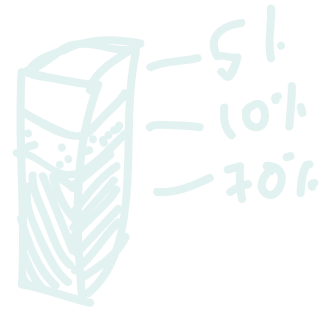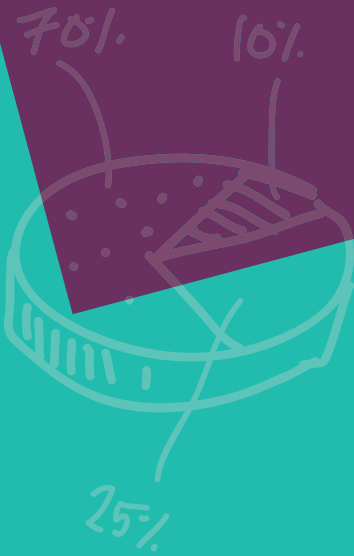+ WEBSITE

6TH EDITION

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DOING RESEARCH

NEL VERHOEVEN

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Doing Research

For Jan Willem, Sharon and Sander

Doing Research
The Hows and Whys of Applied Research

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Sixth edition

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Preface

Subjects such as research methods and statistics are not the most popular courses. Students are afraid that they won't understand the subject matter, let alone be able to apply it. When I wrote the first edition of *Doing Research*, I tried to lower this threshold for carrying out research and getting to know stats.

The sixth edition

When the previous edition (the fifth) of *Doing Research* was printed, a different layout was chosen. The reasons for this are the changing landscape within higher education, the personal and interactive approach to research education and the changing exit qualifications for graduates. Whereas fifteen years ago the emphasis was on having as many research skills as possible, and producing what to all intents and purposes is an academic graduation thesis, nowadays the emphasis is much more on acquiring skills and producing a professional product. Research skills still come in handy in this respect. In fact, they are indispensable if the student is to produce a good professional product. That said, more and more these days research skills are being used as a tool for answering practical questions. It means having a different range of research skills, and for that the book needed a new layout, one with many short chapters. Unlike previous editions, each chapter deals with one subject only. The four phases of applied research are the guiding principle.

In the sixth edition, the method has been refined even more, with the focus on case studies. Many of the examples have been updated and the corresponding website has been changed. In this edition, the focus is on the *research toolbox*, which can be used alongside the book when doing applied research.

The new edition of *Doing Research* is even easier to navigate, and is hands-on, with lots of infographics and visuals, and short, inspiring texts. The book is suitable as an introduction to research methods, but also as a reference work during internships and graduation projects.

Many thanks

Many people were involved in the compiling of all editions of this book. Many teachers took the trouble to complete a questionnaire about the book and to provide me with their useful suggestions.

When writing this book, I took heed of the advice of the following people, to whom I am most grateful: Bob Bouhuijs, Annette Bogstra, Jan van Leeuwen,

The field of "research methodology" is evolving continuously; teaching this subject and developing material for lessons are too. Which is why I am always keen to receive your comments and suggestions via www.nelverhoeven.nl.

Nel Verhoeven
Ovezande, January 2022

Contents

Instructions for using the book and website

*Read these instructions for use before you carry on reading this book or looking at the website. Then you'll know straight away what a good **method of working** is, how **the method** is structured, the help that the **procedure guide** in the book has to offer, what the **recurring components** are in the book and what exactly you can find on the **website**.*

Is research new to you? How are you going to tackle it then?

You get the most out of this book and the website that goes with it, by doing the following in each **chapter**:

1 Read through the learning objectives in the book.

2 Read through the whole chapter in the book.

3 Look at the answers to the questions on the website under the *checkpoints*.

4 Do the extra assignments on the website.

5 Check whether you have mastered the material properly by going through the learning objectives again.

If you have finished all chapters of a **part**, you go to that part on the website. You can then do the following:

6 Do the knowledge test.

7 Practice the concepts with the key concepts trainer.

8 Check out the links, research toolbox and the in-depth material.

Method structure

The research procedure can be divided into **research phases**. *Doing Research* is based on four phases:

1. Design
2. Data collection
3. Analysis
4. Evaluation and recommendations
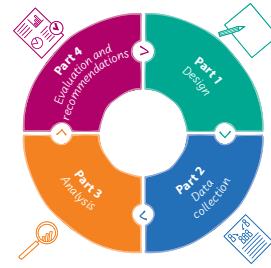
That is why this method comprises four sections. Each section deals with the topics that are important in the research phase being discussed. In total there are twenty chapters. At the beginning of each chapter, you will find **learning objectives**.

Procedure guide

To help you find your way through the various stages of research, you can use a **procedure guide**:

- procedure guide Part 1: p. 16
- procedure guide Part 2: p. 102
- procedure guide Part 3: p. 222
- procedure guide Part 4: p. 296

The chapters of that part are mentioned in the procedure guide. For each chapter, you will find an overview of the most important steps that are discussed in that chapter. At the end of each chapter, we show you a part of the procedure guide related to that chapter. This way you always know exactly where you are in the process of doing research.

Recurring components

In each chapter of the book you will come across several set elements:

	Examples	Of, for instance, the research design, analyses, results or conclusions
	Checkpoints	Knowledge questions concerning the dealt with subjects
	Key concepts	Most important concepts and their meaning
	Overviews	For instance, tips, checklists or characteristics of research methods
	Website	An overview of all parts of the website

The book as a reference work

Are you familiar with research? For instance, because you will be graduating, or because you work as a researcher? Then you can use *Doing Research* as a reference work. The index at the back of the book lists the most important terms used. You can also consult the process guide for each section and chapter so that you consult the right information at the right time.

Website

You need the book's website so that you understand and process the material properly. You can access the website using the unique activation code on page 4 of this book.
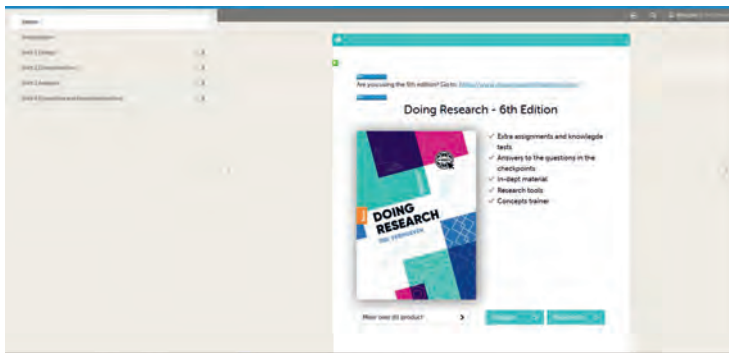
The website is structured in the same way as the book: in four parts. Each part covers the following aspects:

- answers: to the questions in the checkpoints;

- extra assignments: questions with feedback so that you can check your progress;

- knowledge test: a test per part with a final score;

- concepts trainer: to test your knowledge per section on all key concepts and many other concepts discussed in the book;

- research toolbox: the toolbox comprises overviews and checklists that you can use in the various research phases You can consult them separately, checking each time whether you are still on the right track in your research;

- in-depth material: information on several topics if you want to know more about them, for instance, on statistics topics.

Part 1
Design
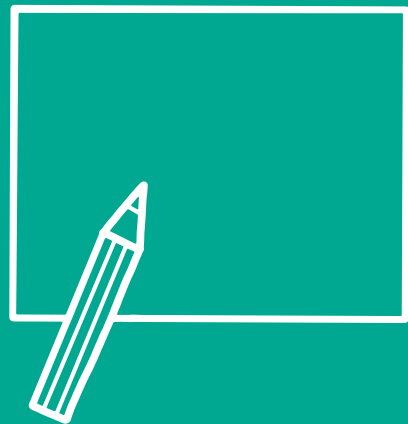
Procedure guide

2 ***Choosing the subject***
Choose the subject
Conduct the intake interview
Discuss expectations with
supervisor and client

3 ***The background to your research***
Formulate the background (reason)
Search for background information
Set up logbook

4 ***Main question and objective***
Formulate the main question and objective
Formulate sub-questions

5 ***Concept demarcation and model building***
Demarcate definitions
Design the theoretical framework
Model the assumptions about the results
Formulate assumptions about the results

6 ***Research proposal***
Write and present the research proposal
Draw up a schedule
Process feedback

Part 1
Design

This part of the *Doing Research* method is about the first phase of your research. This is the design phase. Designing consists of all the things you do that result in you setting up your research. First and foremost, this means that you demarcate the research topic (the *domain*): you formulate the main question, the objective, and perhaps sub-questions. For the rest, the contours of your research project become clearer in the design phase. This phase not only clarifies the domain, the questions, and statements about that domain become clear too. Apart from that, you answer the following questions:

- What information do I need?
- Where should I look for that information?
- How do I get that information?
- What am I researching?
- With what objective in mind am I going to do the research?
- How am I going to research it?
- When am I going to research it?
- Who am I going to research?
- Which agreements will I reach about the final products that I have to deliver? About the procedure and the communication? About the deadlines?

Chapter 1 is an introduction. You learn what research is, what you need it for, what the assumptions (methodology) are, and what characteristics a good researcher and good research have. The chapter also discusses the four research phases.

Chapter 2 deals extensively with the contacts with the client, and selecting a subject.

Chapter 3 deals with the background to your research. Here you will be given a handy tool to help you write the background: the 6W method. You will also be given information to make your search easier, and you will learn how to use a logbook as an aid in your research.

In Chapter 4 you will learn how to formulate a main and sub-questions, and what conditions they must meet. Here, we will also discuss why asking sub-questions can be useful, how many sub-questions you can ask and what the criteria for them are.

Chapter 5 is the chapter that discusses demarcation, the theory, and model building. You will be taught how to demarcate the subject of your project, how to define the most important concepts, and – again – how you can use preliminary research for this. You do this preliminary research to gather information about previous research results, and to look for theoretical principles. You will be taught how go about designing a research model and how to search for theoretical or modeling principles that you can use to write the chapter on the theory.

Chapter 6 is about your research proposal. This chapter gives you a general overview of the various components that constitute a research proposal for most studies.

If you go back a page, you will see the procedure guide for Part 1 of your research: the design. This way you can see at which points in time during your research certain parts are dealt with, and where you have to make important decisions. At the end of each chapter, we show you a part of the procedure guide related to that chapter.

1 *Why do you do research?*

After going through this chapter, you will know:
- *why it is useful to learn more about research (introduction);*
- *what the assumptions of research (methodology) are (1.1);*
- *what the characteristics of a critical researcher are (1.2);*
- *the quality criteria your research must meet (1.2);*
- *which practical requirements your research must meet (1.2);*
- *what the various phases in a research project are (1.3);*
- *what role a professional product plays in your research (1.4).*

Why this method?
During your study, you will regularly have to submit a research report and/or professional product. But how do you do research? And how do you compile this kind of research report or professional product? This method teaches you how to set up, carry out, and evaluate your own research. It teaches you how to give a reliable answer to a good research question. For that, you need knowledge, skills, and a research-oriented attitude. Finally, you will learn how you can report on your research, and part the professional product plays in this.

Doing Research
When you do research you analyze a problem, a question or a situation according to a specific phased plan. The tools you use here can be compared with tools in a toolbox. Everything that you need is in that toolbox. All you have to do is unpack it. Needless to say, you have to have the right tools.

Why do you do research?
By approaching the situation or problem in this way, you can answer questions and you can solve problems. That is the objective of doing research. It makes no difference whether at a later stage you teach at a elementary school or work at an architecture firm, become a nurse or work in the hospitality sector. Wherever you are, there will be questions that require an answer, one that is best found by working according to a systematic approach. You will be able to provide an answer to these questions in your professional field and the world around you using the research skills that this method discusses. These skills ensure that you adopt a research-oriented attitude that allows you to address practical problems and work situations as a professional.

Research doesn't necessarily have to solve a problem, and a problem is definitely not always negative. Research may be used to take stock of things. It answers questions like "How does … work?" Or "What are the characteristics of …?" You may not always get an answer to your question straight away. But even so a research-oriented attitude can be useful. Bear in mind that "doing research properly" doesn't necessarily mean that you can get the right answer; but rather that you can ask the right questions! Being inquisitive. That is what an inquisitive attitude is all about. It's about learning how you can satisfy your curiosity in a systematic way: using the tools in your toolbox.

Research is like a journey

Think of research as a journey. Along the way – from the start of your journey until the end (your report/professional product) – you will come across several forks, crossroads, and side roads: the choices that you have to make along the way, i.e., during your research. When you go on a journey, you first choose the destination. Then you find out about the best way to travel, and you make a plan. You plan your whole trip based on your expectations, with the expected arrival time, and a few stopovers along the way. You gather your information about departure times, hotels, travel times, and so on. During the journey you keep checking whether you're still on the right route, whether you're on time, and whether all the various parts of your travel plan are still on track. At the end of your journey, you will know whether your plan was a good one. You look back (evaluation) and you look forward (recommendations). You also assess the quality of your journey. What went well, and what would you do differently or better next time?
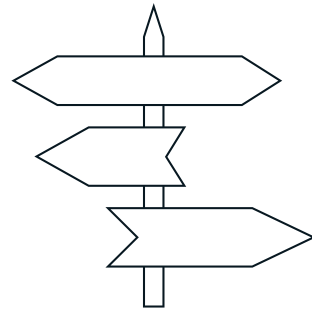
When you do research, you start with an idea for a project, or a question from your professional field. Then you elaborate this idea or question in greater detail, you look for sources, you formulate the key question for your research, and you make a plan. You develop certain expectations about the results. You then start collecting and processing information. You supervise the project throughout, and keep an eye on the quality. Then you evaluate it, and finally you report on the results and present your recommendations.

A research journey is not one-way traffic. You don't only assess your own research process: you share your experiences with colleagues. By studying one another's methods, you learn from one another.

You get tools from your research toolbox

During your research project, you use a "research toolbox" with tools: assumptions, instruments, and instructions. These tools will help you to conduct your research properly. They are the foundation for your project.

Let's go back to the analogy of research as a journey. The tools in the toolbox would be your travel plan or the timetable. They guide you and give you something to go by and make sure that you make the right choices at the right time. You will find the research toolbox in this book's website, with all the tools you need to design your research, to conduct the research, and analyze the data and report on it.

Research in steps
Maybe you don't realize it, but if you have a problem or a question, you often use research techniques to find the answer. For instance, if you see long queues at the tills, you take the following steps:
- Your question is: how can you get to the till in the shortest possible time?
- To answer your question, you observe the queues and count the number of people waiting in each queue.
- You conclude that the waiting time will be shortest in the shortest queue.
- You go to the queue with the fewest people.

In *Doing Research* you'll learn the steps you need to take in any research project, whether you want to predict the wait time at the till or find out the causes of a particular disease.

Simple or complex
The example about the queue at the box office is simple. There's a lot more to it when it comes to systematic research. Your research design is generally much broader. Many people may be involved, you will be conducting extensive and complicated analyses, you will be writing a detailed research report, and you will be presenting it to the client. Also, quite often you have to make recommendations, or present a design, plan or measures. That said, whether research projects are complicated or simple, they follow the same pattern.

If you want to learn how to do research, knowledge acquired from a book won't suffice. A book can teach you how to set up a plan, design a research project or formulate a main question. You can also learn how to carry out an analysis and how you compile a report and account for the findings. When you *conduct* research, you have to be able to combine the knowledge and skills that you've acquired; you have to develop a kind of helicopter view of your research. Doing research has much more to do with skill than with knowledge. You have to get experience. You learn research by doing it.

Informal or systematic
Is anyone who makes a casual observation automatically a proper researcher? No, not quite. When it comes to *informal observations*, i.e., in daily life, you may use your own frame of reference to draw your conclusions. That means that you subconsciously assume that other people do the same as you, as Example 1.1

shows. Real researchers don't do that. They use *systematic observation* based on a phased plan, without having preconceived ideas about the outcome.

Example 1.1	Reflections on a vacation

It's the end of August, you're visiting London and it seems like an excellent day for a boat trip on the Thames. Once on the boat you see a group of young Oriental people. Complete with smartphone cameras and strange shoes, they're jabbering in what sounds like Japanese, but then it would, wouldn't it? Must be Japanese tourists, you think to yourself. Are they really?

This is an informal observation, not a systematic one. Were you to carry out systematic research, for example because you are surveying visitors to the city, you could ask the young people whether they would like to fill out a questionnaire and give you their background information. What you'd find from the analysis is that you're looking at a group of first year students who have come to study at the London School of Economics. It's freshers' week and they're preparing for a pub crawl.

Because you yourself are on vacation, you automatically assume that the young Japanese people are too. You use your own frame of reference to draw your conclusions.

1.1   Research approaches

Practical considerations

You don't do research in a vacuum. First you draft a research plan: you define a clear main question, you check whether anyone else has researched the subject and what their conclusion was. You set a deadline and you draw up a budget to see what is necessary (and available) for carrying out the study. You consult your supervisor, your client, and your co-researchers. These are the practical aspects of research.

Markers

Besides these practical aspects, there are other, underlying approaches that can be used to classify research. They are known as the *methodology*. For instance, there's a difference between *fundamental* and *applied* research, between *qualitative* and *quantitative* research and between *induction* or *deduction*. These are described in the following sections.

1.1.1   Theory-based or applied research?

In principle, and according to the science of methodology, there are two main types of research: *theory-based* research (also known as *fundamental*) and *applied* research. University students are more often than not confronted with

theory-based research. College students, on the other hand, mainly carry out applied research.

The main difference between these two approaches is the type of problem to be solved. The questions raised in theory-based research generally answer questions that aim at developing knowledge. So they are *questions about theory*. Applied research, however, is all about solving problems that have a practical application, i.e., *practical questions*. Applied research, therefore, is especially important for society (externally oriented) and theory-based research is important for science, for the research itself (more internally oriented, see Smaling, 2006).

Example 1.2	Addiction to tobacco

Nicotine is one of the most addictive substances around. Theory-based research shows that tobacco addiction has two components: a physical dependence (on nicotine) and a behavioral dependence (the "habit" of smoking) (Trimbos, 2020). The tobacco addiction model makes clear how the brain reacts to nicotine, how psychological dependence works, and how tobacco addicts behave. Applied research helps to master this tobacco addiction, for instance by finding out which treatment works best.

Doing Research is mainly about designing and conducting *applied research*, and paying attention to the practical relevance of the research. In other words, you look at the extent to which the result is useful for the environment or situation in which the research is conducted, as well as for the client (see Greve et al., 2015). That said, it is important to know something about the theory behind the subject. Ultimately, knowing about these basic research norms is crucial for a good understanding of the function of research.

Sometimes the answer to question about theory is a good solution for a practical problem. In that case theory-based research is also applied research. For instance, theory-based research into the shifting of sandbanks in coastal areas may well have social relevance if it leads to better protection against floods. So the difference is not very clear: questions about theory can also be answered in applied research, and practical questions are also investigated in theory-based research.

Key concepts	
Theoretical question	A question to which the answers provide knowledge about a subject (theory-based or fundamental research).
Practical question	A question to which the answers lead to the solution to a practical problem (applied research)

1.1.2   Qualitative or quantitative?

Another distinguishing factor is that between *qualitative* and *quantitative* research. There is an important distinction between the two when it comes to choosing the research method you are going to use. That depends on the main question of your research.

The *quantitative* method is based on *numerical* information, i.e., figures that represent objects, organizations, and people. As researcher you assign a number to this data: age in years, value from "1" to "5," sex in "1" (male) and "2" (female). With these figures, these values, you can make an objective measurement. You use statistical techniques to process the attributes and to test assumptions. Statistical techniques are the tools used in quantitative methods, like the method used on Example 1.3.

Example 1.3	Music festival

A research plan is drawn up to assess the level of satisfaction among those attending a music festival. To gather the information, they decide to carry out a survey in which about 20% of the 2,500 festival-goers will be interviewed. They will assess levels of satisfaction for the festival according to a number of aspects by "rating" them. The background characteristics of the visitors themselves will also be recorded (sex, age etc.). Their responses will be analyzed numerically (quantitatively), by comparing the various ratings. Differences between the ratings will be compared according the various groups as well, i.e., young versus old, men versus women and so on.

When *qualitative* methods are used, you carry out research in the *field*, i.e., in the daily reality of life in society. As a qualitative researcher, you are interested in the meaning that a person attaches to a situation or experience. You judge an experience as a part of their perception of their lives, and not as a separate, independent entity. This is also known as *holism*.

When you gather information for qualitative research, the methods you use are open and flexible, and during the research you can intervene when the unexpected happens. You don't gather statistical information; instead it's recorded in everyday language (Maso & Smaling, 1998). In this approach, language is the tool (see Example 1.4).

Example 1.4	Guest experience

Recreational attractions and parks are often evaluated qualitatively. During a short interview, guests can be asked what they found to be the most striking, fun, irritating or boring part of their experience. These days, researchers often use tablets for this. Guests are asked to write down a few sentences about what they thought of the park or attraction. The information is then analyzed qualitatively.

Some researchers view qualitative research results as less reliable than those based on quantitative research. Other researchers believe that figures do not offer enough insight into the issues at hand; they would rather use research methods that listen to what the people have to say (Wester, 1991). The method used by parliamentary inquiries is an example of qualitative research: by conducting interviews with experts and the people concerned, and by hearing ministers and officials (under oath), the committee not only finds out the facts in detail, but also finds out what these people think about them.

> **Key concepts**
>
> **Qualitative research**   Research not based on numerical information.
>
> **Quantitative research**   Research based on numerical information.

In *Doing Research* you learn about qualitative *and* quantitative methods because they are both key when doing applied research. Obviously, the difference between these methods is in the way in which you conduct the research, but also in the way you look at research. The emphasis in qualitative research is on the meaning that respondents give to a situation based on their own background, say the respondent's *context* (and the researcher, see Chapter 16) and the extent to which the results can be applied to other situations or groups.

In quantitative research the emphasis is on making phenomena measurable and on generalization, i.e., objectively measuring characteristics and drawing a valid, general conclusion. The corresponding context is not measured. Qualitative research often involves collecting a lot of information about a few people, while for quantitative research the researcher collects little (or at least less) information. It's about a large group of people instead. In a diagram, it looks like this:

	Qualitative	Quantitative
Emphasis on meaning/context	Yes	No
Number of respondents	Few	Many
Data per respondent	A lot	Not very much
Type of information	In-depth	Superficial
Objectively measurable (numerical)	No	Yes
Statistically generalizable*	No	Possibly
Theoretical generalizable*	Possibly	No

*More about this in Chapter 9.

Table 1.1   The characteristics of qualitative and quantitative methods

But the two methods are not polar opposites. They complement each other very well and are often used side by side to get the full answer to the main question (see Doorewaard et al., 2015).

Triangulation and the mixed method approach

If you want to approach a research question from various perspectives, then you can use various methods to collect information, i.e., data. Companies and organizations are not only interested in the bare figures, they also want to know what the background is. This is a good reason to look at the research question from multiple angles, which enhances the reliability of your research results. This is called *triangulation*, which literally means "triangular measuring." Triangulation is used to enhance the quality of research. Example 1.5 shows you how this works in practice.

Example 1.5	Timber frame construction

An engineering student carried out graduation research with a company that uses timber frame constructions. He demarcated the quality criteria, investigated the state of affairs regarding quality control and quality assurance at the company, and gave them recommendations so that the company could guarantee the quality of its construction products. He conducted the research using various methods for each sub-question, such as researching source material, observations, and interviews.

Source: Geulleaume, 2016

A special kind of triangulation is the *mixed method approach* (De Boer, 2016). In this method, you choose a combination of qualitative and quantitative data collection methods to answer your question. There's more about triangulation in Chapter 6.

Key concepts	
Triangulation	Tackling the main question using various research methods.
Mixed method approach	Research that uses qualitative and quantitative methods.

1.1.3 Inductive or deductive?

When you do *inductive* research, the theory or model about your subject is not known in advance. Your objective then is to gradually collect data and develop a theory. You're looking for "empirical regularities" (Tijmstra & Boeije, 2011, p. 32).

Inductive research

Researchers who use inductive methods often use qualitative research whereby they work from the "particular" (the information collected) to the "general" (the theory to be developed). So inductive research is about *developing a theory* (see Example 1.6). *Iteration* (repetition) is a guiding principle in this because it leads to a higher standard of results. If you're using iteration, this is how you go about it: you gather and analyze the information and draw the first conclusions. This establishes the kind of additional information that is required. You then go on to gather and analyze new information. Each time you link the results to the results obtained previously and so a theory is formed. More about this in Chapter 6.

Example 1.6	Social media

> Suppose you are researching social media usage among students at a college in Michigan. You collect information using interviews, you analyze the information and you discover that a degree of self-motivation arises. You go on to collect additional information about self-motivation, you analyze the information once again and you draw conclusions about the students' attitudes to work. With these conclusions, you present a model for the digitizing how students learn.

Deductive research

The opposite of research is deductive research. For this, you formulate assumptions based on existing theories and models. You gather and analyze information to assess whether the theories hold water. In simply terms this means that you assess whether your model (theory) is valid (is true) for the information that you have collected. This principle is often used in quantitative, theory-based research where the process goes from "general" (the theory) to "specific" (the information). Deductive research is therefore *tests theories*.

In effect, induction and deduction complement each other: you develop a theory inductively, and then you can use deduction to check whether the theory is true for certain situations or groups of people (see Example 1.7).

Example 1.7	Bloom's taxonomy

> Bloom's revised taxonomy (Anderson, Krahwohl & Meyer, 2001) describes various cognitive competency levels. Based on this theory, you develop assumptions about the cognitive competency levels when deploying social media in tertiary education. Then you apply the a theory to a new subject. You gather information and analyze it to see whether the theory holds for your subject.

Based on their knowledge and expertise, researchers have certain expectations about their research findings, also if they're doing inductive research. But in inductive research these assumptions are not based on a model or theory, whereas they are in deductive research. Tijmsma and Boeije (2011) call this an *exploratory hypothesis*. You test these qualitatively: not with numbers, but by looking closely at your collected texts, interviews or observations or by collecting new data.

Key concepts	
Inductive research	Theory-developing research.
Deductive research	Theory-testing research.

Checkpoint 1.1

– What methods of data collection were used in Examples 1.2 (Tobacco addiction), 1.3 (Music festival), and 1.4 (Guest experience)?
– Suppose you do research into student satisfaction at your college. You conduct interviews with students and lecturers, you design a survey and the analyze findings from previous research into student satisfaction. Which approach have you chosen to answer your main question?

1.2   Rules for the quality of research

There are rules for the quality of research that all researchers stick to – regardless of whether they are doing applied or theory-based research. We apply two types of rules: rules for your behavior as a researcher, and rules for the quality of conducting research and interpreting the results.

In applied research, it is called *methodological soundness* (Andriessen & Butter, 2016). Some rules apply more to quantitative research, while other criteria are applied in qualitative research. Chapter 9 will discuss these rules in detail. In addition to these rules, there are practical criteria, such as, the feasibility, efficiency, and usability of the research.

1.2.1   Characteristics of critical research

Research plays an important role, not only during your education, but also in your (future) job. After all, the world you live and work in is dynamic and constantly changing. As a professional, you can anticipate these situations, raise and solve problems, ask the right questions and use methods to answer those

questions. That is what a *research-oriented attitude* is all about (Van der Velde et al., 2020). To do research properly, you have to have a certain kind of attitude as well as knowledge and skills.

Attitude

Critical researchers can be distinguished by their attitude. As a researcher, you are curious, want to find answers and solve problems. And you are also *impartial*. Your personal opinions about situations and your preferences have no role to play in your research. This kind of *objectivity* is not always possible. After all, researchers are people too, with their own views and opinions. That is why it is important that you always strive for *openness* in your research. In Section 1.2.2 on "falsifiability of statements" you can find out more about this.

Theory-based scientific research implies that you are open to comments from your colleagues and accountable for your results. This *scientific attitude* is important because it will reinforce your research findings. If your research findings are contradicted by other research, then your research findings were *refuted*. This means that your research may be the first in a series of scientific developments.

Are you doing applied research? Then having a *research-oriented* and *critical attitude* is also important. You learn to look at your own research critically, from a "distance." You also learn to not just accept other people's research as true, but to always examine it critically. As a *critical friend*. This critical, *research-oriented attitude* may stand you in good stead later on in your profession.

Knowledge

Obviously you can't apply research methods if you don't know what they are. *Knowledge* of methods is and always will be an important part of doing research. You always need to know which research methods are out there, what criteria they use, and what their pros and cons are.

Alongside knowledge about methods, you will also need to know about the subject you intend to research. This is the kind of knowledge that you have to acquire or refresh for each project. You can look for information on the subject; you can read up about it or talk to experts or those involved.

Skill

You hone the skills you need for research by actively going out and doing it. You learn how to apply research knowledge based on examples or a case study. Your active research-oriented attitude will give you experience with the various parts of the research process. For example, you learn how to conduct an intake interview with a client, how to formulate the right questions for your research, how to select a research group, and how to enter data into a software package.

1.2.2   Quality criteria for carrying out and interpreting research

Clients often use your research results to make important decisions, or to determine policy. So the research has to be good quality. Below, we discuss two important quality criteria for conducting and interpreting research: reliability and validity. These criteria are discussed in detail in Chapters 9 and 16.

Reliability

First and foremost, research is judged by the reliability of its results. The reliability of research has to do with the extent to which it is free of *random errors*. These are deviations in or aspects of your research that are not verifiable, ones that are caused by unknown factors. Examples are noise nuisance when doing an experiment and inaccurate scales when measuring a person's weight. Random errors in research can affect the reliability.

Reliable = it can be replicated

The most important condition for reliability is that it can be replicated. This means that the same research carried out in the same way leads to similar results. There should also be *agreement* among the researchers about the findings of the research. That is why your independent attitude as a researcher is so important (Section 1.2.1); you must view the research objectively, regardless of the results.

Reliable = verifiable

One objective of research is to get results about things that are observable in "real" world around us, also referred to as "reality." A subject, question or assertion must be falsifiable. This means that you can't make assertions like "angels exist" or "Manchester United is the best." These are assertions that cannot be proven, that you cannot verify through testing. They are *speculative* (not based on facts) and *subjective* (it's your opinion).

Research also has to be refutable. This means that different researchers should be possible to *confirm* or *refute* (reject) an idea or assumption by doing the research again. That has consequences for the way in which you formulate the subject, question or assumption of your research. There can be no confusion about the people or objects under discussion, about the time and place that are relevant to the research, or about the terms and concepts that you use to describe them. In short, the subject must be *unambiguous*. The "falsifiability of statements" criterion therefore mainly applies to quantitative research.

To be able to confirm or refute research, it has to be *in the public domain*. So other researchers have to be able to test your statements or comment on them. This means that research can be *replicated*.

Reliable = informative

Part of doing research entails making statements about the subject. The *information content* of these statements must be *optimal*. This has to do with the requirement of falsifiability: to be able to verify a statement, you have to formulate it very precisely. You need to know what it is you are about to research, when and with whom (Scheepers & Tobi, 2021; Swanborn, 2010, p. 243-244; Swanborn, 1987, p. 35 et seq.). You have to be sure you indicate:

- the situation that you are referring to;
- the boundaries within which your research applies;
- the groups involved;
- the period that is relevant to your research;
- what the *domain* of your research is, i.e., the whole "area" that is relevant to your research, including the subject and all the elements that your research involves. The larger the domain, the more informative your statements will be.

One way to do this is to keep a research logbook.

Validity

A second important criterion for research quality is validity. Validity has to do with the *accuracy* of the research results. Simply put: you need to be certain that the research doesn't have any *systematic errors*. These are errors that cannot be put down to coincidence. For example, respondents in your study may deliberately give wrong answers or react differently because they know they are part of an experiment.

There are various kinds of validity (more on this subject in Chapter 9). We'll discuss three of them here:

1. If you able to draw the correct conclusions from your results, then your research is *internally valid*.
2. *Construct validity* has to do with "measuring what you want to measure."
3. If your research has *external validity*, you can make assertions about a large group of people or situations. That concerns the generalizability of your research.
   - When you talk of *statistical generalization* you use statistical tests to see if a particular result is generalizable. For instance, research may be carried out in an organization among a randomly chosen and representative selection of staff, and the results are valid for the entire organization.
   - For *theoretical generalization* you assess whether your results are comparable or applicable in similar situations that have not actually been studied (Scheepers et al., 2021). So research may be carried out within one department of an organization. It is not necessary to apply the results to the whole organization, but they may be relevant to similar departments, even though the study was not conducted in those departments.

Key concepts	
Reliability	The extent to which the research is free of random errors.
Validity	The extent to which the research is free of systematic errors.

1.2.3   Practical criteria when conducting research

There are also several practical criteria that all types of research must meet: research has to be efficient, feasible, and usable.

Efficiency
Research must be *efficient*. This means that the costs should be in proportion with the results, and the schedule should be feasible.

Feasibility
In line with this, research must be feasible. You must have a big enough team of researchers, be able to approach the people in your sample, collect and analyze data and report on time. For instance, you may not be able to conduct a survey properly at a festival because the music is too loud or because many festival-goers have drunk too much.

Usability
A general consideration that is particularly relevant to applied research is that it should be *usable*, i.e., relevant to practice (Andriessen & Butter, 2016) (see Example 1.8). There is no point at all in doing research that has no practical application.

Example 1.8	Food bank

One hundred and thirty volunteers and customers at the Philadelphia food bank were given a written questionnaire to find out how about their experiences of how food is handed out. Of these, 39 were completed and returned. That is a response rate of 30%. Despite the low response rate, the results are very valuable for the food bank, because the organization can use them to improve the system they have in place for handing out food.

Key concept	
Usability	The extent to which research has practical relevance.

Checkpoint 1.2

Which quality aspects were not taken into account sufficiently in the following studies?
– A company that produces baby milk pays for research into the effect on toddlers of vitamin D in this milk.
– The voting behavior of a panel is followed during election polls. The results will be applicable for all voters who are entitled to vote.
– Research among students who belong to a student association shows that students don't rate organized activities highly. But only five students took part in the survey.

1.3 Research phases

When you're designing and conducting research you are constantly asking questions, for example:
• What am I going to research?
• Why am I going to research that subject?
• Who am I going to research?
• How am I going to do my research?
• Where am I going to do my research?
• When am I going to do my research?

You don't only ask yourself these questions when you start researching. During the research, too, you continually ask yourself questions. You stop along the way and check your progress. You look back, and then forward. Are things going according to plan? Are you on the right track when it comes to the content? What was the main question again? Are you on schedule? Are you within the budget? Sometimes you have to stop in your tracks, reconsider your whole research project, talk to your client or go back to the "drawing board." You go over and over again this process of looking back and forward, and moving on again, like a cycle (see Figure 1.1).

Research has a fixed structure. It consists of several *research phases*, which every researcher, student, and lecturer goes through. At the end of all these phases, you answer the main research question. Often that's when new research questions pop up, which you can then answer in a subsequent study. This section shows what such a fixed structure (also referred to as a research *cycle*) looks like and how it produces a research report as well as a professional product.

Research cycle

Phase 1 Design

The main objective in this phase is to demarcate your objective and to draft the main question of your research. If you don't do this properly, you run the risk that your research will become unwieldy, and you won't be able to draw clear and usable conclusions.

The next step is to design your research, showing how you intend to address the main question, which data collection methods you will use to do so, how much time, what you'll need, and who will be involved in your research. You also specify how you are going to analyze the information.

Taking clients into account

In applied research you have to take your clients into account. Perhaps there is already a research question, a problem, an intervention measure or a diagnosis, and the client wants you to work on it. That said, often the problem or the situation still needs to be demarcated. You may do some preliminary research for this. This involves talking to experts at the organization, reading documents, searching for information online, attending meetings and so on. It is important to find out what is expected of you: do you have to write a report, give recommendations or deliver a different kind of (professional) product?

Phase 2 Data collection

After you have finalized the design, you go on to conduct the research. You collect the information that you need to answer the main question or sub-questions. There are many strategies for this, depending on the number of subjects (people, objects, organizations) that you will be researching, the nature of the question (does it lend itself to qualitative or quantitative research?), and the time and budget available. You have already indicated this in your draft document (your research proposal).

Phase 3 Analysis

You then go on to process and analyze the data that you have gathered. As is the case in Phases 1 and 2, there are several methods to choose from when it comes to, both qualitative and quantitative (for numerical information), depending on the kind of data collected, for instance text, video recordings or photos. This will be discussed later in this book.

Phase 4 Evaluation and recommendations

At the last phase of the research, you look back to the beginning: what was it that you were researching, which methods were used, did you manage to answer all the questions using them and, if so, what are the answers? What recommendations can be made? Are there any other opportunities for research? How can we evaluate the research project? Is it good quality research? Or are

there issues to do with the content and/or design? You then finish your report, advice or professional product.

Normally the research is then completed. But these findings may also lead to follow-up research. This may be relevant if the questions that remained unanswered can be addressed in the new research project. Or your research may be the first in a series of projects.

In Figure 1.1, there is a diagram showing the four phases of research. A part of this book is dedicated to each phase.
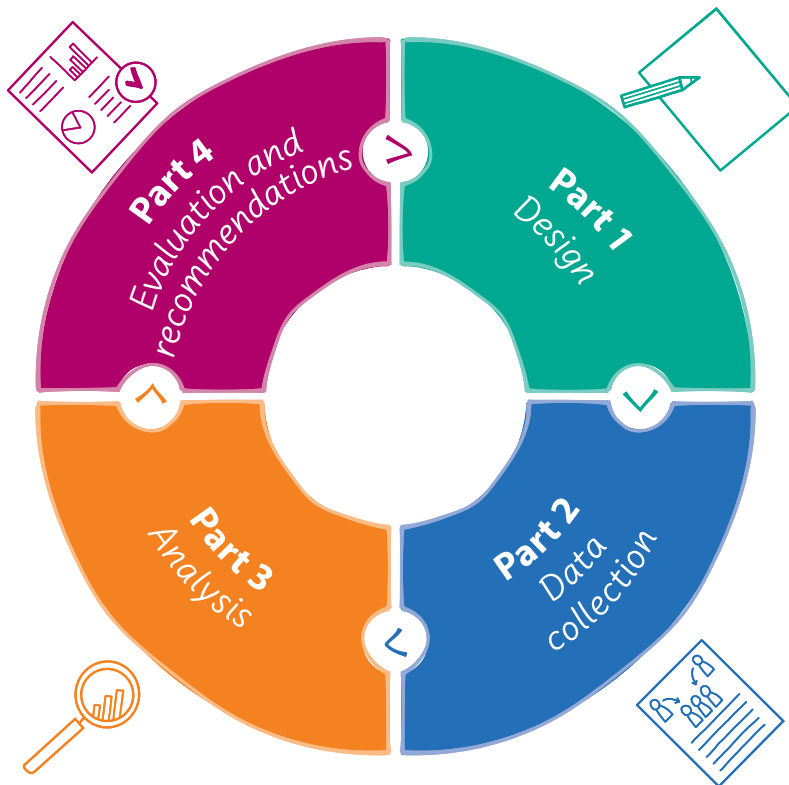

Figure 1.1   The research cycle showing the research phases

1.4   Research report and/or professional product?

Once you have completed all the phases of the research, you write a report that gives an account of the research methods used and presents the results (Phase 4). But that is not the whole story. You can also summarize these results in a service or a product that for the client: a *professional product* (Losse, 2016). These professional products vary depending on the discipline, subject and

question. It may comprise recommendations, a plan of action, a treatment plan, a design for a procedure, a prototype and so on.

What you're actually doing is choosing between a research report and a professional product: you base your professional product on your research findings. Along the way, you will use the same research toolkit and skills as you would in a research project, which produces a research report only. So the cycle that you go through to arrive at a professional product is the same as for a research report (Figure 1.1), only in this case the product follows the evaluation.

Website

Go to this book's website.

Test your knowledge based on:
–   the answers to the questions in the checkpoints
–   the extra assignments with feedback
–   the concepts trainer
–   the knowledge test

Handy tools:
–   research tools: overviews and checklists that you can use in the various research phases
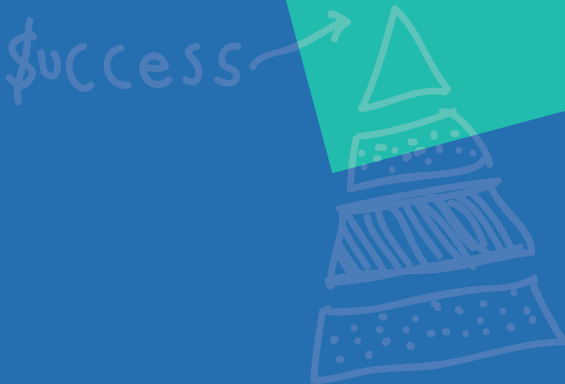
Doing Research is a clear introduction to the methods and techniques required for research. It answers questions like: what does 'doing research' actually mean, how do you design a research project, what steps do you have to take, how do you collect data and what are the pitfalls?

Doing Research sheds light on the complicated process of research. It teaches you research skills one step at a time. It discusses the theory based on the four phases of applied and fundamental research: design, data collection, analysis, and evaluation and recommendations. The various research steps are presented in clear procedure guides, so that it is easy to see where you are in the research process. Each chapter also has checkpoint assignments to test whether you have processed the theory correctly. You can find practical tools, tests and answers to the checkpoint assignments on the website. This 6th edition has been completely revised and pays extra attention to design research and action research.

Doing Research is suitable as an introduction for students in higher education, but it can also be used as a reference book for applied research.

Nel Verhoeven is an independent senior research consultant. She advises and supervises fundamental and applied research projects. She also gives various lectures, workshops and courses. She is the author of several successful teaching methods in the field of methodology.