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# Introduction to Research Methods

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MGM 333

**Part 1: Starting the research process**

CH3: Defining the research

**Lecture 4**

Chapter  
**03**

# Defining the research





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# Session Outline

Chapter  
**03**

## Session Outline

- ☐ Introduction
- ☐ Designing a conceptual framework
- ☐ The research hypothesis
- ☐ Defining variables
- ☐ Constructing your hypothesis
- ☐ Research aims and objectives
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# Introduction

- ❑ Now you have developed a theoretical framework for the research from the literature review; the next step is to use that theoretical framework to construct a conceptual framework.

- ❑ Both qualitative and quantitative research demand the development of a theoretical and conceptual framework; after the conceptual stage the two approaches begin to move forward in their own discrete fashion.

- ❑ Table 3.1 outlines the divergence that takes place at this stage in the research, if it has not already done so at least in the mind of the researcher.

**Table 3.1** Pre-operational structure of quantitative and qualitative research

| Quantitative research                          | Qualitative research                                          |
|------------------------------------------------|---------------------------------------------------------------|
| Topic of interest                              | Topic of interest                                             |
| Literature review                              | Literature review                                             |
| Theoretical framework                          | Theoretical framework                                         |
| Conceptual framework                           | Conceptual framework                                          |
| Define variables                               | Identify a tentative research question                        |
| Define hypothesis <i>or</i> aim and objectives | Define aims and objectives (mutable subject to investigation) |

- ❑ The theoretical framework covers the theories, concepts and issues which surround your chosen topic. It needs to be narrowed down, as not every one of those theories, issues or concepts will relate directly to your investigation.

- ❑ When you move from theory to concept you begin to identify the true focus of your research, to define the boundaries of your own work as it relates to the wider theory that already exists.



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# Designing a conceptual framework

- There will be a number of factors influencing you at this stage: your own agenda, external requirements, resources available to you and, not least, your own experience of research.

- Essentially the research question should itself determine the design of your study but it is usually the case that naturally qualitative researchers ask questions such as: Why? How? What?, and naturally quantitative researchers ask such questions as How many? How often? Where?

- So let us look at the ways in which we could explore the issues surrounding the use of electronic information resources in the provision of learning opportunities for young people.
- Our research question for this stage in the process will be: 'Does access to electronic information resources have a role in breaking down barriers to learning opportunities encountered by young people?' (Pickard, 2002, 5).

- We shall explore the possible approaches available to us when defining a research design to address this question. Looking back at Chapter 1 we know that the research question can be approached in a number of ways, depending on our ontological and epistemological stance.

- It is at this stage that we must make a decision about how we are going to construct our research; this choice will be guided by our own views, the purpose of the research and very often the research traditions within our professional field

- How we proceed from this point on will determine the choices we have to make relating to our research method: sampling, data collection, data analysis and presentation of our findings.

- Based on what we have learned from our theoretical framework and other influencing factors we make the first decision: whether this is to be a quantitative study, a qualitative study or a mixed methods approach.



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# The research hypothesis

- Hypothesis testing is only carried out in quantitative or positivist research; very often qualitative or interpretivist research will culminate in the generation of a working hypothesis but it is not the driving force behind the research design.

- Although devising and testing hypotheses is useful in most quantitative research, it is an essential part of statistical inference.
- Hypothesis testing is an attempt to investigate the relationship between two or more variables.

- The hypothesis is a 'scientific guess' (Busha and Harper, 1980, 10) at the nature of that relationship, established before the empirical investigation takes place and developed from the theoretical framework.

- According to Popper (1963), there is no logical way of evaluating how researchers draw up a hypothesis; it is a result of their own interests, knowledge of the theory and a way of constructing a framework to engage in empirical activity.

- Popper claimed that 'proving' a hypothesis in social research was almost impossible, therefore it is of more value to falsify that hypothesis.
- Falsification is definite; we may not be able to 'prove' a hypothesis, only offer support that the hypothesis may be true or prove that it is not

# The research hypothesis

- The data gathered from any empirical investigation may itself be, in part, a product of the research process.
- Formulating a hypothesis has great advantages in quantitative research, but claims made concerning the outcome of the research in relation to the hypothesis needs to be realistic.

- In the majority of research studies involving human subjects in real-world conditions, it is impossible to conduct completely 'clean' hypothesis testing. This can only be done in experimental conditions where the researcher has control of all variables; even then there is an argument that it is impossible to control everything.

- Burns identifies three essential steps in using a hypothesis to engage in scientific discovery:
  - ✓ The proposal of a hypothesis to account for a phenomenon.
  - ✓ The deduction from the hypothesis that a certain phenomenon should be observed in given circumstances.
  - ✓ The checking of this deduction by observation. (Burns, 2000, 106)
- The hypothesis must be capable of being tested; from a theoretical proposition we must create an 'operational' hypothesis (Burns, 2000, 108).

- **A hypothesis must be:**
  - A proposition that implies a relationship between two or more concepts,
  - which is located on a lower level of abstraction and generality than the theory,
  - and which enables the theory to be transformed into terms that can be tested empirically. (Corbetta, 2003, 61)

- From our theoretical framework we now need to identify the concepts we wish to investigate in terms of connections and relationships.
- These concepts will provide us with the variables we need to construct the research hypothesis, and then the operational hypothesis we will use to engage in the empirical investigation.
- 'A variable is an operationalized concept' (Corbetta, 2003, 68).

- There are three types of variable: nominal, ordinal and interval variables. **The classification is related to the functions** that can be performed on the particular variable.

- A **nominal variable** is one that can be classified by categories which cannot be ordered, such as gender and colour.
- The variable value will have names.

- **An ordinal variable** is one in which the order of data points can be determined but not the distance between data points, for example letter grades such as 'A' and 'B'.
- The variable value will be numbers but only ordinal numbers.

- **An interval variable** is one in which both order of data points and distance between data points can be determined, as in percentage scores and distances.
- **There are two forms of interval variable:** discrete variables, which have a definite value and can be counted, and continuous variables, which can occur on an infinite number of points on a continuum such as a tape measure.
- The variable value will be numbers with cardinal properties.

- It is obvious that the variables you select to create your hypothesis will determine the nature of your data collection and analysis later in the process.
- You need to be aware that your choice of variables has implications for your empirical research design.

- Your choice of variables is concerned with the research question.
- Our question for this example is: 'Does access to electronic information resources have a role in breaking down barriers to learning opportunities encountered by young people?'

- Access to electronic resources – interval variable, which is either continuous or discrete, depending on how we want to measure or count it; for example, the number of times a PC is accessed or length of time of access

- Social background – *nominal variable* if we are using recognized named social groupings; *ordinal* if we are using a predefined classification scale such as the Standard Occupational Classification
- Academic attainment – ordinal variable
- IT literacy – ordinal variable
- Gender – nominal variable

- Once we have decided on our variables it is then time to construct a hypothesis that would allow any relationship between the variables to be tested.



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# Constructing your hypothesis

- ❑ We now have a research question and a list of potential variables to help us respond to that question. It is now time to examine those variables and decide what relationship, if any, may exist and how we can test for its existence

- ☐ The literature review may have already identified potential relationships between these variables, for example, there may be evidence to suggest that young people who spend more time than others accessing electronic resources are those with higher levels of IT skills.
- ☐ You may want to test this for yourself with your own sample group or you may want to introduce a third variable to find out if that has any influence on the relationship

- ☐ **Hypothesis testing is deductive:** the problem is stated and then data is collected in direct response to the stated problem.
- ☐ You can see that there is a rigid structure to this approach that dictates the empirical data collection.
- ☐ **An experimental hypothesis will have three types of variable:** an independent variable, a dependent variable and intervening variables

- ☐ **The independent variable** is the condition that is manipulated by the researcher
- ☐ **The dependent variable** is the effect of this manipulation
- ☐ **The intervening variables** are all of those things the research has no control over. It is important to acknowledge the potential impact of intervening variables on any research findings

- ❑ In the majority of research within a natural setting there is no manipulation of a variable; the independent variable becomes an existing condition.

- ☐ In our example below of whether access to electronic resources has a role in breaking down barriers to learning opportunities encountered by young people:
  - ✓ the independent variable could be IT literacy
  - ✓ the dependent variable academic attainment
- ☐ We would be looking to see if levels of IT literacy had a relationship with level of academic attainment among our sample group.

## **Example 3.1** Possible approaches to research questions

There are a number of possible approaches to any research question; here are three possible approaches to the same question.

**Research question:** 'Does access to electronic information resources have a role in breaking down barriers to learning opportunities encountered by young people?'

**Hypothesis 1:** 'Higher levels of IT literacy in young people will lead to higher levels of academic attainment in assignments where electronic information resources are used.'

**Hypothesis 2:** 'Young people from the top two groups of the Standard Occupational Classification will perform better in assignments where access to electronic information resources is needed.'

**Hypothesis 3:** 'Young males are more confident in navigating electronic information resources and this confidence leads to more successful use of these resources.'

- ❑ If this approach is appropriate to your investigation then you have chosen:
  - ❖ a quantitative research design;
  - ❖ this would then imply that your research design may include probability sampling.
  - ❖ Your research method is likely to be experimental, quasi-experimental or a large-scale survey



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# Research aims and objectives

- We have a research question, a question that emerged from our investigation of the current state of knowledge within our particular area of interest.
- 
- We know what is known; we have decided on which element of what remains unknown we wish to explore. Now we have to frame a focus that will guide our investigation.

- In order to do this there are a number of questions that we have to ask about our research question:
  - ✓ Why am I doing this research?
  - ✓ What is the purpose of this research?
  - ✓ What do I hope to learn from this investigation?
  - ✓ What do I need to know in order to provide an answer to my research question?
  - ✓ Who can provide access to that knowledge?
  - ✓ What will be the likely output from this investigation?

- The answers to these questions allow us to frame our aim(s) and from that to construct the objectives of the investigation
- An aim is concerned with the conceptual level of the research, the overall purpose, which is not necessarily time and context bound. It is related to the wider research question and any intended research outputs. It would be the answer to the question 'What is the purpose of this research?'

- **Aim** is concerned with the why and the what, why we are doing it and what we hope to produce by doing it.
- **A research objective** is concerned with the 'how' of the research activity; defining objectives comes from answering the question: 'How will I achieve my stated aim(s)?'

- You could almost call it a task list and so it is not surprising that most objectives begin with a verb.
- Simple as this sounds, it does help when constructing objectives to consider the type of words you should be using: words such as 'examine', 'identify' and 'establish' are usually the first words of a research objective.
- The operational list of activities will ultimately lead to you achieving your aim(s); they are the pieces of the puzzle that need to be understood and put in place before the whole picture can be revealed

## **Example 3.2 Aims and objectives**

**Research question:** 'Does access to electronic information resources have a role in breaking down barriers to learning opportunities encountered by young people?'

### **Aims:**

- To answer the question 'Does access to electronic and digital information resources have a role in breaking down barriers to learning opportunities encountered by young people?'
- If so, how and why does it have this role and what are the circumstances that influence this role? To provide a clear understanding of the use of these resources.
- To suggest a guide to good practice in managing electronic information resources (EIRs) and develop a criterion-based framework of potential learning opportunities in the electronic information environment.

A set of seven specific objectives has been established arising from these aims:

- 1 Identify and evaluate contemporary use of electronic and digital information by young people.
- 2 Establish the current context set by central government, local education authority and individual school policies.
- 3 Establish what young people assume they are doing in relation to the process witnessed by the researcher.
- 4 Consider motivation to use electronic information and the effect this has on participants' learning.
- 5 Establish the level and quality of information skills training available to young people, and examine its application during the information seeking process.
- 6 Examine the conditions that influence use.
- 7 Establish the conditions under which access to electronic and digital information does impact positively on learning. (Pickard, 2002, 5)



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# Summary

- At this stage in the research design major decisions are made about the approach, nature and purpose of the investigation.
- We have taken the same research question and looked at how we can respond to that question from each of the major research traditions discussed in Chapter 1.

- Decisions are based on the purpose of the research as well as the researcher's experience, preference and understanding. It is vital that once those decisions are made the purpose of the research is expressed in an appropriate and practical manner.

- If you are to achieve your research goals then you must create a design that will lead to a logical and defensible outcome. Your research design must ensure rigour or trustworthiness, depending on your chosen approach



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# PRACTICAL EXERCISE

- Identify the dependent and independent variables in the two hypotheses given below:
  - Hypothesis 1: 'Higher levels of IT literacy in young people will lead to higher levels of academic attainment in assignments where electronic information resources are used.'

- Identify the dependent and independent variables in the two hypotheses given below:
  - Hypothesis 2: 'Young males are more confident in navigating electronic information resources and this confidence leads to more successful use of these resources



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# Thank You

