Design Thinking

Noordhoff

Teun den Dekker

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Design Thinking

Teun den Dekker

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Acknowledgements

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Design thinking is...

'Make things people want instead of making people want things.'

—Geoff Cubitt, CEO Isobar U.S.

When you see the word 'design', do you think of expensive *Off-White* sneakers or *Christian Louboutin* high heels? Or a beautiful yet totally uncomfortable sofa in a luxury hotel? You are not the only one. For many, the word 'design' is synonymous with expensive and exclusive products that excel in their form, technical design and aesthetics. In other words, luxury goods for the elite.

For a long time, 'design' was the exclusive domain of architects, product designers and graphic designers who created new and innovative products – apparently from scratch. These creative professionals follow a seemingly hazy thought and working process, full of sketching, combining, experimenting and prototyping, resulting in often surprisingly innovative products that match the wishes and needs of the customer. This thought and working process is not only useful for making exclusive design products but can be more widely applied in other areas.

This different way of thinking and working, known as design thinking, has been gaining interest. In 2015, the *Harvard Business Review* dedicated a complete edition to design thinking. The caption read: 'It is no longer just for products. Executives are using this approach to devise strategy and manage change.' In an article for this edition, Jon Kolko (2015) writes that design is no longer only for aesthetic purposes but that an increasing number of corporations are integrating design thinking principles in their organizational processes. Besides large commercial corporations, such as PepsiCo, IBM, General Electric, Samsung, Puma and Philips, various municipalities and other social institutions are using design thinking to improve their services and to help solve complex social problems and challenges.

As a result, the idea that people had about designers is changing; they are no longer just creative types hired to make products more aesthetically pleasing and expensive, but instead are now considered as serious partners who help to look at the challenges facing an organization in different ways.

Until now, organizations were used to thinking in solutions when confronted with problems. Preferably, they want a single and clear-cut answer. But the current complex problems they are confronted with are not self-contained, clear and easily defined, they are typically linked to other problems, interdependent, they transcend organizational boundaries and are dynamic. In addition, the needs and wishes of clients and end-users are changing so rapidly that ready-made solutions are not the answer to these ever-changing demands. Creating innovative products and services and using creative problem solving strategies is more and more necessary.

Design thinking can be used for a product, service, technology, strategy, policy, or organization. It does not matter whether this is about setting up a stage for cultural events for the elderly, a potato processing factory needing to expand its market, or an IT company wanting to improve its services. Design thinkers think about complex problems and design challenges in a different way, which can lead to surprising and innovative solutions that meet the needs of the customer.

Wild game

Problems or questions that are both complex and contradictory are especially suitable for design thinking.
As early as 1973, Rittel & Webber wrote about 'tame' problems and 'wild' or 'wicked' problems. Wicked problems can be formulated in different ways and the way they are formulated determines the solution. Wicked problems do not have clear causes and effects because they are closely connected to other problems. In this case, a single solution to solve such a problem is an illusion, according to Rittel & Webber. Perhaps they were clair-voyant because more and more of our social issues and organizational problems today are wicked problems that require solutions in a broad context.

What if we compare wicked problems with wild game? If you get three attempts to catch a tame rabbit, you can just go for it, chances are you will succeed in catching it. However, if you want to catch a wild rabbit in three attempts, it is better to make a well thought out plan first. Otherwise, who is actually the wild game? The rabbit or you running after it?

Who is this book for?

Since the end of the millennium, design thinking has been getting more attention from the corporate world, universities and colleges. Many universities and colleges now include design thinking in their curriculum. Students in many different disciplines can now follow so called minors in design thinking. Service Design, Design 360, Design Without Limits, Design Thinking and Doing and Co Design Studio are just a few examples of minor courses that can help students apply design thinking in their own specific disciplines. There are actually colleges that have based their courses on design thinking. *Design based education* is an example of this.

This book was written for students and employees who would like to apply the principles of design thinking when addressing challenges, problems or complex (social) issues in a different way in their own profession or field.

You shouldn't just read this book. Design thinking is something you must actually do. Reading about it will give you the basic knowledge but doing it will teach you what design thinking can do for you, your field of study or your work. In this book we therefore stimulate action and emphasize learning about design thinking by doing.

How to read and use this book?

You cannot summarize or define design thinking in a catchy one-liner. There are researchers and design thinkers who stress that design thinking is a way of thinking. Others would think of it as a process that describes the way design thinking works. In practice, design thinking is put to use in a project approach. Finally, design thinking is considered to be a collection of useful and directly applicable tools. In this book we are not going to define design thinking in just one way. For us, design thinking is a way of thinking, a way of working, a project approach and a tool box. Every chapter in this book tells the same story but in a different light. Hopefully, after reading this book, you will be able to form your own view of design thinking.

In Chapter 1, *Design thinking is a way of thinking*, we answer questions such as: How do design thinkers tackle problems and challenges? Which fundamental attitudes do they use and which skills must they have?

Chapter 2, *Design thinking is a way of working*, answers questions such as: Which phases and milestones are distinguished in the design process? What is the difference between the 'messy' design thinking cycle and the more structured design process?

Due to the fact that you can only learn design thinking by actually doing it, we will give you a roadmap of a design project in chapter 3, *Design thinking is a project approach*, so that you can actually start practising with design thinking as a way of thinking and working.

Finally, in chapter 4, *Design thinking is a tool box*, we bring together different tools you can use in design thinking.

By the end of this book, you will have thought, worked and practised as a design thinker, and you will be able to apply what you have learned in a (school) project, in your work, or any personal situation, like when a friend asks you for advice. That is also what design thinking is: looking at the world in a new way.

FIGURE 0.1 Visual reading guide

Chapter 1
Design thinking is a way of thinking

Chapter 2
Design thinking is a way of working

Chapter 3
Design thinking is a project approach

Chapter 4
Design thinking is a tool box
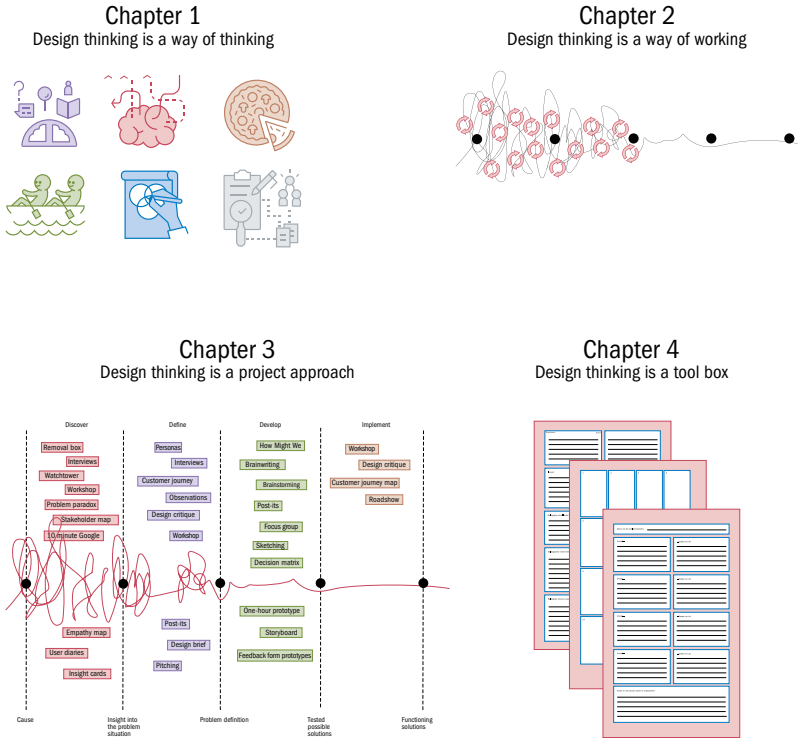
Reading guide

How can you use this book to capture and learn what you think is important?

Here are a few options:
– Chapter by chapter: to discover all aspects of design thinking.
– As a self-study guide, to explore design thinking on your own.
– As a workbook, to practise design thinking: Read chapter 2 and do the exercises in chapter 3.
– As a reference for the design thinker who wants to primarily use the tools in chapter 4.
– As a handbook in your workplace. With this book you can promote design thinking in your company or as an intern.
– Do you only have two hours available? Scan the fundamental attitudes in chapter 1, read through the cycle of design thinking and the design thinking process in paragraphs 2.2 and 2.3 and scan the tools in chapter 4.

DESIGN AS BUSINESS

World-wide, there are various companies specialized in applying design thinking to many different issues. These companies call themselves strategic design consultancy firms.

1 Go to the websites of IDEO (ideo.com), Designit (designit.com), Fjord (fjord.com), Livework (liveworkstudio.com).
2 What kinds of projects do these companies do?
3 What distinguishing factors do these companies have that set them apart from one another?
4 How do they sell design thinking?

WHAT'S IN A NAME?

Different sources explain and interpret design thinking in different ways. Because of this, concepts have originated which are related or linked to design thinking. Fill in form 0.1 will give you a visual overview of concepts that you may already have come across.

1 Do you know of any other terms or concepts associated with design thinking? Complete the list with your own additions.
2 Google the meaning of the different terms and concepts.
3 Which of these terms and concepts have you come across before in your own field.

FILL IN FORM 0.1 What's in a name

Design based education

Co-creation

_____

_____

Co-design

Systematic thinking

Interaction design

_____

_____

Organizational design

UX design

(DESIGN THINKING IS ...)

_____

Human centered design

Innovation

_____

Experience design

_____

Service design

User experience design

What Design Can Do

In March 2017, the *What Can Design Do Foundation* organized the grand finale of the Refugee Challenge. In cooperation with the United Nations Refugee Organization (UNHCR) they organized a competition for designers from all over the world to think about and address the refugee problem. The idea was to come up with innovative solutions which would improve the lives of refugees in urban areas.

A total of 631 proposals were submitted. Five designers/teams were selected and given 10,000 euros to develop their ideas. Four start-ups emerged from this process. *Agrishelter* makes high quality temporary housing using local materials. *Makers Unite* is a social platform that, together with refugees, develops sustainable products. The *Eat and Meet Bus* is a mobile restaurant that brings together refugees and locals.

The Welcome Card is an app (among other things) developed with the help of refugees, that strives to make the asylum application process more user friendly.

All these are great initiatives, with the wishes and needs of the customer catered for, or so you would think. Before the results of the competition were announced, a critical article appeared in *de Volkskrant*, a Dutch newspaper. In this article, author Jeroen Jutte, stated he had 'an uneasy feeling' about the competition. He wrote: 'Refugees should not be seen as a problem. This difficult social issue can not be solved by design'. The participating designers were allegedly thinking for the refugees and not with them, and not taking the complexity of these issue into consideration. 'If there is one thing that design cannot do, it is forcing social change', according to Jutte.

Tim Brown, the CEO of the strategic design consultancy firm IDEO has a different take on this. In a TED interview he gave in 2009, he said that design thinking should actually be used to solve complex problems, because by definition design thinkers think up solutions based on the needs and wishes of end-users.

QUESTION 1
Go to www.designthinkinginternational. noordhoff.nl. Read Jeroen Jutte's article (5 minutes reading time) and check out the TED video with Tim Brown (viewing time is 17 minutes).

QUESTION 2
Split into groups (of 2 or 4). Prepare a discussion with one group finding arguments in support of Jeroen Jutte's view and the other group supporting Tim Brown's viewpoint. Then switch roles. Write down your personal opinion about design thinking.

'So I'd like to believe that design thinking actually can make a difference, that it can help create new ideas and new innovations.'

— Tim Brown, CEO and president of IDEO

1
Design thinking is a way of thinking

In this chapter, we will approach design thinking as a way of thinking. Design thinkers have a number of fundamental ways of looking at the world around them and they see different possible solutions for (complex) design challenges. In this chapter we will discuss six fundamental attitudes with which you can apply design thinking in your studies, work or daily life.

We will answer the following questions:
- What are the fundamental attitudes of the design process?
- How do I apply them?
- How do I develop these fundamental attitudes and a general design thinking attitude?

Vera Winthagen brings happiness to the neighborhood

Eindhoven is the first city in the world that has recruited a design thinker to combat bureaucracy and compartmentalization using design thinking. In other words, a more creative way of thinking offered by design thinking with the intention to prepare the city for the future.

'I want you to make the city and the municipality happy' said Mary-Ann Schreurs, the city's councilor for innovation, design, sustainability and cultural affairs, to Vera Winthagen on her first day on the job in June 2015. […]

Design thinking can change the way civil servants do their work, according to the municipality of Eindhoven, who has been hiring designers since 2010. Designers know how to make a product that actually works for the user. Whether it be a coffee machine or a municipal service, the principles used to make a good design are basically the same. For example, designers often work with users as well as with other involved parties and put every idea to the test until everyone is satisfied with the results. Civil servants on the other hand, are used to thinking for the citizens and present solutions only after all details have been ironed out and approved internally.

Go to www.designthinkinginternational. noordhoff.nl to read the entire article and check out which projects Vera Winthagen is doing at the moment.

Source: Het Financieele Dagblad, 19 October 2017 by Ilse Zeemeijer

'Another way of thinking about complex problems is necessary and urgent.'

— Vera Winthagen

1.1 Introduction

If you google 'design thinking', you will see a diverse set of design processes that all describe design thinking in a slightly different way. The processes that are presented look simple and structured. Easy does it, or so you would think.

Appearances deceive. In reality, design thinking tackles problems in a completely different way than the more traditional and linear approaches. There are designers who talk about a certain feeling that is required to arrive at a good design. This so-called 'touch of the designer' is the reason why design is associated with exclusivity and even veiled in mystery. However, the 'feeling' that is needed to complete a successful design process can be analyzed. It appears that there is a clear way of thinking involved in design thinking that can be summarized in six fundamental attitudes, which can be learned.

FIGURE 1.1 The six fundamental attitudes of design thinking

Experiment

Think flexibly

Work integrally

Imagine

Cooperate

Empathize

1
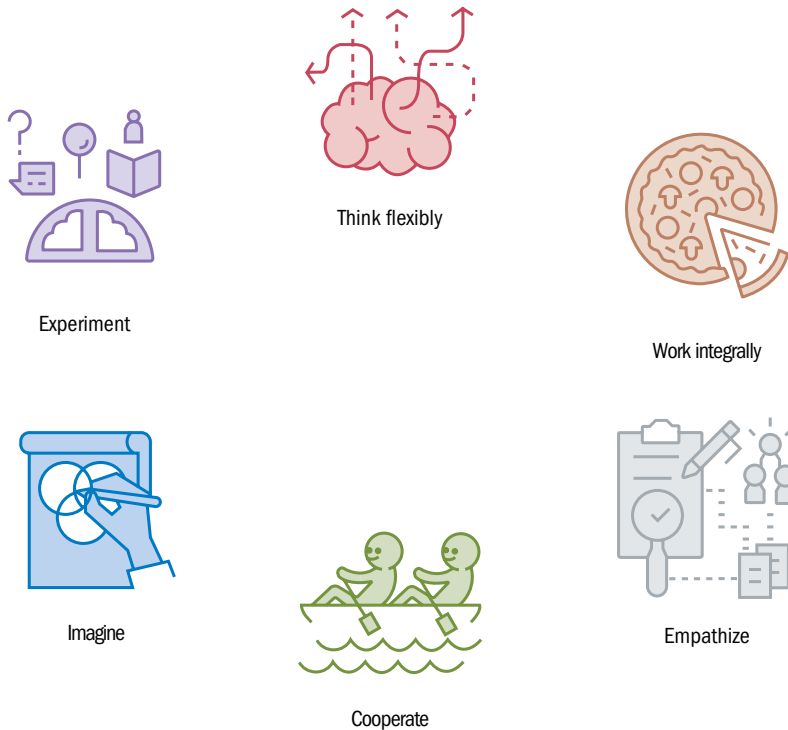
1.2 The fundamental attitudes of design thinking

Design thinking requires a different way of looking at the world. To see the possibilities in the impossible, to make connections that were not thought of before and to work in interdisciplinary teams that challenge everyone to seek solutions for a problem. Design thinking puts the customer first when developing new products and services. In design thinking we believe it is all about channeling imagination and unrelenting experimentation in order to achieve real innovation.

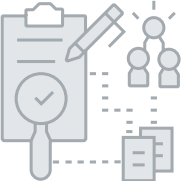When implementing design thinking, six fundamental attitudes are important:
1 Think flexibly
2 Work integrally
3 Empathize
4 Cooperate
5 Imagine
6 Experiment

Design thinking can conflict with the way we learned stuff at school: linear thinking, working towards a single solution as quickly as possible, thinking about every aspect in a rational manner instead of trying out ideas right away and using your imagination. Therefore, it can take some effort to adopt the fundamental attitudes of design thinking. Our brains simply do not like change and when learning new skills, we first need to unlearn what has become an automatic response. People have trouble changing their behaviors. If you are a regular Instagram user and try not to use it for a week, you will notice how hard it can be not to grab your phone.

Fundamental attitudes

Experience shows that people who start using design thinking learn best by doing. Especially if there is a positive impact on one's word when using the fundamental attitudes, the willingness to learn will be greater. In the following sections, we will give you ample opportunity to practise using the six fundamental attitudes of design thinking, so that you can learn to use these 'automatically'. Table 1.1 summarizes the six fundamental attitudes of design thinking.

TABLE 1.1 The six fundamental attitudes of design thinking

	Fundamental attitude	Applications
	Think flexibly	Balance between: – diverging and converging – analysis and synthesis – zooming in and zooming out – optimism and a critical view
	Work integrally	Become a T-shaped person Look for the innovation sweet spot
	Empathize	Develop empathic ability
	Cooperate	Cooperate in interdisciplinary teams
	Imagine	Learn to visualize Storytelling Creating prototypes for visualization
	Experiment	Learn to experiment Develop an eye for serendipity

1.3 Think flexibly

As a design thinker you will continually want to look at things differently by approaching a problem from all different angles. To look at the big picture, then zoom in on the details, to analyze and then to schematize. This requires your brain to be flexible. People with a flexible brain think up interesting new ideas and solutions to problems that others do not come up with. They have an optimistic and positive attitude without losing sight of critical thinking.

1.3.1 Balancing between diverging and converging

Think about a time when you were involved in a project and had to come up with a subject for a group task. A number of subjects were probably proposed pretty quickly but the focus was more on making a choice from a limited number of possibilities. If you want to come up with that one subject that will surprise and be as innovative as possible, you will need to explore more alternatives first. To achieve this, you will need to postpone making choices and focus on creating more alternative choices that seemingly have nothing in common, by brainstorming and making connections. This is called **Diverging** diverging. This entails increasing the number of options to choose from.

**Converging** Converging is working from several solutions or answers to a single solution or answer. Wanting to achieve this too quickly can lead to a forced choice between options. This could be a bad idea because all options may have very worthwhile elements or characteristics. It can also lead to choosing the best answer at that time which, in the final analysis, is thought to be the right answer. Are you going for the best solution at that moment or are you going for the best solution in the long run?

In the short term, it can seem attractive to come up with a solution by converging without first diverging, but in the long run this will not lead to game changing ideas. Balancing between diverging and converging will require learning to use flexible thinking, thus increasing the possibilities for a solution and knowing when there are enough options on the table from which a solid choice can be made.

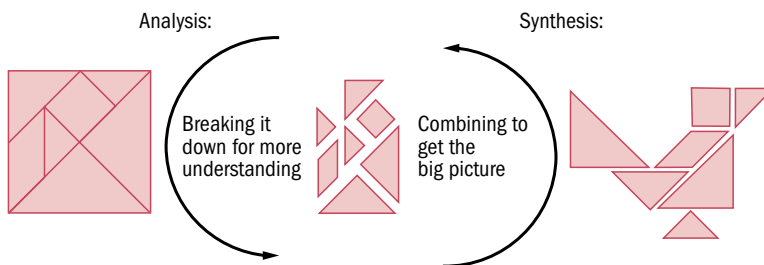**FIGURE 1.2** Diverging and converging
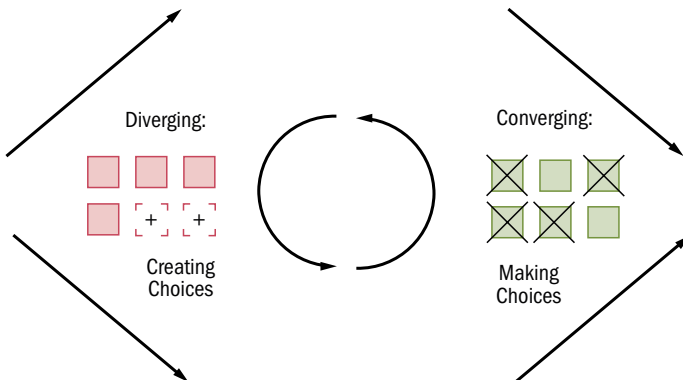
1.3.2   Balancing between analysis and synthesis

It is difficult to understand the world around us without analysis. Analysis comes down to taking something complex apart and then turning it into digestible parts to yield to a greater understanding. This requires you to widen your perspective and gather as much information as possible. By using synthesis, everything that was analyzed can then be interpreted and organized into one story. The raw information from the analysis can be translated into meaningful patterns and new insights. When to use analysis and when to use synthesis is not a question of chronological order. During the entire design process, you will constantly be using both techniques, dissecting the elements of a problem and its solution and then merging them into a larger entity.

Analysis

Synthesis

FIGURE 1.3 Analysis and synthesis

Analysis:

Breaking it down for more understanding

Combining to get the big picture

Synthesis:

© Noordhoff Uitgevers bv

1.3.3 Balancing between zooming in and zooming out

Flexible thinking requires a good balance between zooming in and zooming out. When zooming out, you are looking at something from a distance in order to get perspective and overview. That distance is necessary to see relationships and connections so that you can derive logic from these.

Zooming in on the smallest details is just as important. The key to insight into problems and their solutions is often hidden in the details. Professor Rosabeth Moss Kanter (2011) summarizes it as follows: 'Zoom in, and get a close look at select details - perhaps too close to make sense of them. Zoom out, and see the big picture - but perhaps miss some subtleties and nuances.'

A design thinker is constantly switching between the strategic and the operational level, between getting an overview and working out the details. Both the big picture and detailed picture are essential in solving a design problem.

FIGURE 1.4 Zooming in and zooming out

Zoom in on the smallest details

Zoom out for more overview
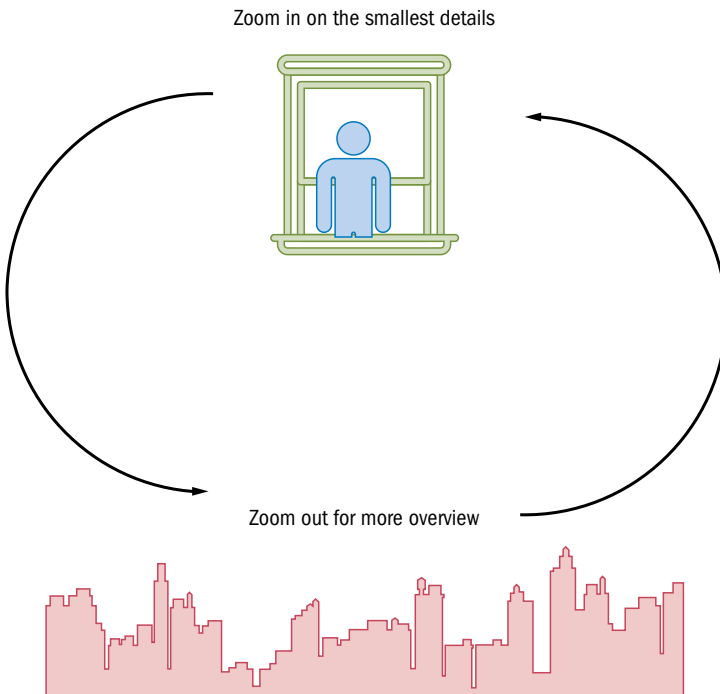
WHAT DO YOU NOTICE?

Here we will show you two photographs taken during the mission to execute
Osama Bin Laden on May 1st, 2001. The president at the time, Barack
Obama, followed the mission in the situation room of the White House.

EXERCIZE

1 Check out the picture below. Based on this picture, try to imagine what
 was going on in the situation room.

1

1

2 Now look at this next photograph below. Again, imagine how things would have been in the situation room at the time.
3 After seeing the complete picture, did your perception of the situation based on the first picture change?

1.3.4   Balancing between optimism and a critical view

Optimism

Design thinkers are known for their optimism and positive attitude towards problems. Entrepreneur, design thinker and professor Ad van Berlo describes this as follows: 'Designers see a glass as always being half full. That is definitely occupational deformation, I have this myself as well. But in a period of major changes, you have two possibilities: either you hold on to the past or see the changes as a great opportunity to make something new. As a designer I want to move forward.'

The way in which a balance is struck between optimism and maintaining a critical view is closely linked to the design thinker's personality. There are always people who look at new situations and the world around them in a more conservative manner. An optimistic viewpoint means that there will always be a positive solution for a problem or that the situation will develop in a positive manner in the future. A critical view will help to reject assumptions and infuse realism in crazy ideas.
Design thinking requires constantly switching between optimistic and critical viewpoints.

'YES, BUT...' OR 'YES, AND...'

Part 1: Split into groups of two. One plays the role of the optimist, the other the pessimist.

The optimist starts the conversation and says: 'I want to go to Thailand on vacation!'

The optimist will now have two minutes to try and persuade the pessimist to go with him on vacation (use the timer on your phone!). The pessimist may only react with: 'Yes, but...' phrases.

- Do you think you will go on vacation to Thailand in the end?
- How would you describe the cooperation?
- How do you feel after doing this exercise?
- What ideas did you get?

Part 2: Now repeat the exercise with both of you playing the role of the optimist. Again, in two minutes the optimist from part 1 will try to convince the other to go with him on vacation to Thailand. Optimist number 2 may only react with 'Yes, and....' phrases.

- Do you think you will go on vacation to Thailand in the end?
- How would you describe the cooperation?
- How do you feel after doing this exercise?
- What ideas did you get?

1.4 Work integrally

A problem is rarely self-contained and not easy to define simply and clearly. By the same token, a solution can not be seen in isolation, from a single perspective. Problems and their solutions are generally too complex for that.

Working integrally means cooperating and connecting with others, in order to create coherence. To come to suitable solutions, professionals will need to link their expertise and actions. The complexity of problems and their solutions require creative problem solving strategies that approach the problem and the possible solutions in the broader context in which they

1

occur. This can be successful if one actively looks for the links with related problems, inside and outside the organization.

Besides being complex, problems continually change. Design thinking helps to look for solutions that are practical but also take the dynamics of the problem into account. In order to successfully implement solutions, all aspects and cross connections must be considered during the entire design process, especially when determining what the problem is and thinking up solutions.

1.4.1 Becoming a T-shaped person

Since the eighties, consultancy firm McKinsey & Company talks about *T-shaped persons*. These people have mastered the fundamentals of WORKING INTEGRALLY. T-shaped persons have specialist knowledge in their own specific field but also have general knowledge of the fields their colleagues are specialized in. Combining this knowledge will lead to more effective collaboration when working on solutions.

T-shaped person

FIGURE 1.5 Becoming a *T-shaped person*

Specialized knowledge in your own field of expertise

Plus general knowledge of your colleagues' fields of expertise
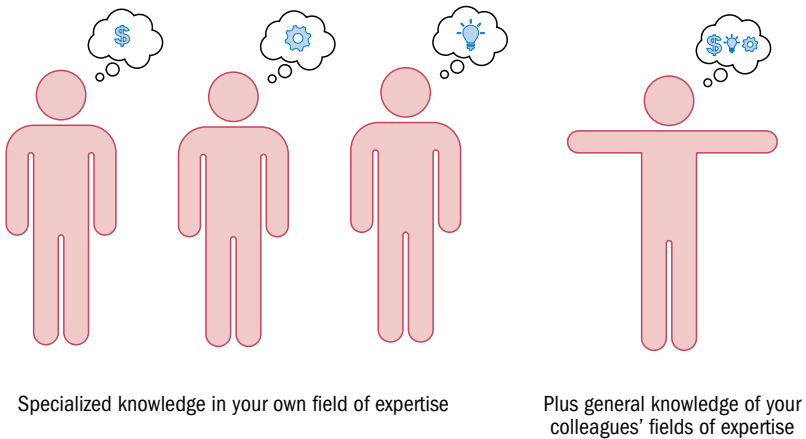
An example will clarify this. Imagine that a group of friends are developing an app. One of them is technically proficient and able to make the app. Another team member is able to translate customer demands into concrete functionalities. Yet another is really good at finding investors and knows how to approach the market. If these friends would only focus on their own areas of expertise, instead of combining their expertise, the app would not be as successful. The messy and iterative design process requires that the friends continually delve into each other's area of expertise so that the technical possibilities are in sync with the functionalities that the customer really needs and with the desires of the investors.

1.4.2   Looking for the innovation sweet spot

A design team finds solutions in the innovation sweet spot by considering the following three factors: feasibility, viability and desirability.

Innovation sweet spot

Feasibility is determined by what is available in an organization in terms of technology, budget, staff or partnerships. The important question here is whether the solution will ultimately strengthen the organization.
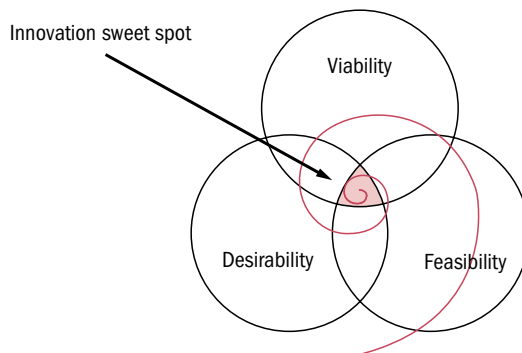
Feasibility

Viability is all about translating an innovative solution to a sustainable business model, meaning that money can be made from this innovation, now and also in the future.

Viability

Desirability focuses on what the end-user wants and how the design team can ensure that the solution reflects this.

Desirability

FIGURE 1.6 The innovation sweet spot

Source: IDEO U (z.d.) (adapted)

1.5 Empathize

Empathy

To meet the wishes and needs of the end-user as closely as possible, it is this end-user who plays a central role in design thinking. A design solution that does not meet the wishes and desires of the end-user is therefore not a proper solution according to the philosophy of design thinking. The fundamental attitude EMPATHIZE is all about understanding the other person as well as being able to step in the other's shoes to get a feel for their world. This is the definition of empathy.

During the entire design process, the design thinker keeps investigating the wishes and needs of the future end-users by empathizing. This can be done via interviews, observation and asking questions via questionnaires. It is only by showing real and structural interest in the customer that the design thinker can gain insight - beyond general assumptions - and can come up with solutions that truly meet the needs of the customers concerned.

● www.limburger.nl, 18-10-2018, by Hennie Jeuken

Students in the world of the patient

Students of Health Sciences at the University of Maastricht immerse in the 'world of the patient' for eight weeks so that they, as future health managers and policy makers, know what happens in daily practice. […] The students have direct contact with patient associations. In groups of three, they do research for a total of fourteen participating organizations. They learn to communicate with patients and discover which issues and problems these patients are confronted with, for example as a result of policy making. 'This is the young generation that will be at the wheel soon. It is important that the health managers of the future know what is going on in daily practice, because these days the patient is more assertive and is a major stakeholder in health care. We do not want our students in an ivory tower', according to university professor Nynke de Jong. […]

Developing empathic capacity

There are four phases in developing empathic capacity (Kouprie & Sleeswijk Visser, 2009). 'Entering the user's world - taking user's point of reference - resonate with the user - leaving the user's world' is the mantra for empathy in design thinking:

1 Entering the user's world starts with discovering his world. This can be via a face-to-face meeting, an internet search or reading a research paper. This sparks interest in the other party.
2 Taking user's point of reference means literally leaving your office or classroom and experiencing the other person's world firsthand, get immersed in this world. This can be achieved by walking/cycling/driving to work with the other person, working together, cooking together, etcetera. In this way, you can gain insight into their mindset. Suspending judgment, is absolutely essential in this phase.
3 Resonate with the other person means, as a design thinker, referring to your own memories and experiences. This creates a connection on an emotional level which is needed to understand someone else's feelings.

In addition, this background knowledge is necessary to give meaning to the behaviors, choices and needs of the other person.
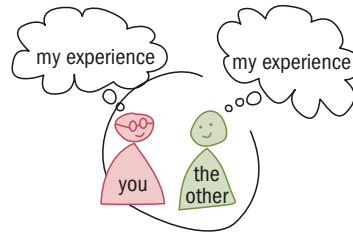
4 Detach from the (future) users altogether and distance yourself from them, leaving the user's world. The trick is to transcend the wishes and needs and look at the underlying driving forces of the other person. By taking a helicopter view, patterns can be discovered that contain the core of the problem and offer new solutions.
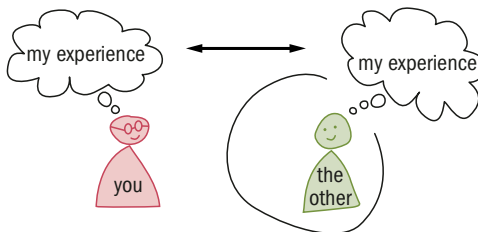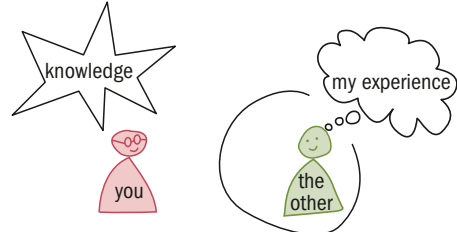
FIGURE 1.7 The four phases of empathy
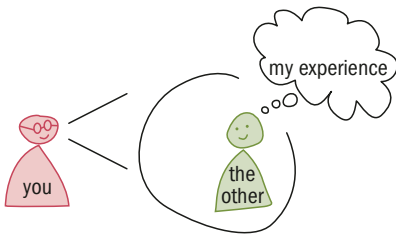
Source: Kouprie et al. (2009) (adapted)

The fourth phase seems contradictory because design thinking puts the customer first but also wants to come up with different kinds of solutions that may not be what the user is actually asking for. However, this is what true innovation is all about: by looking beyond the actual user demands at the underlying driving forces, something can be developed that solves the core of the problem that the customer is experiencing. Henry Ford understood that people wanted to move faster and thought up the production automobile: 'If I had asked people what they wanted, they would have said faster horses.' And Steve Jobs recognized this as well: 'A lot of times, people don't know what they want until you show it to them,' Design thinking uses empathy to develop a service or product that allows users to realize their goals. Do not use empathy to find out what solutions people want but investigate what people feel, think and do and discover why. Translate this into valuable insights and different kinds of solutions.

1

You will never understand it anyway

Japanese politicians thought that the 'Japanese man' should show more understanding for pregnant women because, of all men in the world, they tend to be the least helpful in the household. With a so-called 'empathy belly' around their waist, the politicians set the example. The video about this went viral. Do you also have no idea what it means to be pregnant? But do you think about problems, solutions, products or services for pregnant women? Or do you want to help your girlfriend or sister during their pregnancy? In that case, you can apply the four phases of empathy:

1 Discovering the world of the pregnant woman starts with a first acquaintance. Visit an informative meeting for pregnant women, check out the products that are for sale, check out the website of a midwife or read scientific research about giving birth.
2 Get immersed in the discomfort of pregnancy. Order an 'empathy belly' (yes, they do really exist) and walk around with it for a day.

3 Connect with what you experience. If you are physically tired, answering the doorbell is already an ordeal. If you want to retrieve a bag of potatoes from the lowest rack in the supermarket, you would fall over. Riding your bike with a full shopping bag is not exactly easy either. By referring to such situations that you have experienced yourself, you will gain more understanding of how a pregnant woman feels and what it means to be pregnant.
4 Finally, by detaching yourself from all this, it will be easier to see how you can support your girlfriend or sister. Relieved to be freed of your empathy belly, you will enjoy the freedom to move freely, stretch and bend again. With this in mind and with a fresh view on the matter, you will suddenly see what your girlfriend or sister needs and how you can develop products and services for pregnant women.

1.6   Cooperate

Applying design thinking is a team effort. This means that in every design process, a design team is set up in which the team members cooperate to come up with new solutions to (complex) problems. The picture of the solitary designer who comes up with brilliant ideas on his own is herewith discarded.

Design team

1.6.1   Get the best out of yourself and others

Cooperation starts with getting the best out of the other team members instead of forcing your own opinions, ideas and solutions on others. It is all about building on the ideas of others. An initial idea can become a truly valid idea via interaction. Without the comments, ad-libs or jokes of a jovial colleague, an idea might never have seen the light.

Cooperation in a design thinking context does not always mean that everything is a group effort. By working separately on a regular basis, everyone can contribute their own specialized subject matter expertise and unique qualities to the design process. These moments of individual thoughts and reflection are needed to effectively contribute to the design process. Besides cooperation within the team itself, a cooperative attitude is needed to involve end-users, subject matter experts, managers, sponsors, creative thinkers, technological whizzkids and other stakeholders. They will all add value to the final solution. In design thinking, cooperation is all about how an individual can have a positive influence on the dynamics within the team, and how the team can involve others in such a way that creative solutions for the design problem can be found.

1.6.2   Successful teams

Most organizations have an organigram depicting their divisions and departments. You can see the hierarchical relationships within the organization and these days there often is a separate innovation department included. Design thinking regards innovation as part of everyone's job and sets up a design team based on relevant expertise, attitudes and competencies. A design team works across the organization. In other words, a separate department or manager is not responsible for solving a design problem but the whole organization is. Design thinking assumes a great deal of autonomy on the part of the design team. Managers who are focused on micro management may find this autonomy challenging. It is important for the design team to keep communicating, not from a hierarchical and accountability point of view but from a feeling of intrinsic motivation to involve others in the design process.

Google's HR department studied the characteristics of the most successful teams within the company. A total of 180 internal team members were interviewed. The generic conclusion was that team dynamics were responsible for a team's success and not the sum total of all the talents of the individual team members. The following five traits were considered the most important for successful teams:

Successful teams

1 **They establish psychological safety**. Psychological safety within a team means that team members dare to take interpersonal risks. They feel free to make contributions without asking themselves whether the

contribution is 'smart, good or relevant' enough. In a 'safe team' an idea which is contributed may be incorrect but is not labelled as 'a failure'. Also, harsh feedback can be given in a 'safe team' without the members feeling they are personally under attack or that the team spirit is compromised.

2 **They require dependability**. In teams it is a requirement that people feel dependent on other team members. This ensures that team members stick to deadlines.

3 **They have a clear structure and clarity**. Team members need to get freedom and trust from their managers, micro management is killing. Within the team, a clear structure and boundaries give each individual team member the space they need.

4 **They give each of their members meaning**. Each team member should be able to add value to the team. This gives team members the energy and enthusiasm for the task at hand.

5 **They have a purpose**. Teams that are convinced that they are contributing to the greater good, show more effort, motivation, enthusiasm and energy in working towards the best solution.

In a successful design team, team members will be different from each other. Therefore, focus on each other's qualifications and know each other's weaknesses. It is each individual's unique specific knowledge and skills that make a strong team. The advantage of having differences between team members is that each member looks at the design problem from their own perspective (based on their knowledge, skills, cultural background and other characteristics).

Teacher Inge Rijnders observes that in practice students prefer to see each other as equals: 'To see each other as equals is easier than having to check out everyone's qualifications and weaknesses'. The ambition of a design team is to create an interdisciplinary team composed of T-shaped persons. That means that there is not only a sum total of the knowledge and skills of the individual team members as in multidisciplinary teams (1+1=2), but that team members also look for synergy in the knowledge and skills of the individual team members (1+1=3).

1.6.3   Work on working together
You can learn about the fundamental attitude of COOPERATE by adopting a cooperative mindset.

Working together

Gorodsky and Rubin (2014) give a number of tips that help to make a team successful:

Cooperative mindset

- **Know each other's strengths**. Be a band of superheroes and contribute your own strengths (specialization) and accept other people's weaknesses.
- **Leverage diversity** by being a pain in the neck. The difficult team dynamics do not outweigh the contribution that your 'being different' makes for the final solution.
- **Get personal** and teach yourself to be a 'complete person' when you are at work. Also share personal matters. This increases engagement with others.
- **Build a relationship** with each other and with the outside world. Do not underestimate the value of a network!
- **Craft your team experience in advance**. Make clear how you want to work as a team: what principles will be adhered to, how members are going to help each other, what the team wants to achieve and what the team is satisfied with.
- **Have fun**! Spend time with the others by going to the pub, playing games, exercising together or doing something else to relieve tension and bring in some humor. The 'wasted' time more than pays for itself.

PAIN IN THE NECK OR PRANKSTER?
Think of the times that you have worked together in a team.

EXERCIZE

1 Which of the tips from Gorodsky and Rubin have you applied before?
2 Which would you like to apply?
3 Could you be both a pain in the neck and a prankster?

Design thinking demands a lot from the cooperation between members of the design team. The team goes through a collaborative process with highs and deep lows. An experienced design team knows that things will ultimately work out. However, a design team with less experience can become quite discouraged, if only because assumptions have to be reviewed time and time again, or have to be revised, or that not all (individual) ideas are accepted by the team. Good ideas may be rejected, prototypes may not work, etcetera. Project members display behavior according to a fixed pattern (see Figure 1.8). In the beginning there is enthusiasm: 'This is what we are going to do!' (1). Then it becomes more difficult than expected with a first dip in the project mood (2). When insights are collected and ideas arise from this, it seems to work anyway (3) and this strengthens the team spirit. At this point in time, things become more concrete and definitive. There is no way back, and uncertainty strikes (4). By

maintaining a positive attitude, the team will come out of this crisis. In the end the feeling of 'we are doing well' (5) will prevail.

FIGURE 1.8 The project mood graph
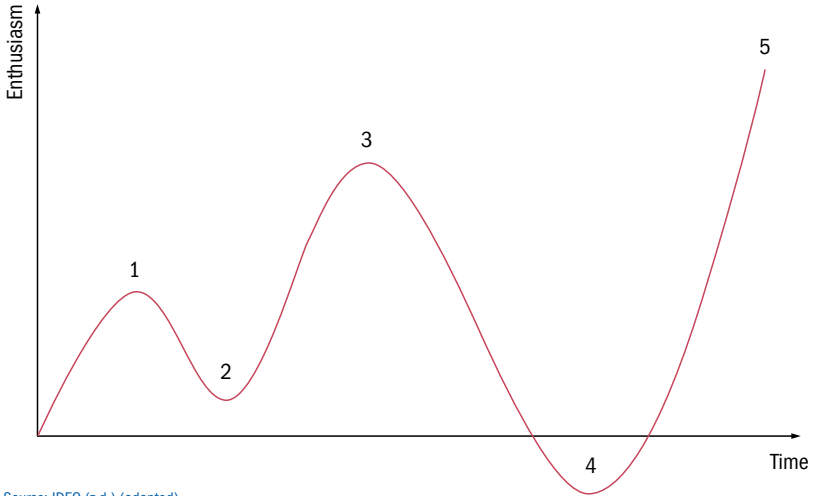
Source: IDEO (z.d.) (adapted)

1.7 Imagine

Whereas kids in first and second grade of primary school may still build and draw stuff to their heart's content, in their subsequent school career the emphasis is placed on finding the right words to understand each other or convey a message. Design thinking preaches: 'Imagination says more than a thousand words.' This fundamental attitude is about: 'Show, don't tell'. Make sure you have sketches, videos, a performance, animations, prototypes and so on to show how an idea will turn out as it continues to be worked out. Let those involved experience the solutions instead of hearing about it. This fundamental attitude is not just about conveying something to the other person, but also helps design thinkers to improve their own thinking about ideas and solutions. This can be achieved by making research data clear in an infographic or by writing down initial ideas that stimulate the creative mind.

1.7.1   Learn to visualize

Whoever uses his imagination will notice that in doing so, a message is more easily transferred, becomes more attractive and is actually better remembered. **Visualizing** helps to picture information and makes it more expressive. This can be done at any stage of the design process. By taking pen and paper and by using a rough infographic, creating a mind map, drawing some quick doodles or symbols and linking images to an idea, you can use simple visualization techniques that not only help those involved and the team, but also help you with the design process. Kosara (2007) uses the term 'pragmatic visualization' for visualization techniques that generate many ideas quickly, helping to discover alternatives that can initiate a discussion.

Visualizing

Pragmatic visualization

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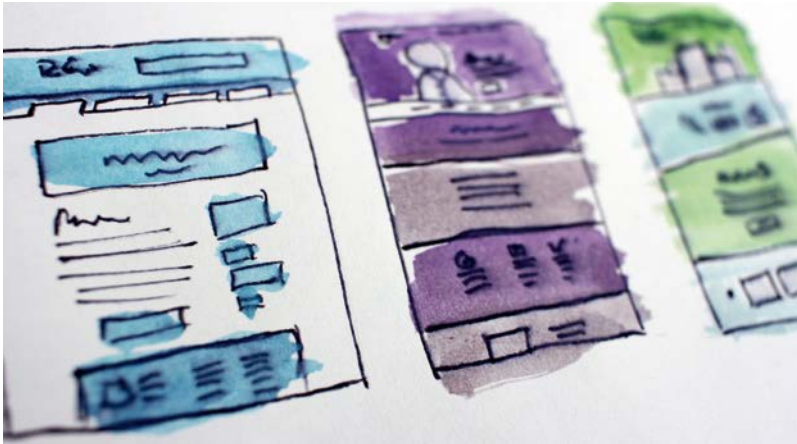
PRACTISING SKETCHING

Whoever thinks they can't do anything with pen and paper: *ugly can actually get the job done just fine*. Rediscover the creative child within yourself that drew stuff - without thinking in terms of 'beautiful' or 'ugly'.

EXERCIZE

1 In five minutes, come up with as many ideas as possible for squeezing one single orange without an orange press.
2 Grab a pen and paper and sketch the ideas you have come up with. Take fifteen seconds each time to make a quick sketch of the idea that:
    a   can also serve as a toy;
    b   will surprise people on the beach;
    c   will surprise people on the train;
    d   scares people;
    e   makes that you will immediately buy a bunch of oranges;
    f   shows what pressing of oranges will be like in the year 2080;
    g   ... (come up with a criterion yourself);
    h   ... (come up with a criterion yourself).

Was the sketching not so bad or disappointing? Did you gain new insights during the sketching? Did you get completely different ideas?

● www.advocatenblad.nl

Words in drawing

It was no longer possible to make any sense of the case that lawyer Maurits Fornier (32) was involved in a few years ago at Freshfields [one of the oldest international law firms in the world, ed.]. He therefore decided to make an overview drawing and submit it as a procedural document. Fornier is experienced in graphic design. As a high school student he had already made websites for local retailers. 'Look, it is about this and not about all the other subjects', he told the judge based on his illustration. The other party were overwhelmed but did not respond to the illustration and submitted their own plead. After ten minutes the judge interrupted the other party: 'Good, but where are we now in Mr. Fornier's drawing? 'At that moment Fornier knew that he wanted to continue combining imaging and law.

Since then, Fornier has continued as a lawyer or legal designer via his own company and is hired by his professional colleagues to provide insight into difficult issues. He recently converted a large legal framework agreement into an A3 poster. He explained provisions that are relevant to employees in the workplace via a single sentence, using pictures and colors. He also made a visual step-by-step plan for an extensive international restructuring. Each step in the plan got a check box as a playful element.

'There was a great deal of coordination work involved for the lawyers, tax specialists and notaries in terms of who did what and what still had to be done. This visual plan was an easy guide for them. Their weekly telephone discussions became much shorter because of this.'

A legal contract by Maurits Fornier

1.7.2 Storytelling

If you still want to use words, package the message in an attractive, personal or metaphorical story that appeals to the imagination. Storytelling is the use of stories to depict something. So make sure you have a good story, such as in this radio advertisement: 'You are on the train on your way to work. You hear someone calling ... No, there is no one on the phone, it is a Chinese conductor asking: Do you want a warm towel for your face? Because you are not on the Intercity train to work, you are sitting in the Trans-Siberian Express, to Beijing. You open the window...'

Storytelling

Figure 1.10 shows the structure of a good story. The story starts with a sketch of the situation and the introduction of the main characters. The story is triggered by a so-called trigger moment: something dramatic or unexpected happens and the tension builds up to a climax, (preferably based on a number of sub-climaxes), after which the tension is reduced again. In storytelling, it is important to carefully consider when and which information will be given. We are used to asking ourselves ('which information do I want to send?'), while the question should be: 'what information does the listener need and at what time, to fully understand the message, and more importantly, to embrace it?'

FIGURE 1.10 The structure of a good story
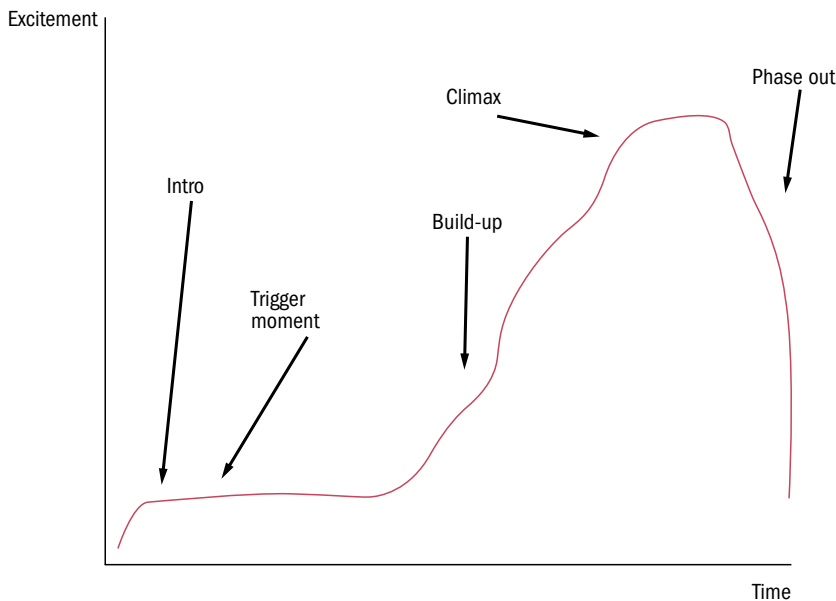
Source: Nijs & Peters (2002)

Liebrecht (2018) elaborates on this and summarizes the theory of Sanders (2017) by identifying the following elements of a good story:
- The story consists of actions and events.
- One or more people are present who are working towards a plot.

- The story is written in the first person; this has more impact than writing in the third person.
- It contains direct quotes; citing is more effective than paraphrasing.
- Time changes take place in the story; switch between the present and the past.

GOOD STORY

1 Read the Liebrecht blog and watch the video on www.designthinking international.noordhoff.nl.
2 What steps for building a good story do you recognize in the video?
3 Which elements of a good 'Sanders story' do you recognize?

1.7.3   Creating prototypes for visualization

A prototype represents the elaboration of a concept into something concrete. This can be a visualization, but also a 3D model, role play or (a partly) functioning piece of software. Prototypes are not only intended to give a concrete elaboration of a concept created by users and others involved, but can be tested as a possible solution for the problem(s) or issue(s) that are experienced. Prototypes can also inspire the team to come up with other ideas by physically building something together. Tim Brown (2008) calls this 'build to think'. In making prototypes, design thinking asks you once again to go back to your childhood in which you touched everything, built endless castles with sand, twigs and water or designed your own world with Lego. It didn't bother you if you had to start over, again and again, if for example, the sea washed away your structure; you stayed with it and used your imagination to make something you could see, hear, smell and touch. Making prototypes right from the first phase of the design process, ensures that the design team can fail quickly and cheaply. Making a prototype forces the team to split a solution into smaller parts to be tested. By analyzing and synthesizing each part separately and by zooming in and out, 'mistakes' can already be discovered and corrected at an early stage. It is also possible that via this process, entirely new concepts arise, which in turn, can be worked out in a prototype.

Think carefully in advance about what you want to achieve with a prototype. Also remember what you need: sometimes a partial prototype will already give you sufficient information about an idea or a solution.

Guido Stompff (2018) uses the following guidelines for this:
- Is the prototype primarily intended to convince others? Make the prototype more beautiful than in real life (often used by architects in the form of a scale model).
- Do you want future users to test solutions with the prototype? Make the prototype understandable and functional (software that is tested by frequent users).
- Does the design team have to make a decision about the details of the concept? Ensure that the prototype shows the essence, i.e. the concept(s) behind the solution.
- Does the team want to explore solutions? Make simple and quick sketches to depict the different concepts.

Chip in your arm

It is good to think in advance which level of precision would be best for the goal that you want to achieve with a prototype. In a design project an idea was developed to enable students to pay for all kinds of services on the college campus using a chip in their arm. The idea was worked out by building an extensive prototype using a mannequin and a technical representation of the chip to make it possible to role play all kinds of situations. The aim was to determine which practical barriers a user would come up against if he wanted to pay with a chip in his arm. After the complicated exercise with the mannequin and the technical representations of the chip, the design team discovered that sticking a simple sticker on someone's arm, to simulate paying for services in real life, was more efficient and effective in testing the idea.

1.8 **Experiment**

Experimenting is learning by doing. It starts at the beginning of a design process and ends after successfully implementing the solution for the design problem. This fundamental attitude is based on making mistakes, falling, getting up again and giving 'crazy' ideas a chance. This principle can clash with an (organizational) culture in which linearity, certainty and avoiding errors, are highly regarded.

'Failure is not the opposite of success, it is an integral part of success.'

— Arianna Huffington, co-founder and editor-in-chief of The Huffington Post

The myth of the never failing genius

The audience applauds for a great piece of music from a brilliant musician or for a Nobel prize-winning scientist. People often believe these are exceptional talents or smart people who can turn everything they touch into gold. Simonton's research (1999) shows that the opposite is true: these talents fail a great deal. The difference with 'normal' people is that they are not afraid to try something out and do not stop when it appears that something is not working. Their brilliant musical pieces or scientific finds do not arise because they 'achieve instant success' but simply because they experiment a lot. If you want more success, prepare yourself for throwing away more failed experiments.

Experimenting offers many benefits:
- It clarifies your own thinking if your assumptions prove to be incorrect based on the results of the experiment.
- It does not have to cost a lot, but not experimenting can cost an organization dearly. By not taking the time to experiment and working out an idea extensively in advance, solutions can be brought to the market where they are not accepted by the customer. Early recognition of errors in our way of thinking or working ensures that the design team can adapt and start again. Failing fast is good!
- Experimentation reduces uncertainty and the sense of risk. Successful experiments confirm that the design process is correct but 'failed' experiments may deliver an even greater source of information. Even if he fails, experimenting always provides the optimistic design thinker with something.

'Don't worry about failure: you only have to be right once.'

— Drew Houston, founder and CEO Dropbox

Return on learning

At ABN-AMRO bank, the term *return on learning* was introduced for experiments which do not succeed, but do provide a learning experience. These learning experiences are widely shared because of the increased learning effect in the organization. This is done via various design teams, internal communication and so-called *return on learning events*. 'Those are actually parties where we celebrate failed experiments, in addition to successful ones, of course' said Tessa Mulder, design thinker at the bank.

Design thinking is impossible without an experimental attitude. An experimental attitude is a playful, curious attitude, but also a critical attitude where you are not easily satisfied and you do not accept the first option that comes up. 'If I can come up with one idea, then there are probably more' and 'you learn the most from mistakes' are typical design thinking attitudes.

In their book *Creative Confidence*, the Kelley brothers write that for experimenting it is especially important to cultivate serendipity. Serendipity means that you find something valuable without looking for it. Pek van Andel calls this phenomenon 'unsolicited finds'. The French chemist Louis Pasteur said: *'Le hasard ne favorise que les esprits préparés'* (chance favours the trained mind). The Kelley brothers summarized this perfectly, coincidence prefers people who do a lot of experiments while keeping an eye out for the unexpected. So an unsolicited find is different from pure coincidence: those who don't pay attention, don't see the opportunities. Serendipity is a choice!

Serendipity

A Nobel Prize by accident?

History has many examples of serendipity. Charles Goodyear discovered how vulcanization worked because he accidentally spilled a combination of rubber and sulfur on an oven and Post-it notes came from a non-sticky glue that turned out to be very suitable for temporary sticking applications. In 1945 Alexander Fleming received the Nobel Prize for Medicine for his 'discovery' of penicillin. Fleming had conducted research into staphylococci (bacteria) and cultivated them for microscopic examination. After a short holiday break, Fleming discovered that one of the petri dishes with bacteria had remained uncovered and that on this particular dish a blue-green mold was formed. The mold that emerged turned out to have secreted a bacteria killing substance: the discovery of penicillin was a fact.

Peka Kroef

If you buy a potato product in a Dutch supermarket, chances are they probably come from one of the Peka Kroef factories. Peka Kroef is based in Odiliapeel and is one of the largest potato-processing producers in The Netherlands. The company does not only supply to supermarkets, but through wholesale, also to other companies and restaurants. Peka Kroef saw growth opportunities for this market and their market analyses showed that sales to professional chefs were consistently lacking. To check out all options and not immediately get into a solution mode, a design process was started with the main question: How can Peka Kroef better cater to the actual wishes and needs of the user? This way of troubleshooting needed some getting used to. Harm Zom, Sales Manager Foodservice & Industry at Peka Kroef: 'Design thinking differs a lot from the way we used to work and was initially received with skepticism. In the course of the project we started to really understand design thinking.' The interdisciplinary design team (sales, marketing and product development) that was set up, worked together intensively and had one common goal: understand the professional cook on a deeper level and come up with integral solutions to his problems.

'By involving different people whom we initially would not have thought of, we got a lot more support and valuable information from different angles'. Initially, the design team thought they knew enough about customers and end-users to be able to stimulate sales to professional chefs. But the team was surprised by new insights after having conversations with focus groups and observing professional chefs. The chefs were continuously followed during cooking in order to really be able to relate to them: what the chefs do, think and feel like when they are on the job. For example, if fresh potatoes were available, these were almost always preferred. Instead of using ready-made mashed potatoes, the chefs preferred to puree prepackaged potato slices themselves. Cooking potatoes was something they could do blindly but what about using pre-processed unpeeled potatoes? And why would they use them? The wholesaler delivered new products several times a week and they did not have space for a large stock of potatoes anyway. Contrary to what Peka Kroef had assumed for years, shelf-life of the products was not so important as expected, but packaging was. Harm Zom: 'We thought we knew it all beforehand but the outcomes of the focus group and the observations were extremely surprising. At the end of the day, some persistent assumptions we had about how the end-user thought about shelf-life and packaging were dropped.' The assumptions that proved false had been the basis for decisions that were made in the past and the reason why this market segment had lagged behind.

QUESTION 1
Which of the six fundamental design attitudes do you recognize in this case?

QUESTION 2
Do you miss some fundamental attitudes? How could the design team have used them to come to the end result?

'It was smart using a certain way of asking questions and using the design thinking process to achieve the end results we got.'

— Harm Zom, Sales Manager Foodservice & Industry Peka Kroef