

WU

Research Methodology

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Science is all about answering questions and acquiring knowledge concerning things around us. Research is an important tool to realize this and the goals of scientific research, according to many researchers, are **description, prediction, and explanation/understanding**. Research type/method used determines each goal to be achieved. Before discussing research type/method, let us see each goal of scientific research.

Description

Description refers to the procedures used to define, classify and categorize subjects and their relationships. Descriptions allow us to establish generalizations and universals. By gathering information on a large group of people, for instance, a researcher can describe the average member or the average performance of a member of the specific group being studied. The description of the large groups of people does not rule the existence of important differences among individuals. This is in the sense that the researchers merely attempt to describe subjects or events on the basis of average performance. In other words, the description allows researchers to describe a single phenomenon and/ or observations of a single person.

In science, descriptions are systematic and precise. Scientific research makes use of operational definitions. Operational definitions characterize events, qualities and concepts in terms of observable operations, or procedures used to measure them. Researchers are interested in describing only things that are relevant to the study. They have no interest in describing observations that are irrelevant to the investigation.

Which research type/method is more appropriate for description? Does description apply to legal research? To what extent?

Prediction

Besides descriptions, researchers make predictions. Descriptions of events often provide a basis for prediction. Predictions are sometimes made in the form of hypotheses, which are tentative, testable predictions concerning the relationships between or among variables. Hypotheses are frequently derived from theories, or interrelated sets of concepts that explain a body of data and make predictions.

Prediction of later performance is of particular importance to researchers. For example:

- Does eating a low-fat diet decrease chances of cholesterol?
- Does scoring the highest CGPA make a student a good teacher/lawyer?
- Does undergraduate GPA predict how well one will do in graduate school?

When a variable can be used to predict another variable or variables we can say the variables are correlated. Correlation exists when different measures vary together, which makes it possible to predict values of one variable by knowing values of another variable.

Which research type/method is more appropriate for prediction? Does prediction apply to legal research?

Explanation/Understanding

Arguably, the most important goal of scientific research is explanation. Explanation is achieved when the cause or causes of a phenomenon are identified. In order to determine cause and effect three pre-requisites are essential: co-variation of events, proper time-order sequence and the elimination of plausible alternative causes.

- **Co-variation of events** (relationship): The variables must correlate. To determine the relationship of two variables, it must be determined if the relationship could occur due to chance. Lay observers are often not good judges of the presence of relationships, thus, statistical methods are used to measure and test the existence and strength of relationships.
- **Proper time-order sequence** (time precedence): For 1 to cause 2, 1 must precede 2. The cause must precede the effect.
- **Elimination of plausible alternative causes** (non-spuriousness, or genuine): For a relationship between A and B to be non-spurious, there must not be a C that causes both A and B such that the relationship between A and B vanishes once C is controlled.

The most difficult condition to be met when determining cause and effect relationships is the elimination of other plausible causes.

Which research method is more pertinent to explanation? Does explanation apply to law? To what extent?

Types of Research

There are mainly four types of research:

- Quantitative vs. Qualitative
- Descriptive vs. Analytical
- Applied vs. Fundamental
- Conceptual vs. Empirical

Qualitative and Quantitative

The two standard ways of conducting research are qualitative research or quantitative research.

Qualitative research: is used to gain an in-depth understanding of human behaviour, experience, attitudes, intentions, and motivations, on the basis of observation and interpretation, to find out the way people think and feel. It is a form of research in which the researcher gives more weight to the views of the participants. Case study, grounded theory, ethnography, historical and phenomenology are the types of qualitative research.

Qualitative research is the approach usually associated with the social constructivist paradigm which emphasises the socially constructed nature of reality. It is about recording, analysing and attempting to uncover the deeper meaning and significance of human behaviour and experience, including contradictory beliefs, behaviours and emotions. Researchers are interested in gaining a rich and complex understanding of people's experience and not in obtaining information which can be generalized to other larger groups.

Quantitative research is a form of research that relies on the methods of natural sciences, which produces numerical data and hard facts. It aims at establishing cause and effect relationship between two variables by using mathematical, computational and statistical methods. The research is also known as empirical research as it can be accurately and precisely measured.

The data collected by the researcher can be divided into categories or put into rank, or it can be measured in terms of units of measurement. Graphs and tables of raw data can be constructed with the help quantitative research, making it easier for the researcher to analyze the results.

Quantitative research is generally associated with the positivist/postpositivist paradigm. It usually involves collecting and converting data into numerical form so that statistical calculations can be made and conclusions drawn.

Major Distinction between Qualitative and Quantitative Research

The differences between qualitative and quantitative research can be highlighted on the following grounds:

1. Qualitative research is a method of inquiry that develops understanding on human and social sciences, to find the way people think and feel. Quantitative research is not about human thinking and feeling.
2. Qualitative research is holistic in nature while quantitative research is particularistic.
3. The qualitative research follows a subjective approach as the researcher is personally/closely involved, whereas the approach of quantitative research is objective, as the researcher is uninvolved and attempts to precise the observations and analysis on the topic to answer the inquiry(qualitative research tends to be interpretative, quantitative research is concrete).
4. Qualitative research is exploratory whilst quantitative research is conclusive.
5. The reasoning used to synthesise data in qualitative research is inductive whereas in the case of quantitative research the reasoning is deductive.
6. Qualitative research is based on purposive sampling, where a small sample size is selected with a view to having a thorough understanding of the target concept. On the

other hand, quantitative research relies on random sampling; wherein a large representative sample is chosen in order to extrapolate the results to the whole population.

7. Verbal data are collected in qualitative research but in quantitative research measurable data is gathered.
8. Inquiry in qualitative research is a process-oriented, whereas in the case of quantitative research it is a resulted-based one.
9. Elements used in the analysis of qualitative research are words, pictures, and objects while that of quantitative research is numerical data.
10. Qualitative Research is conducted with the aim of exploring and discovering ideas used in the ongoing processes. As opposed to quantitative research the purpose is to examine cause and effect relationship between variables.
11. The methods used in qualitative research are in-depth interviews, focus group discussion. The methods of conducting quantitative research are structured interviews and observations. Semi-structured interviews can be used in qualitative research.
12. Qualitative Research develops the initial understanding whereas quantitative research recommends a final course of action.

Particular research might involve both. However, depending on the information required by a researcher, there are some particular areas which require only one type of research.

Points of Comparison	Qualitative Research	Quantitative Research
Meaning	Qualitative research is a method of inquiry that develops understanding on human and social sciences, to find the way people think and feel.	Quantitative research is a research method that is used to generate numerical data and hard facts, by employing statistical, logical and mathematical technique.
Nature	Holistic	Particularistic
Approach	Subjective	Objective
Research type	Exploratory	Conclusive
Reasoning	Inductive	Deductive
Sampling	Purposive	Random
Data	Verbal	Measurable
Inquiry	Process-oriented	Result-oriented
Hypothesis	Generated	Tested
Elements of	Words, pictures and objects	Numerical data, hard facts/statistics

Points of Comparison	Qualitative Research	Quantitative Research
analysis		
Objective	To explore and discover ideas used in the ongoing processes.	To examine cause and effect relationship between variables.
Methods	Non-structured techniques like In-depth interviews, group discussions etc.	Structured techniques such as surveys, questionnaires and observations.
Result	Develops initial understanding	Recommends final course of action

Qualitative Research- process and principle

The approach adopted by qualitative researchers tends to be inductive which means that they develop a theory or look for a pattern of meaning on the basis of the data that they have collected. This involves a move from the specific to the general (a bottom-up approach). However, most research projects also involve a certain degree of deductive reasoning.

Qualitative researchers do not base their research on pre-determined hypotheses. Nevertheless, they clearly identify a problem or topic that they want to explore and may be guided by a theoretical lens - a kind of overarching theory which provides a framework for their investigation.

Data collection and analysis is methodical but allows for greater flexibility than in quantitative research. Data is collected in textual form on the basis of observation and interaction with the participants e.g. through participant observation, in-depth interviews and focus groups. It is not converted into numerical form and is not statistically analysed.

Data collection may be carried out in several stages rather than once and for all. The researchers may even adapt the process mid-way, deciding to address additional issues or dropping questions which are not appropriate on the basis of what they learn during the process. In some cases, the researchers will interview or observe a set number of people. In other cases, the process of data collection and analysis may continue until the researchers find that no new issues are emerging.

Principles

Researchers will tend to use methods which give participants a certain degree of freedom and permit spontaneity rather than forcing them to select from a set of pre-determined responses (of which none might be appropriate or accurately describe the participant's thoughts, feelings, attitudes or behaviour) and to try to create the right atmosphere to enable people to express themselves. This may mean adopting a less formal and less rigid approach than that used in quantitative research.

It is believed that people are constantly trying to attribute meaning to their experience. Therefore, it would make no sense to limit the study to the researcher's view or understanding of the situation and expect to learn something new about the experience of the participants. Consequently, the methods used may be more open-ended, less narrow and more exploratory (particularly when very little is known about a particular subject). The researchers are free to go beyond the initial response that the participant gives and to ask why, how, in what way etc. In this way, subsequent questions can be tailored to the responses just given.

Qualitative research often involves a smaller number of participants. This may be because the methods used such as in-depth interviews are time and labour intensive but also because a large number of people are not needed for the purposes of statistical analysis or to make generalizations from the results.

The smaller number of people typically involved in qualitative research studies and the greater degree of flexibility does not make the study in any way "less scientific" than a typical quantitative study involving more subjects and carried out in a much more rigid manner. The objectives of the two types of research and their underlying philosophical assumptions are simply different. This does not however mean that the two approaches cannot be used simultaneously in the same research.

Quantitative Research: Process and Principle

The research will have one or more hypotheses, which are the questions that the researchers want to address which include predictions about possible relationships between the things they want to investigate (**variables**). In order to find answers to these questions, the researchers will also have various instruments and materials (e.g. paper or computer tests, observation check lists etc.) and a clearly defined plan of action.

Data is collected by various means following a strict procedure and prepared for **statistical analysis**. This nowadays is carried out with the aid of sophisticated statistical computer packages. The analysis enables the researchers to determine to what extent there is a relationship between two or more variables. This could be a simple association (e.g. people who exercise on a daily basis have lower blood pressure) or a causal relationship (e.g. daily exercise actually leads to lower blood pressure). Statistical analysis permits researchers to discover complex causal relationships and to determine to what extent one variable influences another.

The results of statistical analyses are presented in journals in a standard way, the end result being a **P value** (P stands for probability). It measures the likelihood that a particular finding or observed difference is due to chance. The P value is between 0 and 1. The closer the result is to 0, the less likely it is that the observed difference is due to chance. The closer the result is to 1, the greater the likelihood that the finding is due to chance (random variation) and that there is no difference between the groups/variables.. For people who are not familiar with scientific research jargon, the discussion sections at the end of articles in peer-reviewed journals usually describe the results of the study and explain the implications of the findings in straightforward terms

Principles

Objectivity is very important in quantitative research. Consequently, researchers take great care to avoid their own presence, behaviour or attitude affecting the results (e.g. by changing the situation being studied or causing participants to behave differently). They also critically examine their methods and conclusions for any possible bias.

Researchers have to make utmost effort to ensure that they are really measuring what they claim to be measuring. For example, if the study is about whether background music has a positive impact on restlessness in residents in a nursing home, the researchers must be clear about what kind of music to include the volume of the music, what they mean by restlessness, how to measure restlessness and what is considered a positive impact. This must all be considered, prepared and controlled in advance.

External factors, which might affect the results, must also be controlled for. In the above example, it would be important to make sure that the introduction of the music was not accompanied by other changes (e.g. the person who brings the CD player chatting with the residents after the music session) as it might be the other factor which produces the results (i.e. the social contact and not the music). Some possible contributing factors cannot always be ruled out but should be acknowledged by the researchers.

The main emphasis of quantitative research is on deductive reasoning which tends to move from the general to the specific. This is sometimes referred to as a top down approach. The validity of conclusions is shown to be dependent on one or more premises (prior statements, findings or conditions) being valid. Aristotle's famous example of deductive reasoning was: All men are mortal: Socrates is a man: Socrates is mortal). If the premises of an argument are inaccurate, then the argument is inaccurate. However, most studies also include an element of inductive reasoning at some stage of the research.

Researchers rarely have access to all the members of a particular group (e.g. all people with dementia, carers or healthcare professionals). However, they are usually interested in being able to make inferences from their study about these larger groups. For this reason, it is important that the people involved in the study are a representative **sample** of the wider population/group. However, the extent to which generalizations are possible depends to a certain extent on the number of people involved in the study, how they were selected and whether they are representative of the wider group. For example, generalizations about psychiatrists should be based on a study involving psychiatrists and not one based on psychology students. In most cases, random samples are preferred (so that each potential participant has an equal chance of participating) but sometimes researchers might want to ensure that they include a certain number of people with specific characteristics and this would not be possible using random sampling methods. Generalizability of the results is not limited to groups of people but also to situations. It is presumed that the results of a laboratory experiment reflect the real life situation which the study seeks to clarify.

Pragmatic approach to research (mixed methods)

The pragmatic approach involves using the method which appears best-suited to the research problem. It the freedom to use any of the methods, techniques and procedures typically associated with quantitative or qualitative research, taking note of the fact that that every method has its limitations and that the different approaches can be complementary.

It may also use different techniques at the same time or one after the other. For example, it might start with face-to-face interviews with several people or have a focus group and then use the findings to construct a questionnaire to measure attitudes in a large scale sample with the aim of carrying out statistical analysis.

Depending on which measures have been used, the data collected is analysed in the appropriate manner. However, it is sometimes possible to transform qualitative data into quantitative data and vice versa although transforming quantitative data into qualitative data is not very common.

Being able to mix different approaches has the advantages of enabling triangulation. Triangulation is a common feature of mixed methods studies. It involves, for example:

- the use of a variety of data sources (data triangulation)
- the use of several different researchers (investigator triangulation)
- the use of multiple perspectives to interpret the results (theory triangulation)
- the use of multiple methods to study a research problem (methodological triangulation)

In some studies, qualitative and quantitative methods are used simultaneously. In others, first one approach is used and then the next, with the second part of the study perhaps expanding on the results of the first. For example, a qualitative study involving in-depth interviews or focus group discussions might serve to obtain information which will then be used to contribute towards the development of an experimental measure or attitude scale, the results of which will be analysed statistically.

-Descriptive vs. Analytical: the surveys and fact-finding investigations of distinct types come under descriptive research. In analytical research, a researcher has to avail data which already exists and has to make an accurate evaluation.

There are three main types of descriptive methods: observational methods, case-study methods and survey methods. Observational Method

With the observational method (often called field observation) animal and human behavior is closely observed. There are two main categories of the observational method — naturalistic observation and laboratory observation. The biggest advantage of the naturalistic method of research is that researchers view participants in their natural environments. This, according to its proponents, leads to greater ecological validity than laboratory observation

Ecological validity refers to the extent to which research can be used in real-life situations.

Proponents of laboratory observation often suggest that due to more control in the laboratory, the results found when using laboratory observation are more meaningful than those obtained with naturalistic observation.

Laboratory observations are usually less time-consuming and cheaper than naturalistic observations. Of course, both naturalistic and laboratory observation are important in regard to the advancement of scientific knowledge.

Case study research involves an in-depth study of an individual or group of individuals. Case studies often lead to testable hypotheses and allow us to study rare phenomena. Case studies should not be used to determine cause and effect, and they have limited use for making accurate predictions.

There are two serious problems with case studies — expectancy effects and atypical individuals. Expectancy effects include the experimenter's underlying biases that might affect the actions taken while conducting research. These biases can lead to misrepresenting participants' descriptions. Describing atypical individuals may lead to poor generalizations and detract from external validity.

In survey method research, participants answer questions administered through interviews or questionnaires. After participants answer the questions, researchers describe the responses given. In order for the survey to be both reliable and valid it is important that the questions are constructed properly. Questions should be written so they are clear and easy to comprehend.

Another consideration when designing questions is whether to include open-ended, closed-ended, partially open-ended, or rating-scale questions. Advantages and disadvantages can be found with each type:

Open-ended questions allow for a greater variety of responses from participants but are difficult to analyze statistically because the data must be coded or reduced in some manner. Closed-ended questions are easy to analyze statistically, but they seriously limit the responses that participants can give. Many researchers prefer to use a Likert-type scale because it's very easy to analyze statistically.

In addition to the methods listed above some individuals also include qualitative (as a distinct method) and archival methods when discussing descriptive research methods.

It is important to emphasize that descriptive research methods can only *describe* a set of observations or the data collected. It cannot draw conclusions from that data about which way the relationship goes — Does A cause B, or does B cause A?

Unfortunately, in many studies published today, researchers forget this fundamental limitation of their research and suggest their data can actually demonstrate or “suggest” causal relationships. Nothing could be further from the truth.

Applied vs. Fundamental (action vs. Doctrinal): the objectives of the applied research are to search an answer for the difficulty which is facing by a firm or a society. Theory's formulation and interference of general principles with particulars are related to fundamental research. The feature of collecting knowledge for the sake of knowledge is best suited to fundamental research.

Conceptual(Doctrinal/theoretical) vs. Empirical: the conceptual research is concerned with ideas and theories. Empirical research is perfect when we have the proof which explains that few variables generate a change on other variables in some way or the other.