

# CHAPTER 1 WHY WE DO RESEARCH

Imagine the situation: you are asked to make an important decision. It could be something medical, horticultural, about your business or your children's education. You may be under pressure to decide quickly, especially if someone is trying to sell you something. However, you stall. You ask for time to do a bit of research – to talk to a knowledgeable consultant (who has already done their research) or to read extensively yourself because listening to a podcast, phoning a friend or watching a video doesn't give you the high-quality information you want before making that critical decision.

Research can obviously be more complex than this. Does this vaccine work? Does this medication work? Which type of counselling works best? Or we might look at ways to deal with crop pests or improving soil nutrients. Or how our climate is being affected or using sustainable fuels etc. Research can help us learn more about serious topics.



Research helps us to make informed decisions. When we have done our research, we have identified what has been written on a particular subject, found the latest information and worked out how relevant other studies are to the decision at hand. In some cases, all the information we have gathered also indicates gaps in our collective knowledge. At that point, we are faced with a dilemma: to make the decision based on what has been read, or to do our own research. A primary research project is developed based on the questions that haven't been satisfactorily answered by other people's research projects, or by going in an unexplored direction.

In this way, research is an ongoing process. Research carried out in the 1800s, for example, can be the basis of research for today, but it has evolved a lot since then.

For example, antibiotics are commonplace for many people today. Penicillin is a common antibiotic that was discovered accidentally by Alexander Fleming. In 1928, he noticed that the fungus, *Penicillium notatum*, had accidentally contaminated a culture of *Staphylococcus* bacteria.

Fleming realised that the fungus had created zones with no bacteria on the culture. He then grew the mould and found that it was effective in preventing *Staphylococcus* growth. Fleming's research was a starting point for researchers to develop more antibiotics – and eventually more specific antibiotics and treatments for infections, from a simple accidental discovery.

Think about how we sell something. Research conducted in the 1950s on selling products would have resulted in very different suggestions as to how products are sold today. Today social media, the TV, radio, online ad campaigns, face-to-face sales and online calls are primary means of selling.

In some cases, we can also rely on word of mouth for information. Someone in the neighbourhood tells us that she educated her children by reading to them every night, or by sending them to a specific tutor for extra support, or by taking a particular supplement to cure a condition she had. But that is only one person's experience. What works for one person doesn't necessarily work for everyone. This is where research comes in.

Finding out the best treatment, the best way to sell products, the best way to education children or adults (examples only) all require research to find out what works effectively and what does not.

## WHAT IS RESEARCH?

Research is carried out to various degrees in several ways, from business to horticulture to agriculture to psychology to medicine to education.

Research is a systematic investigation.

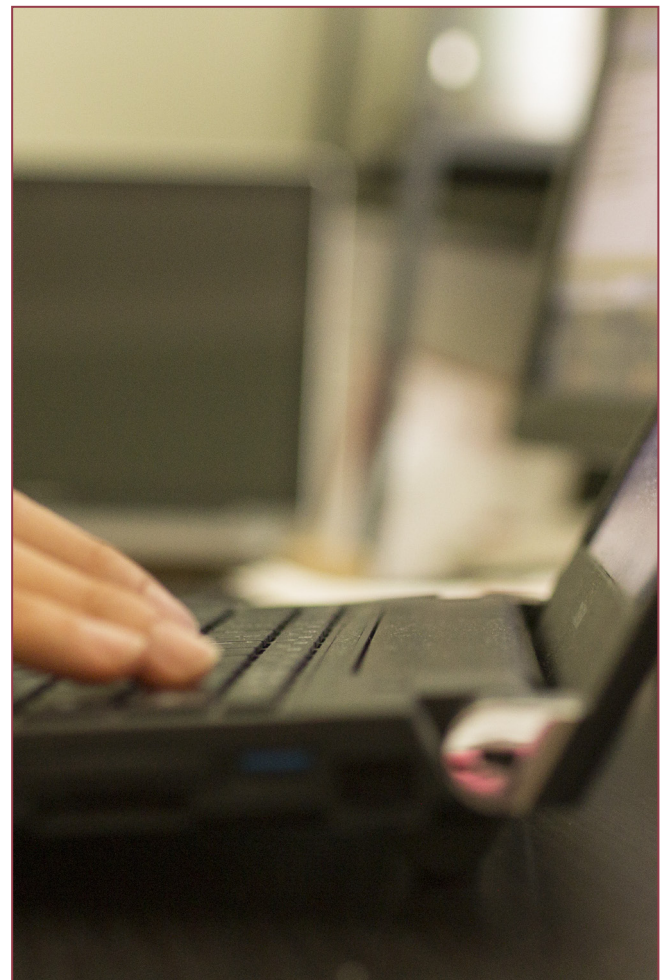
It may be an investigation into a material or product or medication or type of counselling to find out how well it works when compared to something else.

For example, does a new medication help reduce the pain of headaches better than drinking plenty of water or

taking a herbal remedy? Research is the practice of gathering information to answer questions. The way in which information is gathered is dependent on:

- The type of question
- The amount of depth needed
- The topic
- How tests to answer the question are designed
- How easy tests are to run.

The methods used in research will vary across different subjects. How researchers study human beings will be different to how they study ocean currents, but there are some underlying principles that relate to research generally.



# QUANTITATIVE, QUALITATIVE, MIXED METHODS RESEARCH

## Quantitative Research

Quantitative research methods look at the statistics and figures i.e., the quantity of information/data. Quantitative research is about measurement. For example, in quantitative research, researchers might look at:

- What percentage of people state they experience mental health issues during their lifetime?
- What percentage growth a plant experiences in a new brand of fertiliser?
- The effectiveness of headache medication using pre- and post-surveys. Patients given a new headache medication are asked to rate their headache pain on a score of 1 – 10 before taking the medication and then one hour later. The researchers then compare the figures before and after to see if the medication works.

In all these examples, the researchers will come up with a range of data.

Client A says her headache reduced by 10% after the medication. Client B by 4%. Client C by 25%. Client D by 100%. The researchers will then use these figures to create bar charts or pie charts, calculate means, median, modes or use other, more sophisticated statistics for analysis.

Quantitative research is used to test theories and ideas. It is based on the

collection and presentation of numerical data and used to establish facts and results pertaining to the research area. Quantitative research uses techniques such as experiments, structured questionnaires, structured interviews, and recorded observational data. These techniques are very useful when needing to test a hypothesis or to confirm that theory works as expected. As such, quantitative research is a popular type of research at later stages of a project when it is necessary to prove, or disprove, a theory, or in disciplines such as mathematics, physics, and chemistry.

### **Examples of Quantitative Data**

- Survey results that are numerical, e.g., from a scale
- Measurements, e.g., height and weight, number of cars
- Revenue from a business, other financial data
- Sensor data
- Calculation results
- Time data (e.g., number of days, weeks, months)

## Qualitative Research

Qualitative research methods are those that look at the quality of information. Some examples of what qualitative researchers may study include:

- How different topics, such as gender, domestic violence are referred to in the press (such as the words used, the way things are described, if insults and derogatory are made).

- Any topic where they require the participants involved in the study to give detailed information. For example, they may ask a person to describe the pain they feel when they have a headache rather than asking them to score the pain level.
- They may observe children playing in the playground and look at their social skills and comment on how the children play.

Qualitative research is used to get a better understanding of concepts and topics. It facilitates an in-depth insight into the area being researched as it is often based on experience and types of data that cannot be easily translated into quantities or numbers. Qualitative research utilises techniques such as observational data collection, ethnographic studies, interviews with open ended questions, and literature reviews. These techniques are very useful when creating a theory to test, or to summarise or interpret information. This makes it a popular choice at the very early stages of a project where understanding concepts is key.

It is important to note that qualitative data can also include images, such as photographs, illustrations and paintings, and video recordings. The data in these items is often quite rich but cannot be simply translated into a set of quantities. For example, an art historian studying differences in pigment colouration and their effect on the overall impression of a painting within a given school may describe one type of red as crimson (which comes from insect scales and has a bluish or purplish tint), and another as vermilion (which comes from cinnabar, and has a brilliant scarlet

hue). The colour itself could potentially be tested for mineral content, and spectrometry used to give hue values, but the mood effect of crimson vs vermilion cannot be truly quantified with numbers. The historian can only write about their experience, and the experience of others, then contextualise this with data about the paintings as historical documents and perhaps the original artist's intent.

The fundamental difference between qualitative and quantitative research methods is that qualitative methods deal in rich, non-numerical data and quantitative methods deal in numerical data.

### ***Examples of Qualitative Data***

- Photographs and illustrations
- Diary/journal entries
- Calendars and logs, meeting notes, agendas
- Flyers, posters
- Case studies
- Focus groups
- Narratives
- Responses from online forums and message boards
- Text responses to surveys
- Audio recordings (including interviews)
- Video recordings (including television shows, films, and interviews)