Chapter 8
Selecting a Study Design

In this chapter you will learn about:

- The differences between quantitative and qualitative study designs
- Common study designs in quantitative research and when to use them
- Common study design in qualitative research and when to use them
- The strengths and weaknesses of different study designs

Keywords: *action research, after-only design, before-and-after study design, blind studies, case studies, cohort studies, control studies, cross-sectional study design, double-blind studies, experimental study design, feminist research, focus studies, longitudinal studies, non-experimental studies, panel studies, prospective study design, quasi-experimental studies, reflective journal, retrospective studies, semi-experimental studies, trend studies.*

Differences between quantitative and qualitative study designs

In this chapter we will discuss some of the most commonly used study designs in both quantitative and qualitative research. Overall, there are many more study designs in quantitative research than in qualitative research. Quantitative study designs are specific, well structured, have been tested for their validity and reliability, and can be explicitly defined and recognised. Study designs in qualitative research either do not have these attributes or have them to a lesser degree. They are less specific and precise, and do not have the same structural depth.

Differences in philosophical perspectives in each paradigm combined with the aims of a study, to a large extent, determine the focus, approach and mode of enquiry which, in turn, determine the structural aspects of a **study design**. The main focus in qualitative research is to understand, explain, explore, discover and clarify situations, feelings, perceptions, attitudes, values, beliefs and experiences of a group of people. The study designs are therefore often based on deductive rather than inductive logic, are flexible and emergent in nature, and are often non-linear and non-sequential in their operationalisation. The study designs mainly entail the selection of people from whom the information, through an open frame of enquiry, is explored and gathered. The parameters of the scope of a study, and information gathering methods and processes, are often flexible and evolving; hence, most qualitative designs are not as structured and sequential as quantitative ones. On the other hand, in quantitative research, the measurement and classification requirements of the information that is gathered demand that study designs are more structured, rigid, fixed and predetermined in their use to ensure accuracy in measurement and classification.

In qualitative studies the distinction between study designs and methods of data collection is far less clear. Quantitative study designs have more clarity and distinction between designs and methods of data collection. In qualitative research there is an overlap between the two. Some designs are basically methods of data collection. For example, in-depth interviewing is a design as well as a method of data collection and so are oral history and participant observation.

One of the most distinguishing features of qualitative research is the adherence to the concept of respondent concordance whereby you as a researcher make every effort to seek agreement of your respondents with your interpretation, presentation of the situations, experiences, perceptions and conclusions. In quantitative research respondent concordance does not occupy an important place. Sometimes it is assumed to be achieved by circulating or sharing the findings with those who participated in the study.

The 'power-gap' between the researcher and the study population in qualitative research is far smaller than in quantitative research because of the informality in structure and situation in which data is collected.

In quantitative research enough detail about a study design is provided for it to be replicated for verification and reassurance. In qualitative research little attention is paid to study designs or the other structural aspects of a study, hence the replication of a study design becomes almost impossible. This leads to the inability of the designs to produce findings that can be replicated. Findings through quantitative study designs can be replicated and retested whereas this cannot be easily done by using qualitative study designs.

Another difference in the designs in qualitative and quantitative studies is the possibility of introducing researcher bias. Because of flexibility and lack of control it is more difficult to check researcher bias in qualitative studies.

Study designs in each paradigm are appropriate for finding different things. Study designs in qualitative research are more appropriate for exploring the variation and diversity in any aspect of social life, whereas in quantitative research they are more suited to finding out the extent of this variation and diversity. If your interest is in studying values, beliefs, understandings, perceptions, meanings, etc., qualitative study designs are more appropriate as they provide immense flexibility. On the other hand, if your focus is to measure the magnitude of that variation, 'how many people have a particular value, belief, etc.?', the quantitative designs are

more appropriate. For good quantitative research it is important that you combine quantitative skills with qualitative ones when ascertaining the nature and extent of diversity and variation in a phenomenon. In the author's opinion, the qualitative–quantitative–qualitative approach to research is comprehensive and worth consideration. This involves starting with qualitative methods to determine the spread of diversity, using quantitative methods to quantify the spread and then going back to qualitative to explain the observed patterns. As already stated, the author does not recommend your locking yourself into either the qualitative or quantitative paradigm and, though you may have your preference, it is the purpose that should determine the choice between quantitative and qualitative study designs. If you already know (from previous studies or practice knowledge) the nature of diversity in any area of interest to you, knowledge about its extent can be determined only by using quantitative methods. In most cases where you want to explore both, you need to use methods that fall in the domain of both paradigms.

Study designs in quantitative research

Some of the commonly used designs in quantitative studies can be classified by examining them from three different perspectives:

1 the number of contacts with the study population;
2 the reference period of the study;
3 the nature of the investigation.

Every study design can be classified from each one of these perspectives. These perspectives are arbitrary bases of classification; hence, the terminology used to describe them is not universal. However, the names of the designs within each classification base are universally used. Note that the designs within each category are mutually exclusive; that is, if a particular study is cross-sectional in nature it cannot be at the same time a before-and-after or a **longitudinal study**, but it can be a non-experimental or experimental study, as well as a **retrospective study** or a **prospective study**. See Figure 8.1.

Another section has been added to the three sections listed above titled 'Others – some commonly used study designs'. This section includes some commonly used designs which are based on a certain philosophy or methodology, and which have acquired their own names.

Study designs based on the number of contacts

Based on the number of contacts with the study population, designs can be classified into three groups:

1 cross-sectional studies;
2 before-and-after studies;
3 longitudinal studies.

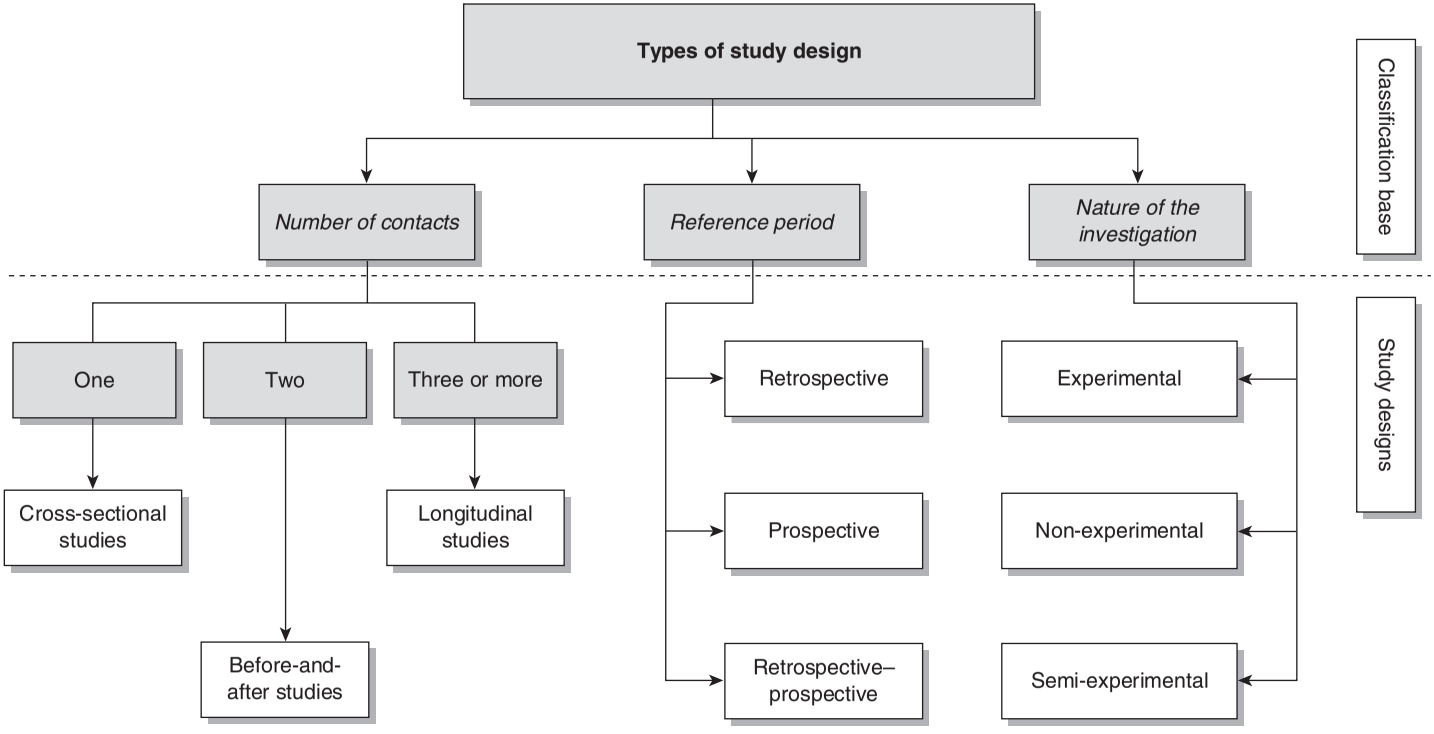

FIGURE 8.1 *Types of study design*

The cross-sectional study design

Cross-sectional studies, also known as one-shot or status studies, are the most commonly used design in the social sciences. This design is best suited to studies aimed at finding out the prevalence of a phenomenon, situation, problem, attitude or issue, by taking a cross-section of the population. They are useful in obtaining an overall 'picture' as it stands at the time of the study. They are 'designed to study some phenomenon by taking a cross-section of it at one time' (Babbie 1989: 89). Such studies are cross-sectional with regard to both the study population and the time of investigation.

A cross-sectional study is extremely simple in design. You decide what you want to find out about, identify the study population, select a sample (if you need to) and contact your respondents to find out the required information. For example, a cross-sectional design would be the most appropriate for a study of the following topics:

- The attitude of the study population towards uranium mining in Australia.
- The socioeconomic–demographic characteristics of immigrants in Western Australia.
- The incidence of HIV-positive cases in Australia.
- The reasons for homelessness among young people.
- The quality assurance of a service provided by an organisation.
- The impact of unemployment on street crime (this could also be a before-and-after study).
- The relationship between the home environment and the academic performance of a child at school.
- The attitude of the community towards equity issues.
- The extent of unemployment in a city.
- Consumer satisfaction with a product.
- The effectiveness of random breath testing in preventing road accidents (this could also be a before-and-after study).
- The health needs of a community.
- The attitudes of students towards the facilities available in their library.

As these studies involve only one contact with the study population, they are comparatively cheap to undertake and easy to analyse. However, their biggest disadvantage is that they cannot measure change. To measure change it is necessary to have at least two data collection points – that is, at least two cross-sectional studies, at two points in time, on the same population.

The before-and-after study design

The main advantage of the before-and-after design (also known as the pre-test/post-test design) is that it can measure change in a situation, phenomenon, issue, problem or attitude. It is the most appropriate design for measuring the impact or effectiveness of a programme. A before-and-after design can be described as two sets of cross-sectional data collection points on the same population to find out the change in the phenomenon or variable(s) between two points in time. The change is measured by comparing the difference in the phenomenon or variable(s) before and after the intervention (see Figure 8.2).

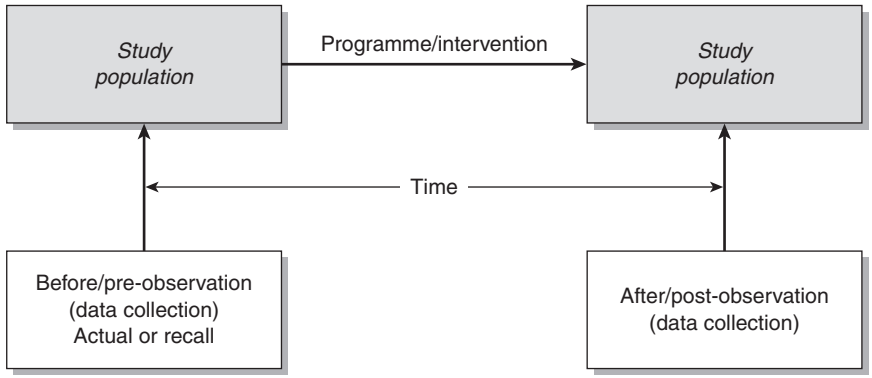

FIGURE 8.2 *Before-and-after (pre-test/post-test) study design*

A before-and-after study is carried out by adopting the same process as a cross-sectional study except that it comprises two cross-sectional data sets, the second being undertaken after a certain period. Depending upon how it is set up, a before-and-after study may be either an experiment or a non-experiment. It is one of the most commonly used designs in evaluation studies. The difference between the two sets of data collection points with respect to the dependent variable is considered to be the impact of the programme. The following are examples of topics that can be studied using this design:

- The impact of administrative restructuring on the quality of services provided by an organisation.
- The effectiveness of a marriage counselling service.
- The impact of sex education on sexual behaviour among schoolchildren.
- The effect of a drug awareness programme on the knowledge about, and use of, drugs among young people.
- The impact of incentives on the productivity of employees in an organisation.
- The impact of increased funding on the quality of teaching in universities.
- The impact of maternal and child health services on the infant mortality rate.
- The effect of random breath testing on road accidents.
- The effect of an advertisement on the sale of a product.

The main advantage of before-and-after design is its ability to measure change in a phenomenon or to assess the impact of an intervention. However, there can be disadvantages which may not occur, individually or collectively, in every study. The prevalence of a particular disadvantage(s) is dependent upon the nature of the investigation, the study population and the method of data collection. These disadvantages include the following:

- As two sets of data must be collected, involving two contacts with the study population, the study is more expensive and more difficult to implement. It also requires a longer time to complete, particularly if you are using an experimental design, as you will need to wait until your intervention is completed before you collect the second set of data.

- In some cases the time lapse between the two contacts may result in attrition in the study population. It is possible that some of those who participated in the pre-test may move out of the area or withdraw from the experiment for other reasons.
- One of the main limitations of this design, in its simplest form, is that as it measures *total change*, you cannot ascertain whether independent or extraneous variables are responsible for producing change in the dependent variable. Also, it is not possible to quantify the contribution of independent and extraneous variables separately.
- If the study population is very young and if there is a significant time lapse between the before-and-after sets of data collection, changes in the study population may be because it is maturing. This is particularly true when you are studying young children. The effect of this maturation, if it is significantly correlated with the dependent variable, is reflected at the 'after' observation and is known as the *maturation effect*.
- Sometimes the instrument itself educates the respondents. This is known as the *reactive effect* of the instrument. For example, suppose you want to ascertain the impact of a programme designed to create awareness of drugs in a population. To do this, you design a questionnaire listing various drugs and asking respondents to indicate whether they have heard of them. At the pre-test stage a respondent, while answering questions that include the names of the various drugs, is being made aware of them, and this will be reflected in his/her responses at the post-test stage. Thus, the research instrument itself has educated the study population and, hence, has affected the dependent variable. Another example of this effect is a study designed to measure the impact of a family planning education programme on respondents' awareness of contraceptive methods. Most studies designed to measure the impact of a programme on participants' awareness face the difficulty that a change in the level of awareness, to some extent, may be because of this reactive effect.
- Another disadvantage that may occur when you use a research instrument twice to gauge the attitude of a population towards an issue is a possible shift in attitude between the two points of data collection. Sometimes people who place themselves at the extreme positions of a measurement scale at the pre-test stage may, for a number of reasons, shift towards the mean at the post-test stage (see Figure 8.3). They might feel that they have been too negative or too positive at the pre-test stage. Therefore, the mere expression of

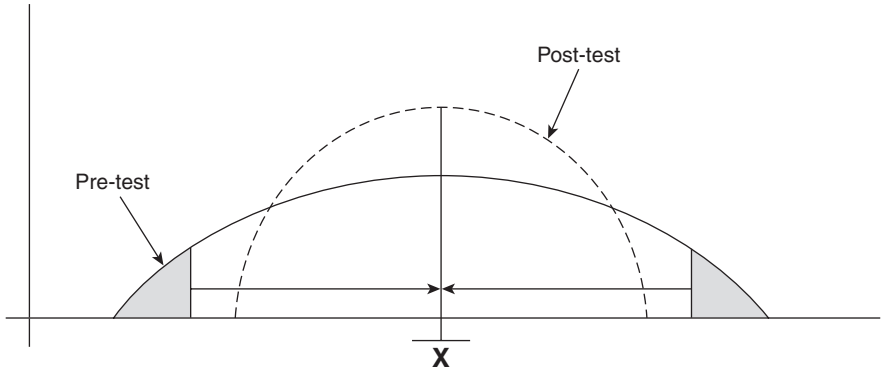

FIGURE 8.3 *The regression effect*

an attitude in response to a questionnaire or interview has caused them to think about and alter their attitude at the time of the post-test. This type of effect is known as the *regression effect*.

The longitudinal study design

The before-and-after study design is appropriate for measuring the extent of change in a phenomenon, situation, problem, attitude, and so on, but is less helpful for studying the pattern of change. To determine the pattern of change in relation to time, a longitudinal design is used; for example, when you wish to study the proportion of people adopting a programme over a period. Longitudinal studies are also useful when you need to collect factual information on a continuing basis. You may want to ascertain the trends in the demand for labour, immigration, changes in the incidence of a disease or in the mortality, morbidity and fertility patterns of a population.

In longitudinal studies the study population is visited a number of times at regular intervals, usually over a long period, to collect the required information (see Figure 8.4). These intervals are not fixed so their length may vary from study to study. Intervals might be as short as a week or longer than a year. Irrespective of the size of the interval, the type of information gathered each time is identical. Although the data collected is from the same study population, it may or may not be from the same respondents. A longitudinal study can be seen as a series of repetitive cross-sectional studies.

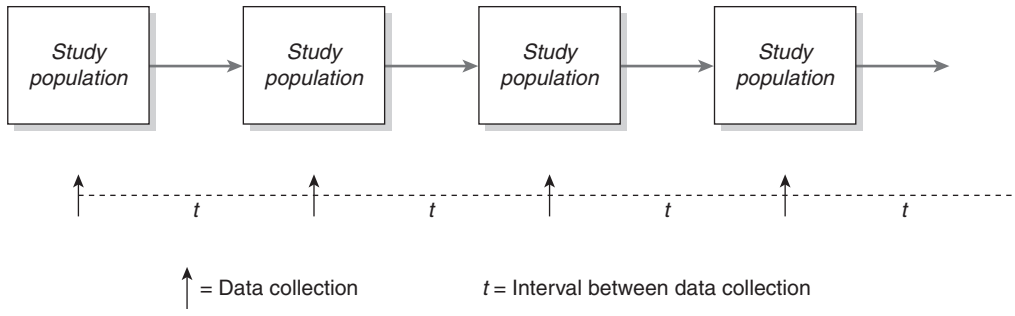

FIGURE 8.4 *The longitudinal study design*

Longitudinal studies have many of the same disadvantages as before-and-after studies, in some instances to an even greater degree. In addition, longitudinal studies can suffer from the **conditioning effect**. This describes a situation where, if the same respondents are contacted frequently, they begin to know what is expected of them and may respond to questions without thought, or they may lose interest in the enquiry, with the same result.

The main advantage of a longitudinal study is that it allows the researcher to measure the pattern of change and obtain factual information, requiring collection on a regular or continuing basis, thus enhancing its accuracy.

Study designs based on the reference period

The *reference period* refers to the time-frame in which a study is exploring a phenomenon, situation, event or problem. Studies are categorised from this perspective as:

- retrospective;
- prospective;
- retrospective–prospective.

The retrospective study design

Retrospective studies investigate a phenomenon, situation, problem or issue that has happened in the past. They are usually conducted either on the basis of the data available for that period or on the basis of respondents' recall of the situation (Figure 8.5a). For example, studies conducted on the following topics are classified as retrospective studies:

- The living conditions of Aboriginal and Torres Strait Islander peoples in Australia in the early twentieth century.
- The utilisation of land before the Second World War in Western Australia.
- A historical analysis of migratory movements in Eastern Europe between 1915 and 1945.
- The relationship between levels of unemployment and street crime.

The prospective study design

Prospective studies refer to the likely prevalence of a phenomenon, situation, problem, attitude or outcome in the future (Figure 8.5b). Such studies attempt to establish the outcome of an event or what is likely to happen. Experiments are usually classified as prospective studies as the researcher must wait for an intervention to register its effect on the study population. The following are classified as prospective studies:

- To determine, under field conditions, the impact of maternal and child health services on the level of infant mortality.
- To establish the effects of a counselling service on the extent of marital problems.
- To determine the impact of random breath testing on the prevention of road accidents.
- To find out the effect of parental involvement on the level of academic achievement of their children.
- To measure the effects of a change in migration policy on the extent of immigration in Australia.

The retrospective–prospective study design

Retrospective–prospective studies focus on past trends in a phenomenon and study it into the future. Part of the data is collected retrospectively from the existing records before the intervention is introduced and then the study population is followed to ascertain the impact of the intervention (Figure 8.5c).

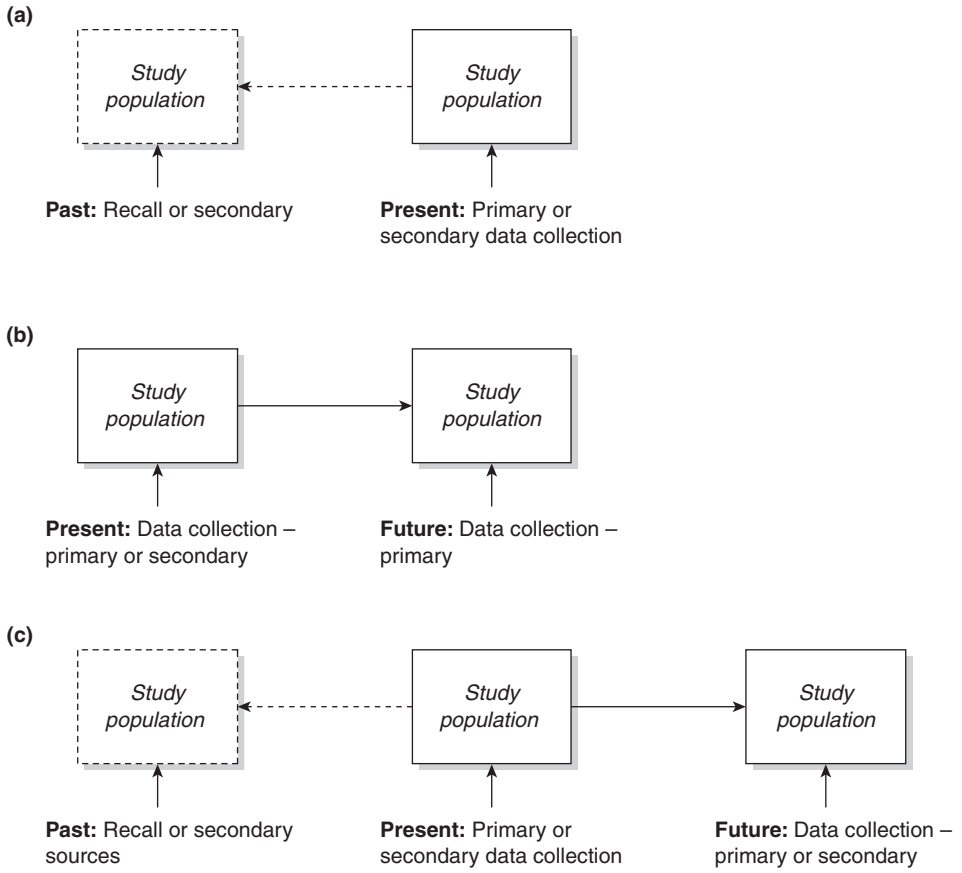

FIGURE 8.5 *(a) Retrospective study design; (b) prospective study design; (c) retrospective–prospective study design.*

A study is classified under this category when you measure the impact of an intervention without having a control group. In fact, most before-and-after studies, if carried out without having a control – where the baseline is constructed from the same population before introducing the intervention – will be classified as retrospective–prospective studies. Trend studies, which become the basis of projections, fall into this category too. Some examples of retrospective–prospective studies are:

- The effect of random breath testing on road accidents.
- The impact of incentives on the productivity of the employees of an organisation.
- The impact of maternal and child health services on the infant mortality rate.
- The effect of an advertisement on the sale of a product.

Study designs based on the nature of the investigation

On the basis of the nature of the investigation, study designs in quantitative research can be classified as:

- experimental;
- non-experimental;
- quasi- or semi-experimental.

To understand the differences, let us consider some examples. Suppose you want to test the following: the impact of a particular teaching method on the level of comprehension of students; the effectiveness of a programme such as random breath testing on the level of road accidents; or the usefulness of a drug such as azidothymidine (AZT) in treating people who are HIV-positive; or imagine any similar situation in your own academic or professional field. In such situations there is assumed to be a *cause-and-effect* relationship. There are two ways of studying this relationship. The first involves the researcher (or someone else) introducing the intervention that is assumed to be the 'cause' of change, and waiting until it has produced – or has been given sufficient time to produce – the change. The second consists of the researcher observing a phenomenon and attempting to establish what caused it. In this instance the researcher starts from the effect(s) or outcome(s) and attempts to determine causation. If a relationship is studied in the first way, starting from the cause to establish the effects, it is classified as an **experimental study**. If the second path is followed – that is, starting from the effects to trace the cause – it is classified as a **non-experimental study** (see Figure 8.6).

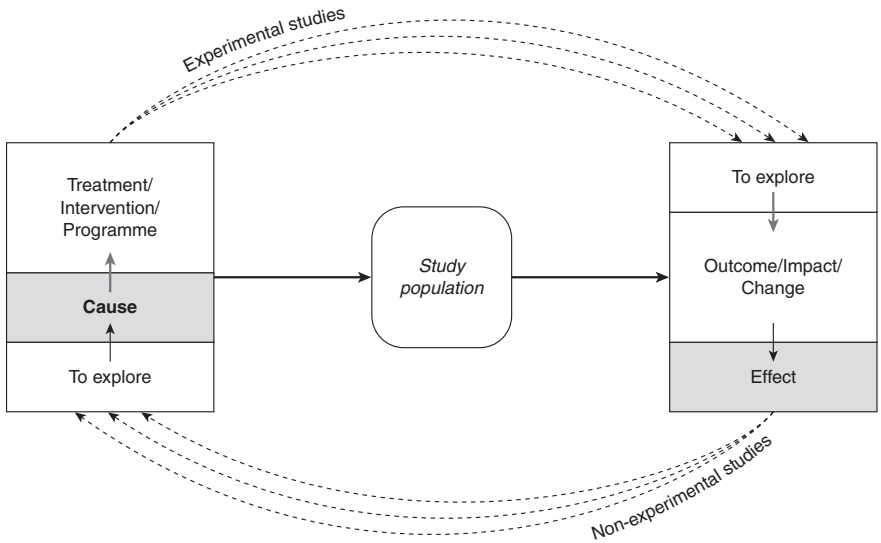

FIGURE 8.6 *Experimental and non-experimental studies*

In the former case the independent variable can be 'observed', introduced, controlled or manipulated by the researcher or someone else, whereas in the latter this cannot happen as the assumed cause has already occurred. Instead, the researcher retrospectively links the cause(s) to the outcome(s). A **semi-experimental study** or **quasi-experimental study** has the properties of both experimental and non-experimental studies; part of the study may be non-experimental and the other part experimental.

An experimental study can be carried out in either a 'controlled' or a 'natural' environment. For an experiment in a controlled environment, the researcher (or someone else) introduces the intervention or stimulus to study its effects. The study population is in a 'controlled' situation such as a room. For an experiment in a 'natural' environment, the study population is exposed to an intervention in its own environment.

Experimental studies can be further classified on the basis of whether or not the study population is randomly assigned to different treatment groups. One of the biggest problems in comparable designs (those in which you compare two or more groups) is a lack of certainty that the different groups are in fact comparable in every respect except the treatment. The process of randomisation is designed to ensure that the groups are comparable. In a **random design**, the study population, the experimental treatments or both are not predetermined but randomly assigned (see Figure 8.7). Random assignment in experiments means that any individual or unit of a study population group has an *equal* and *independent* chance of becoming part of an experimental or control group or, in the case of multiple treatment modalities, any treatment has an equal and independent chance of being assigned to any of the population groups. It is important to note that the concept of randomisation can be applied to any of the experimental designs we discuss.

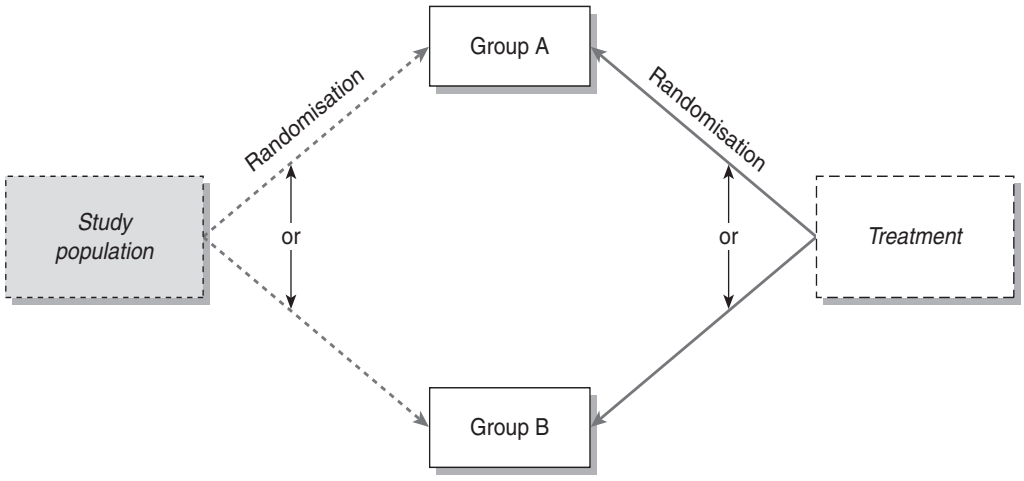

FIGURE 8.7 *Randomisation in experiments*

Experimental study designs

There are so many types of experimental design that not all of them can be considered within the scope of this book. This section, therefore, is confined to describing those most commonly used in the social sciences, the humanities, public health, marketing, education, epidemiology, social work, and so on. These designs have been categorised as:

- the after-only experimental design;
- the before-and-after experimental design;
- the control group design;
- the double-control design;
- the comparative design;
- the 'matched control' experimental design;
- the placebo design.

The after-only experimental design

In an after-only design the researcher knows that a population is being, or has been, exposed to an intervention and wishes to study its impact on the population. In this design, information on baseline (pre-test or before observation) is usually 'constructed' on the basis of respondents' recall of the situation before the intervention, or from information available in existing records – secondary sources (Figure 8.8). The change in the dependent variable is measured by the difference between the 'before' (baseline) and 'after' data sets. Technically, this is a very faulty design for measuring the impact of an intervention as there are no proper baseline data

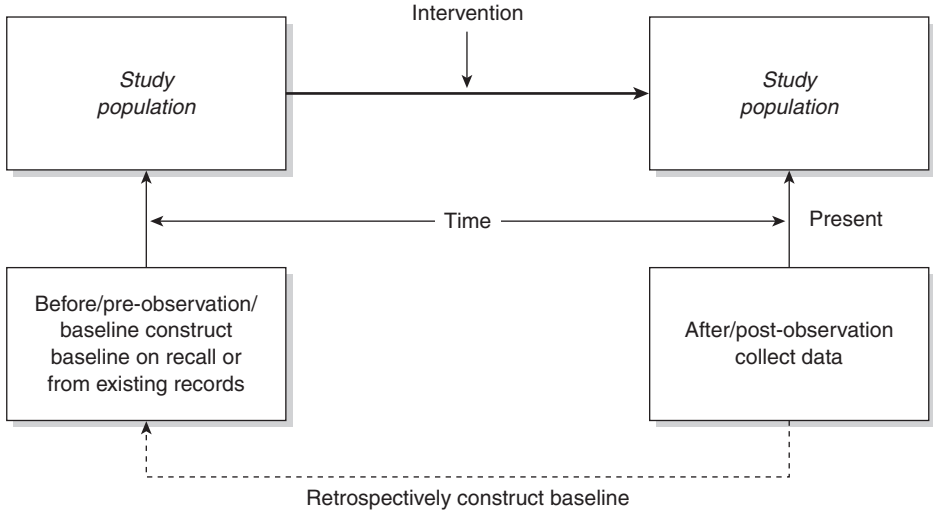

FIGURE 8.8 *The after-only design*

to compare the 'after' observation with. Therefore, one of the major problems of this design is that the two sets of data are not strictly comparable. For example, some of the changes in the dependent variable may be attributable to the difference in the way the two sets of data were compiled. Another problem with this design is that it measures total change, including change attributable to extraneous variables; hence, it cannot identify the net effect of an intervention. However, this design is widely used in impact assessment studies, as in real life many programmes operate without the benefit of a planned evaluation at the programme planning stage (though this is fast changing) in which case it is just not possible to follow the sequence strictly – collection of baseline information, implementation of the programme and then programme evaluation. An evaluator therefore has no choice but to adopt this design.

In practice, the adequacy of this design depends on having reasonably accurate data available about the prevalence of a phenomenon before the intervention is introduced. This might be the case for situations such as the impact of random breath testing on road accidents, the impact of a health programme on the mortality of a population, the impact of an advertisement on the sale of a product, the impact of a decline in mortality on the fertility of a population, or the impact of a change in immigration policy on the extent of immigration. In these situations it is expected that accurate records are kept about the phenomenon under study and so it may be easier to determine whether any change in trends is primarily because of the introduction of the intervention or change in the policy.

The before-and-after experimental design

The before-and-after design overcomes the problem of retrospectively constructing the 'before' observation by establishing it before the intervention is introduced to the study population (see Figure 8.2). Then, when the programme has been completely implemented or is assumed to have had its effect on the population, the 'after' observation is carried out to ascertain the impact attributable to the intervention (see Figure 8.9).

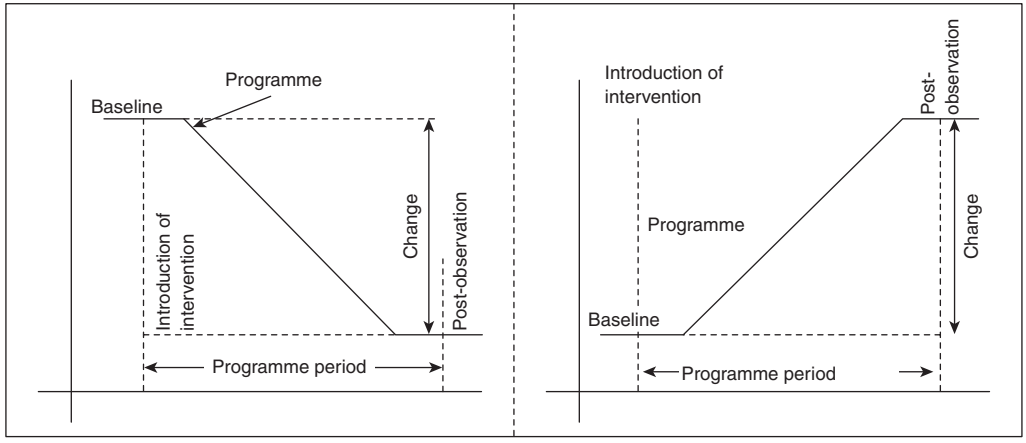

FIGURE 8.9 *Measurement of change through a before-and-after design*

The before-and-after design takes care of only one problem of the after-only design – that is, the comparability of the before-and-after observations. It still does not enable one to conclude that any change – in whole or in part – can be attributed to the programme intervention. To overcome this, a 'control' group is used. Before-and-after designs may also suffer from the problems identified earlier in this chapter in the discussion of before-and-after study designs. The impact of the intervention in before-and-after design is calculated as follows:

[change in dependent variable] =

[status of the dependent variable at the 'after' observation] -
[status of the dependent variable at the 'before' observation]

The control group design

In a study utilising the control group design the researcher selects two population groups instead of one: a **control group** and an **experimental group** (Figure 8.10). These groups are expected to be comparable as far as possible in every respect except for the intervention (that is assumed to be the cause responsible for bringing about the change). The experimental group either receives or is exposed to the intervention, whereas the control group is not. Firstly, the 'before' observations are made on both groups at the same time. The experimental group is then exposed to the intervention. When it is assumed that the intervention has had an impact, an 'after' observation is made on both groups. Any difference in the 'before' and 'after' observations between the groups regarding the dependent variable(s) is attributed to the intervention.

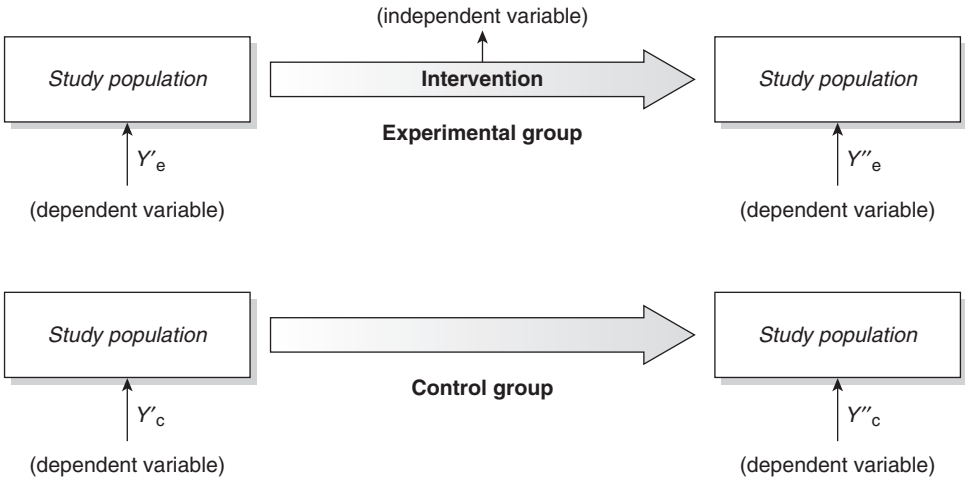

FIGURE 8.10 *The control experimental design*

In the experimental group, total change in the dependent variable (Y_e) can be calculated as follows:

$$Y_e = (Y''_e - Y'_e)$$

where

Y''_e = 'after' observation on the experimental group
Y'_e = 'before' observation on the experimental group

In other words,

$$(Y''_e - Y'_e) = \text{(impact of programme intervention)} \pm \text{(impact of extraneous variables)} \pm \text{(impact of chance variables)}$$

In the control group, total change in the dependent variable (Y_c) can be calculated as follows:

$$Y_c = (Y''_c - Y'_c)$$

where

Y''_c = post-test observation on the control group
Y'_c = pre-test observation on the control group

In other words,

$$(Y''_c - Y'_c) = \text{(impact of extraneous variables)} \pm \text{(impact of chance variables)}$$

The difference between the control and experimental groups can be calculated as

$$(Y''_e - Y'_e) - (Y''_c - Y'_c),$$

which is

{(impact of programme intervention) ± (impact of extraneous variables in experimental groups) ± (impact of chance variables in experimental groups)} - {(impact of extraneous variables in control group) ± (impact of chance variables in control group)}

Using simple arithmetic operations, this equals the impact of the intervention.

Therefore, the impact of any intervention is equal to the difference in the 'before' and 'after' observations in the dependent variable between the experimental and control groups.

It is important to remember that the chief objective of the control group is to quantify the impact of extraneous variables. This helps you to ascertain the impact of the intervention only.

The double-control design

Although the **control design** helps you to quantify the impact that can be attributed to extraneous variables, it does not separate out other effects that may be due to the research instrument (such as the reactive effect) or respondents (such as the maturation or regression effects, or placebo effect). When you need to identify and separate out these effects, a double-control design is required.

In **double-control studies**, you have two control groups instead of one. To quantify, say, the reactive effect of an instrument, you exclude one of the control groups from the 'before' observation (Figure 8.11).

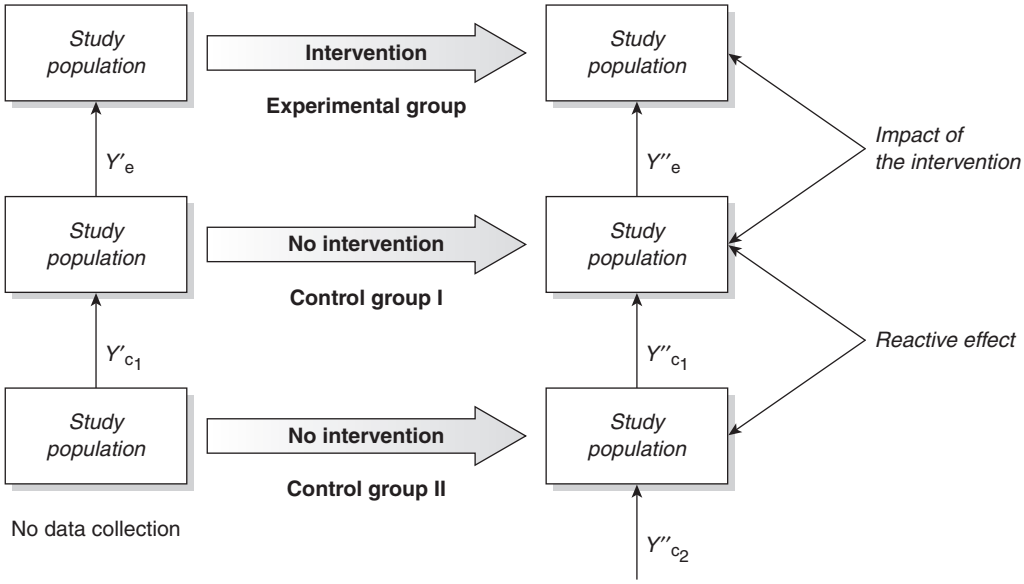

FIGURE 8.11 *Double-control designs*

You can calculate the different effects as follows:

$(Y''_e - Y'_e)$ = (impact of programme intervention) ± (impact of extraneous variables) ± (reactive effect) ± (random effect)

$(Y''_{c1} - Y'_{c1})$ = (impact of extraneous variables) ± (reactive effect) ± (random effect)

$(Y''_{c2} - Y'_{c1})$ = (impact of extraneous variables) ± (random effect)

(Note that $(Y''_{c2} - Y'_{c1})$ and not $(Y''_{c2} - Y'_{c2})$ as there is no 'before' observation for the second control group.)

$(Y''_{e} - Y'_{e}) - (Y''_{c1} - Y'_{c1})$ = impact of programme intervention
$(Y''_{c1} - Y'_{c1}) - (Y'_{c2} - Y'_{c1})$ = reactive effect

The net effect of the programme intervention can be calculated in the same manner as for the control group designs as explained earlier.

The comparative design

Sometimes you seek to compare the effectiveness of different treatment modalities and in such situations a comparative design is appropriate.

With a comparative design, as with most other designs, a study can be carried out either as an experiment or as a non-experiment. In the comparative experimental design, the study population is divided into the same number of groups as the number of treatments to be tested. For each group the baseline with respect to the dependent variable is established. The different treatment models are then introduced to the different groups. After a certain period, when it is assumed that the treatment models have had their effect, the 'after' observation is carried out to ascertain any change in the dependent variable. The degree of change in the dependent variable in the different population groups is then compared to establish the relative effectiveness of the various interventions.

In the non-experimental form of comparative design, groups already receiving different interventions are identified, and only the post-observation with respect to the dependent variable is conducted. The pre-test data set is constructed either by asking the study population in each group to recall the required information relating to the period before the introduction of the treatment, or by extracting such information from existing records. Sometimes a pre-test observation is not constructed at all, on the assumption that if the groups are comparable the baseline must be identical. As each group is assumed to have the same baseline, the difference in the post-test observation is assumed to be because of the intervention.

To illustrate this, imagine you want to compare the effectiveness of three teaching models (A, B and C) on the level of comprehension of students in a class (Figure 8.12). To undertake the study, you divide the class into three groups (X, Y and Z), through randomisation, to ensure their comparability. Before exposing these groups to the teaching models, you first establish the baseline for each group's level of comprehension of the chosen subject. You then expose each group to a different teaching model to teach the chosen subject. Afterwards, you again measure the groups' levels of comprehension of the material. Suppose X_a is the average level of comprehension of group X before the material is taught, and X_a' is this group's average level of comprehension after the material is taught. The change in the level of comprehension, $X_a' - X_a$ is therefore attributed to model A. Similarly, changes in group Y and Z, $Y_b' - Y_b$ and $Z_c' - Z_c$, are attributed to teaching models B and C respectively. The changes in the average level of comprehension for the three groups are then compared to establish which

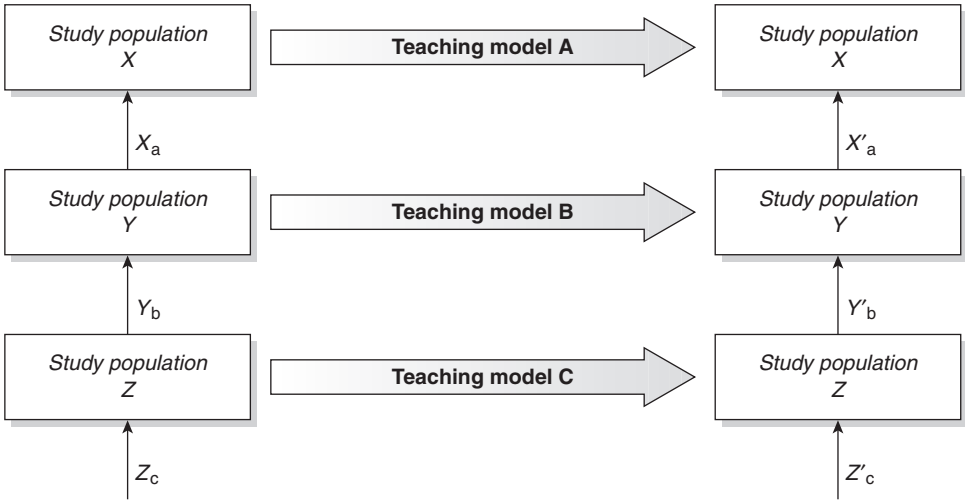

FIGURE 8.12 *Comparative experimental design*

teaching model is the most effective. (Note that extraneous variables will affect the level of comprehension in all groups equally, as they have been formed randomly.)

It is also possible to set up this study as a non-experimental one, simply by exposing each group to one of the three teaching models, following up with an 'after' observation. The difference in the levels of comprehension is attributed to the difference in the teaching models as it is assumed that the three groups are comparable with respect to their original level of comprehension of the topic.

The matched control experimental design

Comparative groups are usually formed on the basis of their overall comparability with respect to a relevant characteristic in the study population, such as socioeconomic status, the prevalence of a certain condition or the extent of a problem in the study population. In matched studies, comparability is determined on an individual-by-individual basis. Two individuals from the study population who are almost identical with respect to a selected characteristic and/or condition, such as age, gender or type of illness, are matched and then each is allocated to a separate group (the matching is usually done on an easily identifiable characteristic). In the case of a matched control experiment, once the two groups are formed, you as a researcher decide through randomisation or otherwise which group is to be considered control, and which experimental.

The matched design can pose a number of challenges:

- Matching increases in difficulty when carried out on more than one variable.
- Matching on variables that are hard to measure, such as attitude or opinion, is extremely difficult.

- Sometimes it is hard to know which variable to choose as a basis for matching. You may be able to base your decision upon previous findings or you may have to undertake a preliminary study to determine your choice of variable.

Matched groups are most commonly used in the testing of new drugs.

The 'placebo' design

A patient's belief that s/he is receiving treatment can play an important role in his/her recovery from an illness even if treatment is ineffective. This psychological effect is known as the **placebo effect**. A placebo design attempts to determine the extent of this effect. A **placebo study** involves two or three groups, depending on whether or not the researcher wants to have a control group (Figure 8.13). If the researcher decides to have a control group, the first group receives the treatment, the second receives the placebo treatment and the third – the control group – receives nothing. The decision as to which group will be the treatment, the placebo or the control group can also be made through randomisation.

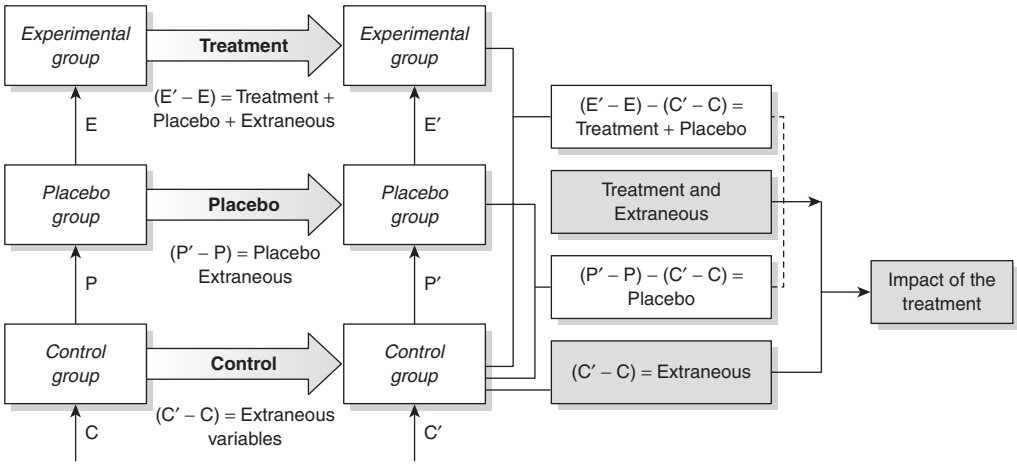

FIGURE 8.13 *The placebo design*

Other designs commonly used in quantitative research

There are some research designs that may be classified in the typology described above but, because of their uniqueness and prevalence, have acquired their own names. They are therefore described separately below.

The cross-over comparative experimental design

The denial of treatment to the control group is considered unethical by some professionals. In addition, the denial of treatment may be unacceptable to some individuals in the control group, which could result in them dropping out of the experiment and/or going elsewhere to receive treatment. The former increases 'experimental mortality' and the latter may contaminate the study. The **cross-over comparative experimental design** makes it possible to measure the impact of a treatment without denying treatment to any group, though this design has its own problems.

In the cross-over design, also called the ABAB design (Grinnell 1993: 104), two groups are formed, the intervention is introduced to one of them and, after a certain period, the impact of this intervention is measured. Then the interventions are 'crossed over'; that is, the experimental group becomes the control and vice versa, sometimes repeatedly over the period of the study (Figure 8.14). However, in this design, population groups do not constitute experimental or control groups but only segments upon which experimental and control observations are conducted.

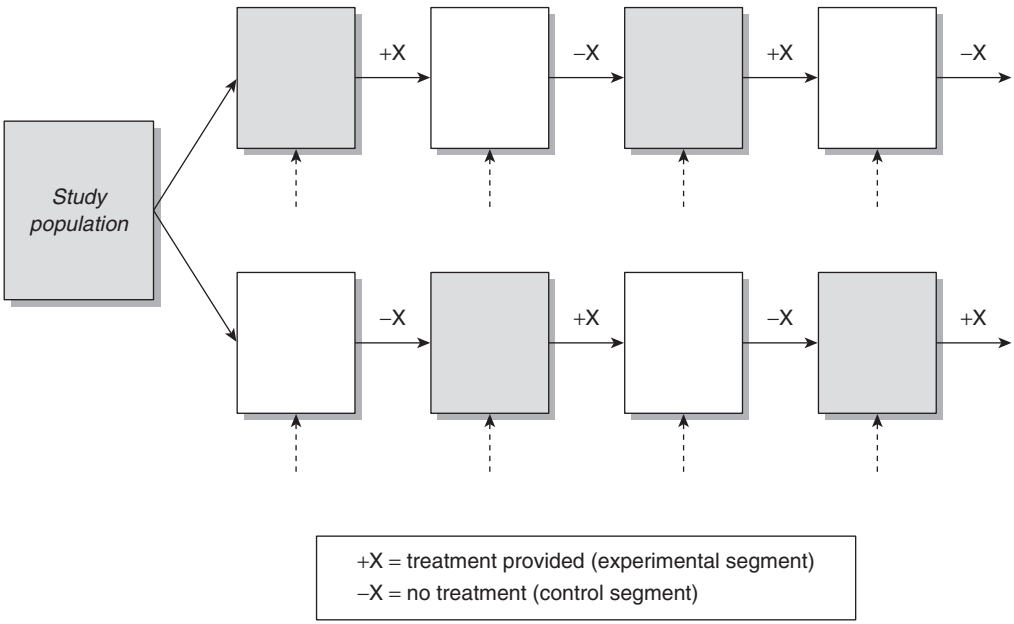

FIGURE 8.14 *The cross-over experimental design*

One of the main disadvantages of this design is discontinuity in treatment. The main question is: what impact would intervention have produced had it not been provided in segments?

The replicated cross-sectional design

In practice one usually examines programmes already in existence and ones in which clients are at different stages of an intervention. Evaluating the effectiveness of such programmes within a conventional experimental design is impossible because a baseline cannot be established as the intervention has already been introduced. In this situation, the usual method of selecting a group of people who were recently recruited to the programme and following them through until the intervention has been completed may take a long time. In such situations, it is possible to choose clients who are at different phases of the programme to form the basis of your study (Figure 8.15).

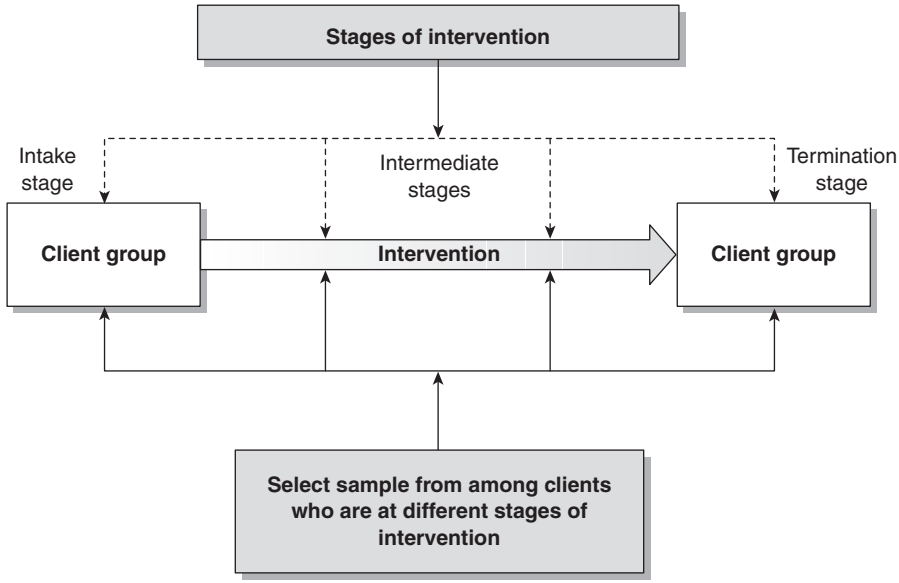

FIGURE 8.15 *The replicated cross-sectional design*

This design is based upon the assumption that participants at different stages of a programme are similar in terms of their socioeconomic–demographic characteristics and the problem for which they are seeking intervention. Assessment of the effectiveness of an intervention is done by taking a sample of clients at different stages of the intervention. The difference in the dependent variable among clients at intake and termination stage is considered to be the impact of the intervention.

Trend studies

If you want to map change over a period, a **trend study** is the most appropriate method of investigation. Trend analysis enables you to find out what has happened in the past, what is

happening now and what is likely to happen in the future in a population group. This design involves selecting a number of data observation points in the past, together with a picture of the present or immediate past with respect to the phenomenon under study, and then making certain assumptions as to future trends. In a way you are collecting cross-sectional observations about the trend being observed at different points in time over past–present–future. From these cross-sectional observations you draw conclusions about the pattern of change.

Trend studies are useful in making forecasting by extrapolating present and past trends thus making a valuable contribution to planning. Trends regarding the phenomenon under study can be correlated with other characteristics of the study population. For example, you may want to examine the changes in political preference of a study population in relation to age, gender, income or ethnicity. This design can also be classified as retrospective–prospective study on the basis of the reference period classification system developed earlier in this chapter.

Cohort studies

Cohort studies are based upon the existence of a common characteristic such as year of birth, graduation or marriage, within a subgroup of a population. Suppose you want to study the employment pattern of a batch of accountants who graduated from a university in 1975, or study the fertility behaviour of women who were married in 1930. To study the accountants' career paths you would contact all the accountants who graduated from the university in 1975 to find out their employment histories. Similarly, you would investigate the fertility history of those women who married in 1930. Both of these studies could be carried out either as cross-sectional or longitudinal designs. If you adopt a cross-sectional design you gather the required information in one go, but if you choose the longitudinal design you collect the required information at different points in time over the study period. Both these designs have their strengths and weaknesses. In the case of a longitudinal design, it is not important for the required information to be collected from the same respondents; however, it is important that all the respondents belong to the cohort being studied; that is, in the above examples they must have graduated in 1975 or married in 1930.

Panel studies

Panel studies are similar to trend and cohort studies except that in addition to being longitudinal they are also prospective in nature and the information is always collected from the same respondents. (In trend and cohort studies the information can be collected in a cross-sectional manner and the observation points can be retrospectively constructed.) Suppose you want to study the changes in the pattern of expenditure on household items in a community. To do this, you would select a few families to find out the amount they spend every fortnight on household items. You would keep collecting the same information from the same families over a period of time to ascertain the changes in the expenditure pattern. Similarly, a panel study design could be used to study the morbidity pattern in a community.

Blind studies

The concept of a **blind study** can be used with comparable and placebo experimental designs and is applied to studies measuring the effectiveness of a drug. In a blind study, the study population does not know whether it is getting real or fake treatment or which treatment modality. The main objective of designing a blind study is to isolate the placebo effect.

Double-blind studies

The concept of a **double-blind study** is very similar to that of a blind study except that it also tries to eliminate researcher bias by concealing the identity of the experimental and placebo groups from the researcher. In other words, in a double-blind study neither the researcher nor the study participants know who is receiving real and who is receiving fake treatment or which treatment model they are receiving.

Study designs in qualitative research

This section provides a brief description of some of the commonly used designs in qualitative research. For an in-depth understanding you are advised to consult books on qualitative research.

Case study

The **case study,** though dominantly a qualitative study design, is also prevalent in quantitative research. A case could be an individual, a group, a community, an instance, an episode, an event, a subgroup of a population, a town or a city. To be called a case study it is important to treat the total study population as one entity.

In a case study design the 'case' you select becomes the basis of a thorough, holistic and in-depth exploration of the aspect(s) that you want to find out about. It is an approach 'in which a particular instance or a few carefully selected cases are studied intensively' (Gilbert 2008: 36). According to Burns (1997: 364), 'to qualify as a case study, *it must be a bounded system,* an entity in itself. A case study should focus on a bounded subject/unit that is either very representative or extremely atypical.' A case study according to Grinnell (1981: 302), 'is characterized by a very flexible and open-ended technique of data collection and analysis'.

The case study design is based upon the assumption that the case being studied is atypical of cases of a certain type and therefore a single case can provide insight into the events and situations prevalent in a group from where the case has been drawn. According to Burns (1997: 365), 'In a case study the focus of attention is the case in its idiosyncratic complexity, not on the whole population of cases.' In selecting a case therefore you usually use purposive, judgemental or information-oriented sampling techniques.

It is a very useful design when exploring an area where little is known or where you want to have a holistic understanding of the situation, phenomenon, episode, site, group or community. This design is of immense relevance when the focus of a study is on extensively exploring and understanding rather than confirming and quantifying. It provides an overview and in-depth understanding of a case(s), process and interactional dynamics within a unit of study but cannot claim to make any generalisations to a population beyond cases similar to the one studied.

In this design your attempt is not to select a random sample but a case that can provide you with as much information as possible to understand the case in its totality. When studying an episode or an instance, you attempt to gather information from all available sources so as to understand it in its entirety. If the focus of your study is a group or community you should spend sufficient time building a trustworthy rapport with its members before collecting any information about them.

Though you can use a single method, the use of multiple methods to collect data is an important aspect of a case study, namely in-depth interviewing, obtaining information from secondary records, gathering data through observations, collecting information through focus groups and group interviews, etc. However, it is important that at the time of analysis you continue to consider the case as a single entity.

Oral history

Oral history is more a method of data collection than a study design; however, in qualitative research, this has become an approach to study perceptions, experiences and accounts of an event or gathering historical knowledge as viewed by individuals. It is a picture of something in someone's own words. Oral history is a process of obtaining, recording, presenting and interpreting historical or current information, based upon personal experiences and opinions of some members of a study group or unit. These opinions or experiences could be based upon eye-witness evidence or information passed on from other sources such as older people, ancestors, folklore, stories. According to Ritchie (2003: 19), 'Memory is the core of oral history, from which meaning can be extracted and preserved. Simply put, oral history collects memories and personal commentaries of historical significance through recorded interviews.' According to Burns (1997: 368), 'these are usually first person narratives that the researcher collects using extensive interviewing of a single individual'.

In terms of design it is quite simple. You first decide what types of account, experience, perception or historical event you want to find out about. Then you need to identify the individuals or sources (which could be difficult and time consuming) that can best provide you with the needed information. You then collect information from them to be analysed and interpreted.

Focus groups/group interviews

Focus groups are a form of strategy in qualitative research in which attitudes, opinions or perceptions towards an issue, product, service or programme are explored through a free

and open discussion between members of a group and the researcher. Both focus groups and **group interviews** are facilitated group discussions in which a researcher raises issues or asks questions that stimulate discussion among members of the group. Because of its low cost, it is a popular method for finding information in almost every professional area and academic field. Social, political and behavioural scientists, market research and product testing agencies, and urban and town planning experts often use this design for a variety of situations. For example, in marketing research this design is widely used to find out consumers' opinion of and feedback on a product, their opinions on the quality of the product, its acceptance and appeal, price and packaging, how to improve the quality and increase the sale of the product, etc. Focus groups are also prevalent in formative and summative evaluations and for developing social programmes and services. It is also a useful tool in social and urban planning for identifying issues, options, development strategies, and future planning and development directions.

In its design it is very simple. You as a researcher select a group of people who you think are best equipped to discuss what you want to explore. The group could comprise individuals drawn from a group of highly trained professionals or average residents of a community depending upon the objectives of the focus group. In the formation of a focus group the size of the group is an important consideration. It should be neither too large nor too small as this can impede upon the extent and quality of the discussion. Approximately eight to ten people are the optimal number for such discussion groups. You also need to identify carefully the issues for discussion providing every opportunity for additional relevant ones to emerge. As a researcher you also need to decide, in consultation with the group, the process of recording the discussion. This may include fixing the times that the group can meet to extensively discussing the issues and arriving at agreements on them. Your records of the discussions then become the basis of analysis for findings and conclusions. The main difference between a focus group and a group interview is in the degree of specificity with respect to the issues to be discussed. The issues discussed in focus groups are more specific and focused than in group interviews and they are largely predetermined by the researcher. In a group interview you let the group members discuss whatever they want. However, your role as a researcher is to bring them back to the issues of interest as identified by the group.

Compared with other designs this is less expensive and needs far less time to complete. The information generated can be detailed and rich and can be used to explore a vast variety of issues. However, the disadvantage is that if the discussion is not carefully directed it may reflect the opinion of those who have a tendency to dominate a group. This design is very useful for exploring the diversity in opinions on different issues but will not help you if you want to find out the extent or magnitude of this diversity.

Participant observation

Participant observation is another strategy for gathering information about a social interaction or a phenomenon in qualitative studies. This is usually done by developing a close interaction with members of a group or 'living' in the situation which is being studied. Though predominantly a qualitative research design, it is also used in quantitative

research, depending upon how the information has been generated and recorded. In qualitative research, an observation is always recorded in a descriptive format whereas in quantitative research it is recorded either in categories or on a scale. It can also be a combination of both – some categorisation and some description or categorisation accompanied by a descriptive explanation. You can also change a descriptive recording into a categorical one through analysis and classification. In addition to the observation itself, where you as an observer generate information, the information can also be collected through other methods such as informal interviewing, in-depth interviewing, group discussions, previous documents, oral histories. Use of multiple methods will enhance the richness of the information collected by participant observation.

In its design it is simple. You as a researcher get involved in the activities of the group, create a rapport with group members and then, having sought their consent, keenly observe the situation, interaction, site or phenomenon. You make detailed notes of what you observe in a format that best suits you as well as the situation. You can also collect information using other methods of data collection, if need be. You analyse records of your observations and data collected by other means to draw inferences and conclusions.

The main advantage of participant observation is that as you spend sufficient time with the group or in the situation, you gain much deeper, richer and more accurate information, but the main disadvantage is that, if you are not very careful, you can introduce your own bias.

Holistic research

The holistic approach to research is once again more a philosophy than a study design. The design is based upon the philosophy that as a multiplicity of factors interacts in our lives, we cannot understand a phenomenon from just one or two perspectives. To understand a situation or phenomenon you need to look at it in its totality – that is, holistically from every perspective.

You can use any design when exploring a situation from different perspectives and the use of multiple methods is prevalent and desirable.

Community discussion forums

Community discussion forums are designed to find opinions, attitudes and/or ideas of a community with regard to community issues and problems. It is one of the very popular ways of seeking a community's participation in deciding about issues of concern to members of the community. Such forums are also used for a variety of other reasons such as developing town planning options and community health programmes for a community, seeking participation of its members in resolving issues relating to traffic management, infrastructure development and determining future directions for the area, informing communities of new initiatives.

Community forums are very similar to group discussions except that these are on a bigger scale in terms of number of participants. Also, in group discussions you may select the participants, but for community forums there is self-selection of the participants as they are open to everyone with an interest in the issues or concerns. The researcher usually uses local media to inform the residents of a local community about the forums.

This is a useful design to find out the spread of issues, concerns, etc., at a community level. It is economical and quick but there are some disadvantages. For example, it is possible that a few people with a vested interest can dominate the discussion in a forum and it is equally possible that on occasions there may be very low attendance. Such situations may result in the discussion not reflecting the community attitudes.

Reflective journal log

Basically, this design entails keeping a **reflective journal log** of your thoughts as a researcher whenever you notice anything, talk to someone, participate in an activity or observe something that helps you understand or add to whatever you are trying to find out about. These reflective records then become the basis of your findings and conclusions. You can have a reflective journal as the only method of data collection or it can be used in combination with other methods such as interviewing, group interviews, or secondary sources.

Other commonly used philosophy-guided designs

There are a number of other approaches to research that have acquired recognition, in terms of design and name, in the research literature. While not designs per se, they do enhance a particular philosophical perspective in social research. These are: action research, feminist research, participatory research and collaborative enquiry. Strictly speaking, a piece of research within each of these could be either quantitative or qualitative, though by many they are considered dominantly as qualitative designs. The need to place them in a separate category stems from their prominence and possible use in each paradigm. These designs are more philosophy guided than methods based. For example, action research is guided by the philosophy that a piece of research should be followed by some form of appropriate action to achieve betterment in life or service, and feminist research is influenced by the philosophy that opposes and challenges the dominant male bias in social science research; it seems to believe that issues relating to women are best understood and researched by women alone. For participatory research and collaborative enquiry, the involvement of research participants or the community in the research process is the underlying philosophy. One of the important aspects of all these 'designs' is that they attempt to involve research participants in the research process. The research findings are then used to depict the current situation with respect to certain issues or problems and help to form a sound basis for strategy development to deal with them.

Action research

As the name suggests, **action research** comprises two components: *action* and *research* (see Figure 8.16). Research is a means to action, either to improve your practice or to take action to deal with a problem or an issue. Since action research is guided by the desire to take action, strictly speaking it is not a design per se. Most action research is concerned with improving the quality of service. It is carried out to identify areas of concern, develop and test alternatives, and experiment with new approaches.

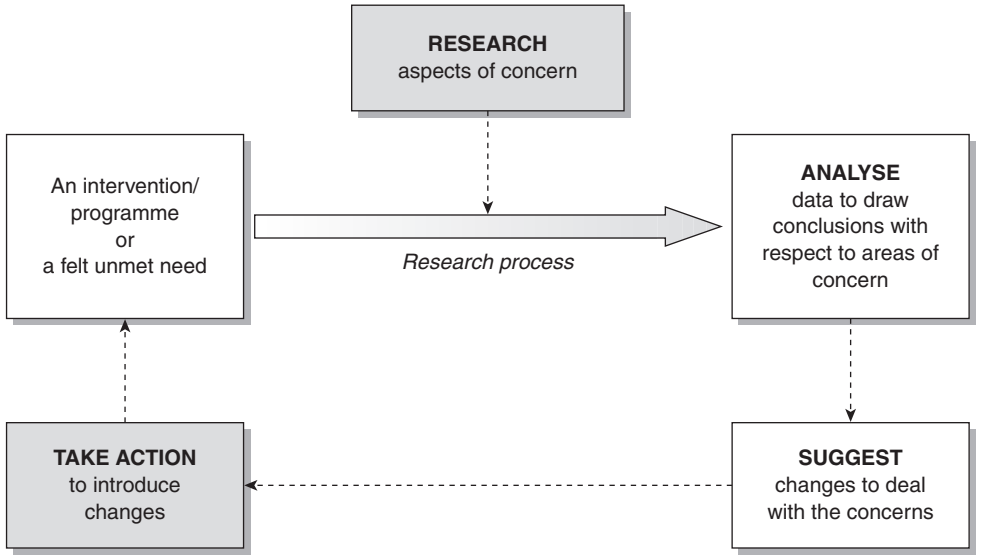

FIGURE 8.16 *Action research design*

Action research seems to follow two traditions. The British tradition tends to view action research as a means of improvement and advancement of practice (Carr & Kemmis 1986), whereas in the US tradition it is aimed at systematic collection of data that provides the basis for social change (Bogdan & Biklen 1992).

Action research, in common with **participatory research** and **collaborative enquiry**, is based upon a philosophy of community development that seeks the involvement of community members. Involvement and participation of a community, in the total process from problem identification to implementation of solutions, are the two salient features of all three approaches (action research, participatory research and collaborative enquiry). In all three, data is collected through a research process, and changes are achieved through action. This action is taken either by officials of an institution or the community itself in the case of action research, or by members of a community in the case of collaborative or participatory research.

There are two focuses of action research:

1 An existing programme or intervention is studied in order to identify possible areas of improvement in terms of enhanced efficacy and/or efficiency. The findings become the basis of bringing about changes.
2 A professional identifies an unattended problem or unexplained issue in the community or among a client group and research evidence is gathered to justify the introduction of a new service or intervention. Research techniques establish the prevalence of the problem or the importance of an issue so that appropriate action can be taken to deal with it.

Feminist research

Feminist research is characterised by its feminist theory philosophical base that underpins all enquiries and feminist concerns act as the guiding framework. Feminist research differs from traditional research in three ways:

1 Its main focus is the experiences and viewpoints of women. It uses research methods aimed at exploring these.
2 It actively tries to remove or reduce the power imbalance between the researcher and respondents.
3 The goal of feminist research is changing the social inequality between men and women. In fact, feminist research may be classified as action research in the area of gender inequality, using research techniques to create awareness of women's issues and concerns, and to foster action promoting equality between sexes.

Any study design could be used in feminist research.

Participatory and collaborative research enquiry

As already mentioned, to the author's mind, these are not designs per se but signify a philosophical perspective that advocates the active involvement of research participants in the research process. Participatory research is based upon the principle of minimising the 'gap' between the researcher and the research participants and increased community involvement and participation to enhance the relevance of the research findings to their needs. It is assumed that such involvement will increase the possibility of the community accepting the research findings and, if need be, its willingness and involvement in solving the problems and issues that confront it. You can undertake a quantitative or qualitative study in these enquiries but the main emphasis is on people's engagement, collaboration and participation in the research process. In a way these designs are based on the community development model where engagement of a community by way of consultation and participation in planning and execution of research tasks is imperative. In these designs you are not merely a researcher but also a community organiser seeking active participation of the community.

As a researcher you work at two different aspects: (1) community organisation and (2) research. Through community organisation you seek a community's involvement and

participation in planning and execution of the research tasks and share research findings with its members. In terms of research, your main responsibility is to develop, in consultation with the community, the research tasks and procedures. Consultation with research participants is a continuous and integral part of these designs.

Summary

In this chapter various study designs in both quantitative and qualitative research have been examined. For each study design, details have been provided on the situations in which the design is appropriate to use, its strengths and weaknesses, and the process you adopt in its operationalisation.

In quantitative research the various study designs have been examined from three perspectives. The terminology used to describe these perspectives is that of the author but the names of the study designs are universally used. The different study designs across each category are mutually exclusive but not so within a category.

The three perspectives are the number of contacts, the reference period and the nature of the investigation. The first comprises cross-sectional studies, before-and-after studies and longitudinal studies. The second categorises the studies as retrospective, prospective and retrospective–prospective. The third perspective classifies studies as experimental, non-experimental and semi-experimental studies.

Qualitative study designs are not as specific, precise and well defined as designs in quantitative research. Also, there is a degree of overlap between study designs and methods of data collection. Some designs can easily be considered as methods of data collection. Some of the commonly used designs in qualitative research are: case study design, oral history, focus group studies, participant observation, community discussion forums and reflective journal log.

Four additional approaches to research have been described: action research, feminist research, and participatory and collaborative enquiries. Though these cannot really be considered designs in themselves, they have acquired their own identity. Both action and feminist research can be carried out either quantitatively or qualitatively, but participatory and collaborative enquiries are usually qualitative in nature.

For You to Think About

- Refamiliarise yourself with the keywords listed at the beginning of this chapter and if you are uncertain about the meaning or application of any of them revisit these in the chapter before moving on.
- Identify two or three situations relating to your own area of interest where you think qualitative study designs might be more beneficial and consider why this might be the case.
- Take an example from your own academic field or professional area where an experimental-control or placebo group might be used and explore the ethical issues relating to this.