitative questions as follows:

In formulating **descriptive** research questions, you can ask them with what is/ what are, how often, how many, how frequently, how much, to what extent, what percentage...

Example : what are the factors influencing students' essay writing ?

Comparative research questions start with what is the difference between x and y? or what is the difference in....?

What is the difference in the weekly photo uploads on Facebook between British male and female university students?

Relationship-based research questions start with what is the relationship between x and y. All have at least one independent variable and one dependent variable. There are different relational questions as illustrated below.

What is the relationship between students' exam scores and their parents' educational level?

Correlational questions: Is there a significant correlation between students' learning strategy and academic success?

Regression: Does students' learning strategy predict academic success?

Cause and effect research questions seek to determine the cause- and effect relationship between two variables (independent and dependent variables). What is the effect of students' learning strategies on students' written productions?

Unlike quantitative research questions, qualitative research questions seek to explore, discover and understand meaning; they are broader than quantitative research questions. In a qualitative study, inquirers state research questions, not objectives (i.e., specific goals for the research) or hypotheses (i.e., predictions that involve variables and statistical tests). These research questions assume two forms: a central question and associated sub-questions (Cressell, 2014, p.129). A central question commonly begins with what or how such as:

What are your sufferings during the curfew due to Covid-19?

How are you managing your time usefully during the lock down period?

Use exploratory verbs to formulate sub- questions. These verbs tell the reader that the study will

- Discover (e.g., grounded theory)
- Seek to understand (e.g., ethnography)
- Explore a process (e.g., case study)
- Describe the experiences (e.g., phenomenology)
- Report the stories (e.g., narrative research)

3. Hypotheses

Research problems are generally expressed in terms of research questions and or/ hypotheses. Research questions are those questions for which answers are sought, whereas hypotheses can be used to express what the researcher expects the results of the investigation to be. Quantitative hypotheses, on the other hand, are predictions the researcher makes about the expected relationships among variables (cresswel, 2014 p.132). They are based on observation or on what the literature suggests the answers might be. There are times when, because of lack of literature, hypotheses cannot be generated because the research is dealing with something new and/or unexplored (Mackey & Gass, 2005, p.19). According to DÖrneiy,

Qualitative and quantitative studies differ considerably in terms of how the purpose of the investigation is specified and how it is broken into specific research questions. In quantitative studies, it is generally true that the more specific the research purpose/ question, the better. Thus, good quantitative purpose statements often identify the target variables and causal or descriptive relationship between them to be examined (2007, p.74).

He adds that: QUAL research purposes and questions are often vaguer than their QUAN counterparts... They tend to be broader than quantitative ones, often focusing on the big picture or the main processes that are shaped to shape the target phenomenon. Unlike quantitative studies, qualitative researchers are more likely to generate new hypotheses as a result of what they find as they go about their work—as they observe patterns and relationships in the natural setting rather than hypothesizing what such patterns and relationships might be beforehand (Fraenkel & Wallen, 1990,p.85). This means that the hypotheses may be generated as the researchers gain insights into what is being studied.

A research hypothesis is essentially a declarative statement of how you expect the research to turn out. In a way, it is a possible answer to your research question. It is a statement that can be an alternative or a null hypothesis. “ A hypothesis is a formal statement that presents the expected relationship between an independent and dependent variable.”(Creswell, 1994).

Hypotheses are of two types : alternative and null.

- An alternative hypothesis designated as H_1 , is a statement of what a statistical test is set up to establish.
- A null hypothesis designated as H_0 is a type of hypothesis in statistics that proposes that no statistical significance exists in a set of given observations. This is virtually the same as the hypothesis but states that there is no relationship between the two variables (Howitt & Cramer).

Example: H_1 : There is a relationship between pupils' academic success and parents' educational level.

H_0 : There is no relationship between pupils' academic success and parents' educational level.

Once the statistical test has been carried out, it is always given in terms of the null hypothesis. We either reject H_0 in favour of H_1 or 'do not reject H_0 .

Hypotheses can be one tailed (directional) or two tailed (non-directional).

The directional, also called **one tailed**, predicts that there will be a difference between groups and specifies how the groups will differ. A directional hypothesis indicates the specific direction (such as higher, lower, more, or less) that a researcher expects to emerge in a relationship (Fraenkel & Wallen, 1990, p. 85).

Example: Boys will perform better than boys in speaking if they are exposed to authentic listening texts. (shows the direction).

The non- directional hypothesis, also called **two- tailed**, predicts that there will be a difference between groups without specifying the direction of this difference.

Example: There will be a difference in the performance of girls and boys in speaking if they are exposed to authentic listening texts. (not defining what kind of difference).

We should keep in mind that a hypothesis has to be testable and that it sets out to test an outcome and not to prove it. A good research hypothesis has to be based on a theory or an idea worth testing (Salkind, 2012, p.13).

Reference

Cohen, L, Manion, L & Morison, K. (2007). Research methods in education. New York: Routledge

Creswell, J. W. (1994). *Research design: Qualitative & quantitative approaches*. Thousand Oaks, CA:Sage.

Dörneiy, Z. (2007). Research methods in applied linguistics: Quantitative, qualitative & mixed methodologies. Oxford: Oxford University Press.

Leedy, P.D & Omrod, J.E. (2001). Practical research: Planning and design . Upper Saddle River, N.J. Merrill Prentice Hall.

Mackey, A & Gass, S.M. (2005). Second language research: Method and design. London: Lawrence Erlbaum, Associate Publishers, Mahwah.

O'Leary, Z. (2017). The essential guide to doing your research project (2nd ed.). London: Sage.