

LESSON 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.

Suggested Tasks: ▼

Throughout this course you will be provided with suggested tasks and reading to aid with your understanding. These will appear in the right hand column.

Remember: these tasks are optional. The more you complete, the more you will learn, but in order to complete the course in 20 hours you will need to manage your time well. We suggest you spend about 10 minutes on each task you attempt, and no more than 20 minutes.

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.

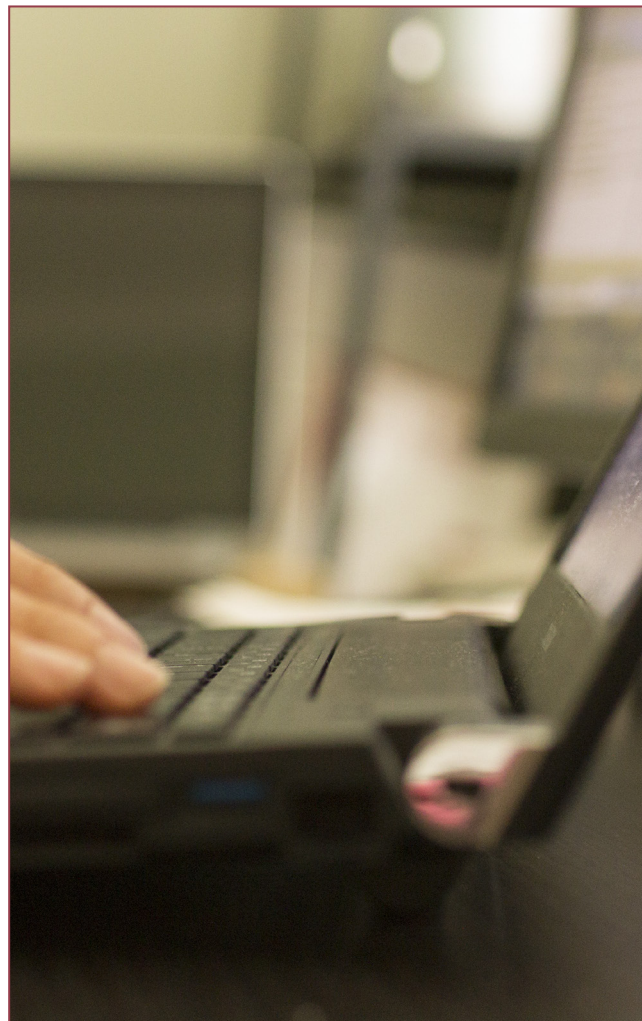
It may be an investigation into a material or product or medication or type of counselling to find out how well it works when compared to something else.

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.



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Suggested Tasks

Ask 3 different people if they can tell you what they think research is.

These should be different people from different households and different educational backgrounds. They might be neighbours, friends or colleagues. They may be working people or people who don't work.

The aim is to see how different types of people might perceive the nature of research in different ways.

Consider the responses.

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

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Suggested Tasks

Search online for the phrase: “Quantitative research videos”. Spend up to 10 minutes watching some of what you find.

- 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 vermillion (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 vermillion 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)

- Descriptions (e.g., observational descriptions, impressions, characteristics), such as ice cream flavours or colours of cars

A Note on Literature Reviews

Literature reviews can be a point of confusion because they involve text-based research, and many people associate text-based research with qualitative research. It is important to note that while a literature review can be written with a qualitative focus, the review itself is not a research method (unless undertaken in a specifically ethnographic and experiential manner), but rather a technique for reviewing what has already been covered in interest. This is important for the researcher as it helps them develop an understanding of the subject area and determine a possible question the researcher can try to answer. Building on this, the researcher may then have a series of experiments to perform or questions to ask. The type of questions will ultimately decide which approach the researcher will need to take – qualitative, quantitative, or mixed methods. In short, the literature review underpins the research design, but is not a research method in and of itself.



Quantitative vs Qualitative

Quantitative questions tend to be closed questions. This allows them to collect quantitative data, i.e., data that can be measured or counted. Consider the question below.

Which type of chocolate do you prefer?

- ✓ Dark chocolate
- ✓ White chocolate
- ✓ Milk chocolate
- ✓ I like all types of chocolate.
- ✓ I do not have a preference.
- ✓ I do not eat chocolate

In this example, respondents would circle one answer. The answers would be tallied up and a percentage calculated based on the total number of people surveyed. This would give a clear statistical result, such as 30% of people like dark chocolate, and 25% of people do not like chocolate. The researcher can then use this information to develop graphs and charts on chocolate preferences.

Now, consider that the researcher wants to know why people they like types of chocolate. This is where qualitative data enters the picture – questions that use “how” and “why” generally draw qualitative data (note that there are exceptions, particularly in the hard sciences). The researcher wants to know: what is it about dark chocolate that some people prefer and others hate? They may ask open questions then, e.g., “tell us more about why you prefer dark chocolate”. The person

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Suggested Tasks

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