Quantitative and Qualitative Research Methods

Research methods are split broadly into quantitative and qualitative methods.

Which you choose will depend on your research questions, your underlying philosophy of research, and your preferences and skills.

Quantitative Research

Quantitative research is perhaps the simpler to define and identify.

The data produced are always numerical, and they are analysed using mathematical and statistical methods. If there are no numbers involved, then it's not quantitative research.

Some phenomena obviously lend themselves to quantitative analysis because they are already available as numbers. Examples include changes in achievement at various stages of education, or the increase in number of senior managers holding management degrees. However, even phenomena that are not obviously numerical in nature can be examined using quantitative methods.

Example: turning opinions into numbers

If you wish to carry out statistical analysis of the opinions of a group of people about a particular issue or element of their lives, you can ask them to express their relative agreement with statements and answer on a five- or seven-point scale, where 1 is strongly disagree, 2 is disagree, 3 is neutral, 4 is agree and 5 is strongly agree (the seven-point scale also has slightly agree/disagree).

Such scales are called *Likert scales*, and enable statements of opinion to be directly translated into numerical data.

The development of Likert scales and similar techniques mean that most phenomena can be studied using quantitative techniques.

This is particularly useful if you are in an environment where numbers are highly valued and numerical data is considered the 'gold standard'.

However, it is important to note that quantitative methods are not necessarily the most suitable methods for investigation. They are unlikely to be very helpful when you want to understand the detailed reasons for particular behaviour in depth. It is also possible that assigning numbers to fairly abstract constructs such as personal opinions risks making them spuriously precise.

Sources of Quantitative Data

The most common sources of quantitative data include:

- **Surveys**, whether conducted online, by phone or in person. These rely on the same questions being asked in the same way to a large number of people;

- **Observations**, which may either involve counting the number of times that a particular phenomenon occurs, such as how often a particular word is used in interviews, or coding observational data to translate it into numbers; and

- **Secondary data**, such as company accounts.

Analysing Quantitative Data

There are a wide range of statistical techniques available to analyse quantitative data, from simple graphs to show the data through tests of correlations between two or more items, to statistical significance. Other techniques include cluster analysis, useful for identifying relationships between groups of subjects where there is no obvious hypothesis, and hypothesis testing, to identify whether there are genuine differences between groups.

Qualitative Research

Qualitative research is any which does not involve numbers or numerical data.

It often involves words or language, but may also use pictures or photographs and observations.

Almost any phenomenon can be examined in a qualitative way, and it is often the preferred method of investigation in the UK and the rest of Europe; US studies tend to use quantitative methods, although this distinction is by no means absolute.

Qualitative analysis results in rich data that gives an in-depth picture and it is particularly useful for exploring **how** and **why** things have happened.

However, there are some pitfalls to qualitative research, such as:

- **If respondents do not see a value for them in the research, they may provide inaccurate or false information.** They may also say what they think the researcher wishes to hear. Qualitative researchers therefore need to take the time to build relationships with their research subjects and always be aware of this potential.

- **Although ethics are an issue for any type of research, there may be particular difficulties with qualitative research because the researcher may be party to confidential information.** It is important always to bear in mind that you must do no harm to your research subjects.

- **It is generally harder for qualitative researchers to remain apart from their work.** By the nature of their study, they are involved with people. It is therefore helpful to develop habits of reflecting on your part in the work and how this may affect the research. See our page on **Reflective Practice**

Sources of Qualitative Data

Although qualitative data is much more general than quantitative, there are still a number of common techniques for gathering it. These include:

- **Interviews**, which may be structured, semi-structured or unstructured;

- **Focus groups**, which involve multiple participants discussing an issue;

- '**Postcards**', or small-scale written questionnaires that ask, for example, three or four focused questions of participants but allow them space to write in their own words;

- **Secondary data**, including diaries, written accounts of past events, and company reports; and

- **Observations**, which may be on site, or under 'laboratory conditions', for example, where participants are asked to role-play a situation to show what they might do.

Analysing Qualitative Data

Because qualitative data are drawn from a wide variety of sources, they can be radically different in scope.

There are, therefore, a wide variety of methods for analysing them, many of which involve structuring and coding the data into groups and themes. There are also a variety of computer packages to support qualitative data analysis. The best way to work out which ones are right for your research is to discuss it with academic colleagues and your supervisor.

Qualitative Research

> Qualitative research is empirical research where the data are not in the form of numbers (Punch, 1998, p. 4).

Qualitative research is multimethod in focus, involving an interpretive, naturalistic approach to its subject matter. This means that qualitative researchers study things in their natural settings, attempting to make sense of, or interpret, phenomena in terms of the meanings people bring to them.

— *Denzin and Lincoln (1994, p. 2)*

An interest in qualitative data came about as the result of the dissatisfaction of some psychologists (e.g., Carl Rogers) with the scientific study of psychologists such as the behaviorists (e.g., Skinner).

Since psychologists study people, the traditional approach to science is not seen as an appropriate way of carrying out research, since it fails to capture the totality of human experience and the essence of what it is to be human. Exploring the experience of participants is known as a phenomenological approach (re: Humanism).

The aim of qualitative research is to understand the social reality of individuals, groups and cultures as nearly as possible as its participants feel it or live it. Thus, people and groups, are studied in their natural setting.

Research following a qualitative approach is exploratory and seeks to explain 'how' and 'why' a particular phenomenon, or behavior, operates as it does in a particular context.

Methods (used to obtain qualitative data)

Qualitative researchers use a variety of methods to develop deep understandings of how people perceive their social realities and in consequence, how they act within the social world.

For example, diary accounts, open-ended questionnaires, documents, participant observation, and ethnography.

The researcher has several methods for collecting empirical materials, ranging from the interview to direct observation, to the analysis of artifacts, documents, and cultural records, to the use of visual materials or personal experience.

— *Denzin and Lincoln (1994, p. 14)*

A good example of a qualitative research method would be unstructured interviews which generate qualitative data through the use of open questions. This allows the respondent to talk in some depth, choosing their own words. This helps the researcher develop a real sense of a person's understanding of a situation.

Notice that qualitative data could be much more than just words or text. Photographs, videos, sound recordings and so on, can be considered qualitative data.

Data Analysis

Qualitative research is endlessly creative and interpretive. The researcher does not just leave the field with mountains of empirical data and then easily write up his or her findings.

Qualitative interpretations are constructed, and various techniques can be used to make sense of the data, such as content analysis, grounded theory (Glaser & Strauss, 1967), thematic analysis (Braun & Clarke, 2006) or discourse analysis.

TABLE 1
PHASES OF THEMATIC ANALYSIS
(ADAPTED FROM BRAUN & CLARKE, 2006)

	PHASES	DESCRIPTION OF ANALYSIS PROCESS
1	Familiarising myself with data	i) Narrative preparation, i.e. transcribing data ii) (Re-)reading the data and noting down initial ideas
2	Generating initial codes	i) Coding interesting features of the data in a systematic fashion across entire data set ii) Collating data relevant to each code
3	Searching for themes	i) Collating codes into potential themes ii) Gathering all data relevant to each potential theme
4	Reviewing themes	i) Checking if themes work in relation to the coded extracts ii) Checking if themes work in relation to the entire data set iii) Reviewing data to search for additional themes iv) Generating a thematic "map" of the analysis
5	Defining and naming themes	i) On-going analysis to refine the specifics of each theme and the overall story the analysis tells ii) Generating clear definitions and names for each theme
6	Producing the report	i) Selection of vivid, compelling extract examples ii) Final analysis of selected extracts iii) Relating the analysis back to the research question, objectives and previous literature reviewed
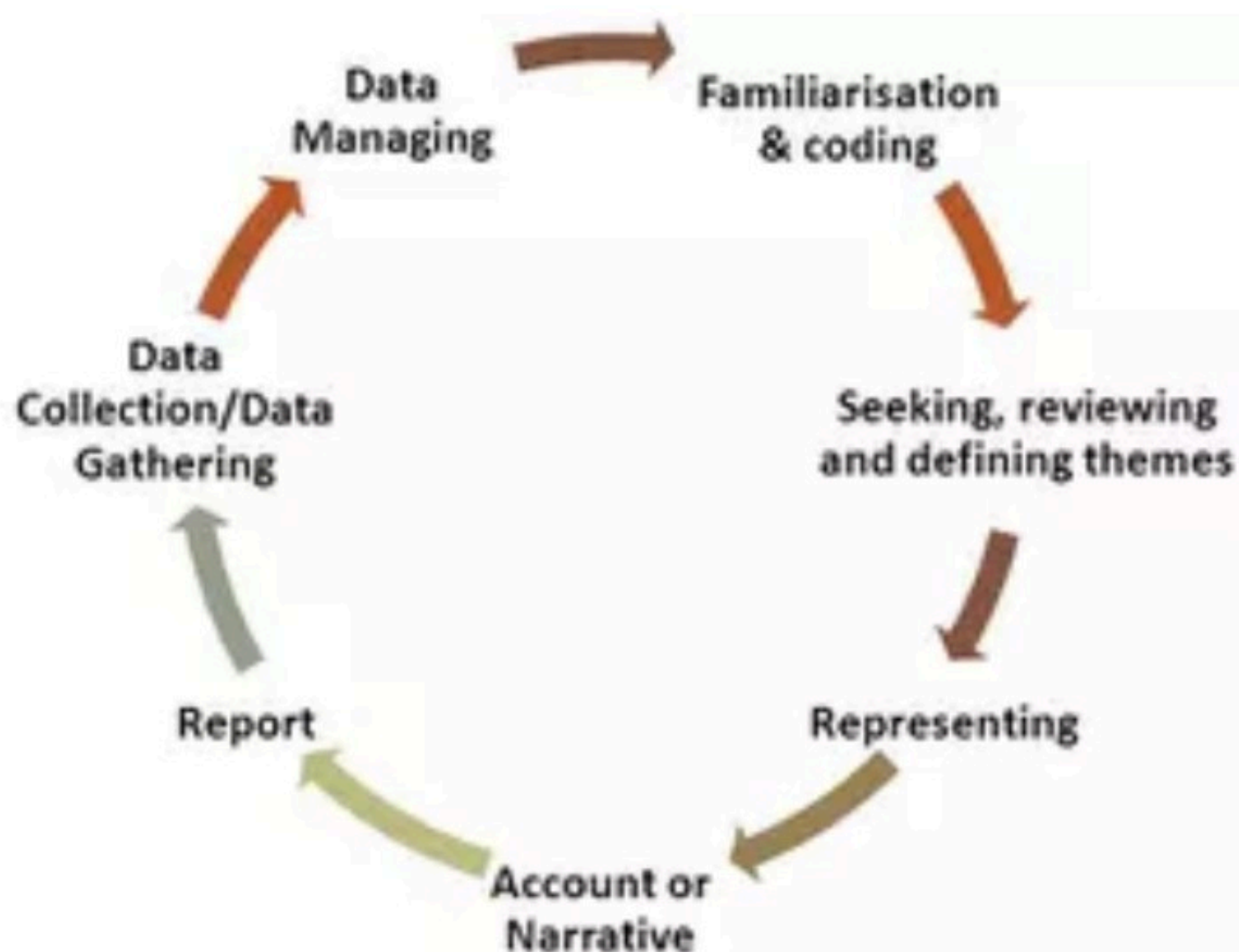
Key Features

Events can be understood adequately only if they are seen in context. Therefore, a qualitative researcher immerses her/himself in the field, in natural surroundings. The contexts of inquiry are not contrived; they are natural. Nothing is predefined or taken for granted.

Qualitative researchers want those who are studied to speak for themselves, to provide their perspectives in words and other actions. Therefore, qualitative research is an interactive process in which the persons studied teach the researcher about their lives.

The qualitative researcher is an integral part of the data, without the active participation of the researcher, no data exists.

The design of the study evolves during the research, and can be adjusted or changed as it progresses.

For the qualitative researcher, there is no single reality, it is subjective and exist only in reference to the observer.

Theory is data driven, and emerges as part of the research process, evolving from the data as they are collected.

Limitations

Because of the time and costs involved, qualitative designs do not generally draw samples from large-scale data sets.

The problem of adequate validity or reliability is a major criticism. Because of the subjective nature of qualitative data and its origin in single contexts, it is difficult to apply conventional standards of reliability and validity.

For example, because of the central role played by the researcher in the generation of data, it is not possible to replicate qualitative studies. Also, Contexts, situations, events, conditions, and interactions cannot be replicated to any extent nor can generalizations be made to a wider context than the one studied with any confidence

The time required for data collection, analysis and interpretation are lengthy. Analysis of qualitative data is difficult and expert knowledge of an area is necessary to try to interpret qualitative data, and great care must be taken when doing so, for example, if looking for symptoms of mental illness.

Strengths

Because of close researcher involvement, the researcher gains an insider's view of the field. This allows the researcher to find issues that are often missed (such as subtleties and complexities) by the scientific, more positivistic inquiries.

Qualitative descriptions can play the important role of suggesting possible relationships, causes, effects and dynamic processes.

Qualitative analysis allows for ambiguities/contradictions in the data, which are a reflection of social reality (Denscombe, 2010).

Qualitative research uses a descriptive, narrative style; this research might be of particular benefit to the practitioner as she or he could turn to qualitative reports in order to examine forms of knowledge that might otherwise be unavailable, thereby gaining new insight.

QuantitativeResearch

Quantitative research gathers data in a numerical form which can be put into categories, or in rank order, or measured in units of measurement. This type of data can be used to construct graphs and tables of raw data.

Quantitative researchers aim to establish general laws of behavior and phenonomon across different settings/contexts. Research is used to test a theory and ultimately support or reject it.

Methods (used to obtain quantitative data)

Experiments typically yield quantitative data, as they are concerned with measuring things. However, other research methods, such as controlled observations and questionnaires can produce both quantitative information.

For example, a rating scale or closed questions on a questionnaire would generate quantitative data as these produce either numerical data or data that can be put into categories (e.g., "yes," "no" answers).

Experimental methods limit the possible ways in which a research participant can react to and express appropriate social behavior.

Findings are therefore likely to be context-bound and simply a reflection of the assumptions which the researcher brings to the investigation.

Data Analysis

Statistics help us turn quantitative data into useful information to help with decision making. We can use statistics to summarise our data, describing patterns, relationships, and connections. Statistics can be descriptive or inferential.

Descriptive statistics help us to summarise our data whereas inferential statistics are used to identify statistically significant differences between groups of data (such as intervention and control groups in a randomised control study).

Key Features

Quantitative researchers try to control extraneous variables by conducting their studies in the lab.

The research aims for objectivity (i.e., without bias), and is separated from the data.

The design of the study is determined before it begins.

For the quantitative researcher reality is objective and exist separately to the researcher, and is capable of being seen by anyone.

Research is used to test a theory and ultimately support or reject it.

Limitations

Context: Quantitative experiments do not take place in natural settings. In addition, they do not allow participants to explain their choices or the meaning of the questions may have for those participants (Carr, 1994).

Researcher expertise: Poor knowledge of the application of statistical analysis may negatively affect analysis and subsequent interpretation (Black, 1999).

Variability of data quantity: Large sample sizes are needed for more accurate analysis. Small scale quantitative studies may be less reliable because of the low quantity of data (Denscombe, 2010). This also affects the ability to generalize study findings to wider populations.

Confirmation bias: The researcher might miss observing phenomena because of focus on theory or hypothesis testing rather than on the theory of hypothesis generation.

Strengths

Scientific objectivity: Quantitative data can be interpreted with statistical analysis, and since statistics are based on the principles of mathematics, the quantitative approach is viewed as scientifically objective, and rational (Carr, 1994; Denscombe, 2010).

Useful for testing and validating already constructed theories.

Rapid analysis: Sophisticated software removes much of the need for prolonged data analysis, especially with large volumes of data involved (Antonius, 2003).

Replication: Quantitative data is based on measured values and can be checked by others because numerical data is less open to ambiguities of interpretation.

Rapid analysis: Sophisticated software removes much of the need for prolonged data analysis, especially with large volumes of data involved (Antonius, 2003).

Replication: Quantitative data is based on measured values and can be checked by others because numerical data is less open to ambiguities of interpretation.

Hypotheses can also be tested because of the used of statistical analysis (Antonius, 2003).