



MODULE II

A WORLD OF DESIGN THINKING TECHNIQUES

Chapter 1

Empathise

Define

Ideate

Prototype

Test

GENERAL OBJECTIVE

Design thinking is a process related to the cognitive, strategic and practical processes by which design concepts (propositions for new products, services etc.) are developed by designers and/or design teams. The purpose of this method is to solve problems, create new, innovative products, services or processes by identifying the real needs of a single user. In this module, different phases of the Design Thinking process are presented. The most popular model of the design thinking process consists of 5 stages that are aimed to develop some solution to the problem (service or product). However, it is important that the design thinking process is not linear and many techniques support the multiple interpenetrations of subsequent stages.

The first stage, the empathy phase is about seeing the user's perspective (products, services) and understanding their needs. At this stage, all data about the user are obtained, for instance about: education, lifestyle, character and attitude towards a service or product, relations with other people. In order to implement this process, various tools are used, including an empathy map or ethnographic interviews. The information obtained during this stage determines the work in the next stages of the design thinking process.

The process of defining the problem consists of summarization of the data collected during the first stage and determination of the real needs of the user. The information collected during this process allows you to carry out the analysis of potential changes to the product or service to meet the user's requirements. The research material obtained at this stage should be exhaustive enough to enable the creation of a realistic description of the situation, thanks to which it will be possible to determine the problem.

Third phase - the generation of ideas stage is about creating ideas that respond to a process issue established during the diagnosis of needs

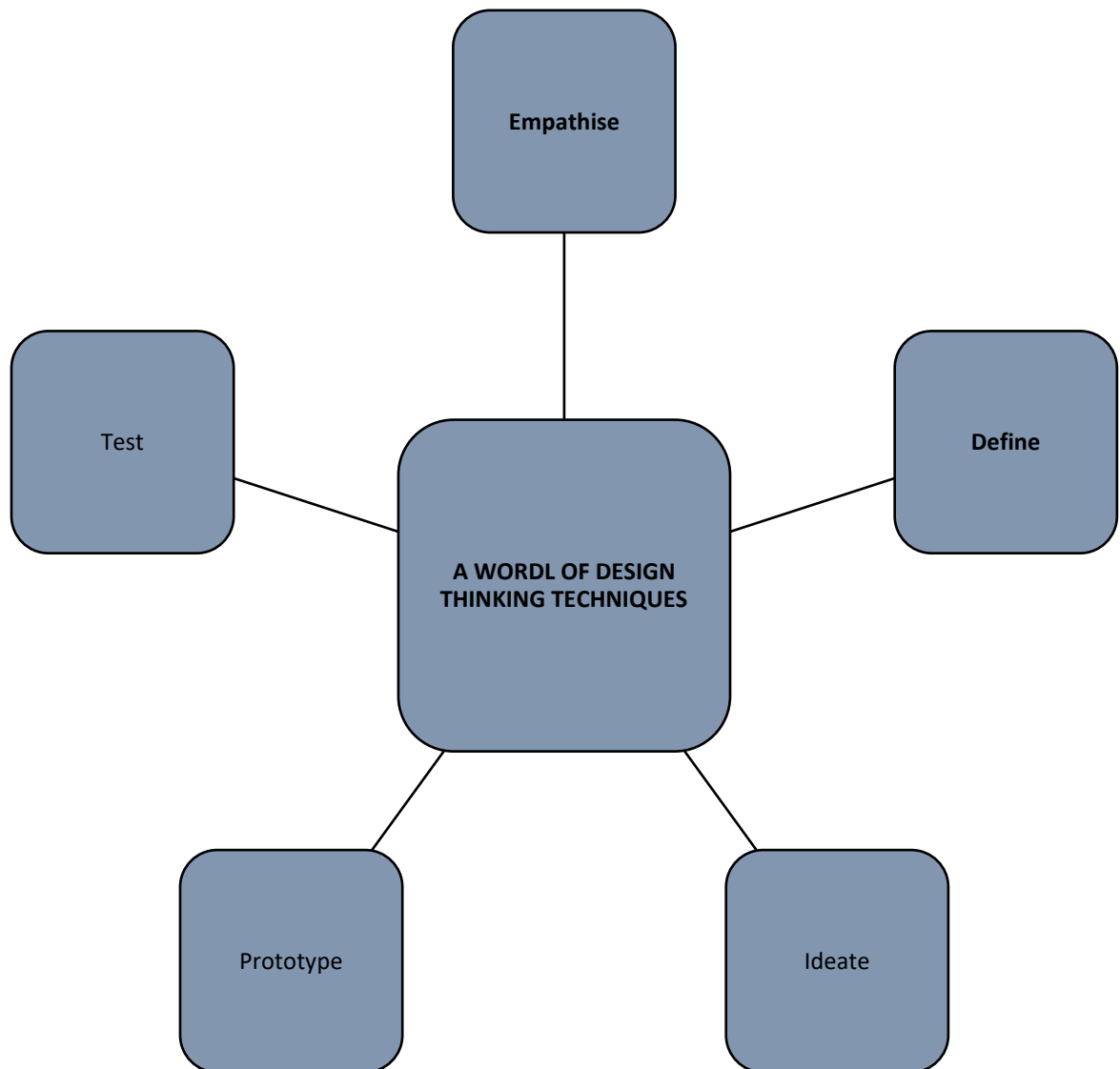
Then, prototyping is one of the most effective visual analytical techniques used to obtain validation of user needs through the iterative process of building a model or design. It is also used to optimize user experience, evaluate various design options, and as a basis for developing the final solution. Prototypes are divided into 2D prototypes (e.g. diagram, storyboard) 3D prototypes (e.g. mock-ups) and enacted prototypes (e.g. story). Each of these types can be combined with another.

The next stage consists of testing the solution in a real user environment. People who are testing new products or services should have as much in common as possible with the user profile created during the previous stages. If testing fails, you need to go back to the previous stages of the design thinking process or start over again.

SUMMARY

This module describes the process of carrying out the various phases of the Design Thinking process. It focuses on the five-stage Design Thinking model proposed by Hasso-Plattner that are as follows: Emphasize, Define (the problem), Ideate, Prototype, and Test. The module includes ideas, scenarios and plans for teams/organizations and suggestions for tools. The main goal is to help the team to come up with precise solutions to address the issues that they have and to think outside the box. The manual is divided into sections, each section includes a short description of the phase and at least two different methods that can be used within that stage - it is clearly and simply structured, which makes it easier to focus on the content. With repeatability in mind, it is developed following the principles of graphic design.

CONCEPTUAL MAP





Chapter 1

Empathise

Techniques

Design thinking strategy cannot function without a deep understanding of the people we are designing for. It is crucial to empathize (see Figure 3) with the people you're designing for so that you can understand their needs, thoughts, emotions and motivations. As mentioned in the previous chapter, if you want to empathize with some users, you should try to adopt the mindset of a beginner, which means that you should try to observe the world without your assumptions and experiences.

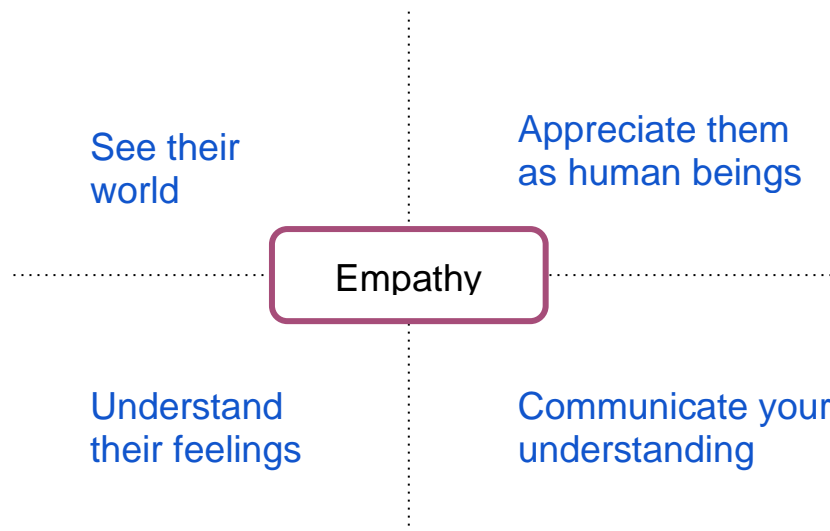


Figure 3 Empathise with your users. Resource: <https://www.interaction-design.org/literature/article/stage-1-in-the-design-thinking-process-empathise-with-your-users>

There are a variety of methods that you can use to learn more about people. In this chapter, three methods are presented: problem statement, ask 5x “Why” and empathy methods.

PROBLEM STATEMENT

A problem statement, or point of view (POV) statement aims to identify the gap between the current statement and the desired state of the whole process. Within design thinking strategy you can think about the problem as an unmet need, an ideal state that is user-centred. A solution that you design in order to meet these needs is meant to satisfy a potential user. A problem statement gives a clear description of the problem that you want to address. It is crucial to construct a problem statement as it is essential to navigating the whole design process. The goal is to articulate the problem in a way that everyone can see its proportions and feel inspired to find a solution.

A problem statement should be human-centred - describe the issue taking information about the user. It should also have the right scope: broad enough to give a space for creative freedom and narrow enough to be practicable, so you can find specific solutions. Moreover, it should be based on action and be assumption-free.




How can you use a problem statement tool?

- Develop a common understanding of a problem with the clients and on the team.
- Formulate the collected findings from the problem analysis in a design challenge.
- Outline the direction and the framework for ideation.
- Create a basis for the formulation of targeted “How might we...” questions (HMW questions).
- Develop a reference value for the subsequent measurement of success.

As an example of the procedure presented above, based on the four questions (why, who, when, how), you could frame your problem as “Our young working professional struggles to eat healthily during the week because she is working long hours. Our solution should deliver a quick and easy way for her to procure ingredients and prepare healthy meals that she can take to work” (Stevens, 2021).

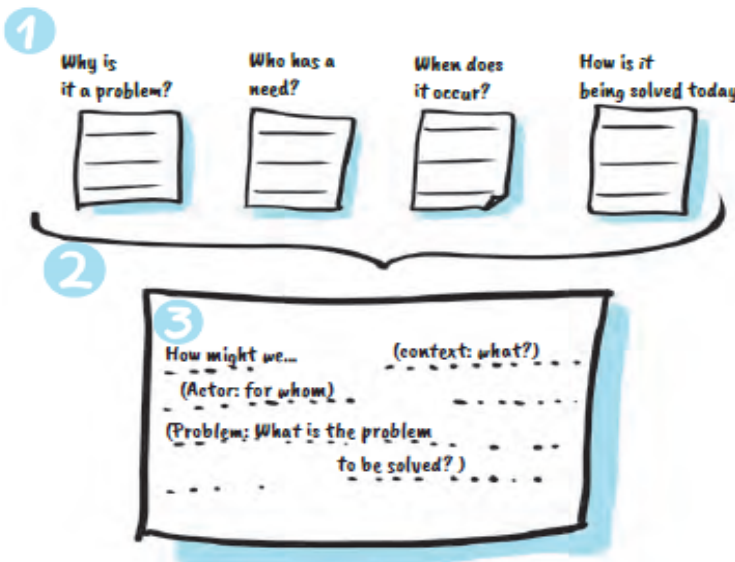
How much time and what materials do we need?

Figure 4 Problem statement (resource: (Lewrick, Link, Leifer and Schmidt, 2020)).

 <p>Group size</p> <ul style="list-style-type: none"> • Ideally, in a group of 3-5 from the design team • Optionally, 1-2 stakeholders or the client (if available) <p>3-5</p>	 <p>Typical duration</p> <ul style="list-style-type: none"> • Formulating normally requires some time as well as blood, sweat, and tears. • Short cycles of at least half an hour are useful. <p>30-40 min.</p>	 <p>Materials needed</p> <ul style="list-style-type: none"> • Pens and Post-its • Several sheets of A4 paper in portrait and A3 paper in landscape • The structure of the question can be given as a fill-in-the-blank text
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Procedure: Problem statement

How the tool is applied...



- Sketch the structural elements yourself on the sheets of paper or use the template.
- **Step 1:** The following questions (problem/actor/context) help with the formulation of the problem statement:
 - ✓ What is the problem? Why is it a problem?
 - ✓ Who has the problem? Who has a need?
 - ✓ When and where does the problem occur?
 - ✓ How is it solved today?
- Write down the questions on several A4 sheets (portrait) and leave enough space for answers underneath.
- Use different colors for the questions and answers and write legibly and as large as possible.
- Produce at least 10 of such problem definitions.
- **Step 2:** Attach these papers to the wall and put an A3 sheet in landscape layout underneath them. Then consolidate the problem definitions or select the most appropriate, for example, through dot voting (see page 159).
- **Step 3:** Start transferring the individual problem definitions systematically into an overarching problem, for example, in the form: “How might we redesign... [what?] ...[for whom?] ...so that...[his need]...is satisfied?”

ASK 5X"WHY"

The five whys is an easy research method that can help you to define the deep motivations and beliefs that underpin a person's behaviour. You'll start with broad questions like "Do you often do sports?" or "How was your holiday this year". Next, by asking why five times you'll get to some answers to make problems more complex. This can be a great method to use if you're trying to get at the human and emotional roots of a problem.

You'll ask 5x "Why?" to understand the situation and the true causes of a problem. This questioning technique can be used whenever we ask questions and observe a user and want to explore critical experiences and functions of a problem in a more in-depth way. Asking repeatedly also helps us to identify hidden problems that a user would not mention if only asked once. In this way, we gain insights on a different level and are better able to assess situations. If we use this interviewing technique in the "test" phase, it may help us to understand more exactly what functions and experiences work and which need to be adapted or should be discarded.




5x "why" method:

- Discover the true cause of a problem.
- Develop a sustainable solution.
- Dig deeper and get to know more than just exploring the obvious symptoms.
- Dig deeper and deeper to gain new and surprising insights.

Steps:

- 1 Ask a broad question about your Interview participant's behaviors then ask "why" to their response five times in a
- 2 Remember that you're not asking a horizontal questions.
- 3 Write down what you hear.
- 4 Keep in mind that you might not get to the core stuff until the fourth or fifth "Why."

How much time and what materials do we need?

Group size  2	Typical duration  30–40 min.	Materials needed  <ul style="list-style-type: none"> • Notepad and pen • Smartphone or camera, if the interview partner consents to the recording
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Template: 5x why

- 1 Detailed description of the problem.

1. Why is it a problem (problem description)?	2 Consequence
2. Why?	What is the problem? What are its symptoms?
3. Why?	Direct impact Why does the problem occur? What technology is used?
4. Why?	Cause – effect What could be another cause of the problem?
5. Why?	Organizational hurdles How could the problem be avoided?
	Systematic hurdles The systematic approach might prevent the occurrence?

How the tool is applied...

- Use the template or write the answers on a blank sheet of paper.
- **Step 1:** Describe the problem in as much detail as possible and use photos or sketches to illustrate it.
- **Step 2:** Start with a “root cause” analysis and ask “Why?” as often as possible. Try to counter each answer with a follow-up why question.
- Stop asking “Why?” once it no longer makes sense. Then explore another problem in this way or get into an in-depth discussion with the interviewee on the answers given.
- Integrate simple prototypes and sketches into the solution discussion to obtain first reactions from the users.

Variation:

In addition to “Why?,” you also ask 5x “How?” Use this interviewing technique to find a lasting solution to the “root causes” of the problem. With the “Why?” questions, design thinking teams can review the problem; with the “How?” questions, they can determine how to solve it.

Figure 5 Ask “5x why” (resource: (Lewrick, Link, Leifer and Schmidt, 2020)).

EMPATHY MAP

An empathy map is the next tool within the first phase of Design Thinking that you can use for empathetic target group analysis. It is used to identify the feelings, thoughts, and attitudes of existing or potential users and customers and understand their needs. The aim is to obtain in-depth insights on the potential user using why and how questions. We use the empathy map mainly in the “understand,” “observe,” “define the point of view,” and “test” phases.

Document the insights from observation or testing with users and capture the user from different perspectives to build empathy. Understand better where the user has problems (pains) or potential benefits (gains) and infer his tasks (so-called jobs to be done). Collect findings to create a persona. Summarize observations concisely and record unexpected insights.

How much time and what materials do we need?



2-3

- A team of 2 per interview is ideal.
- One person documents and records, while the other person poses the questions.

Typical duration



20-30 min.

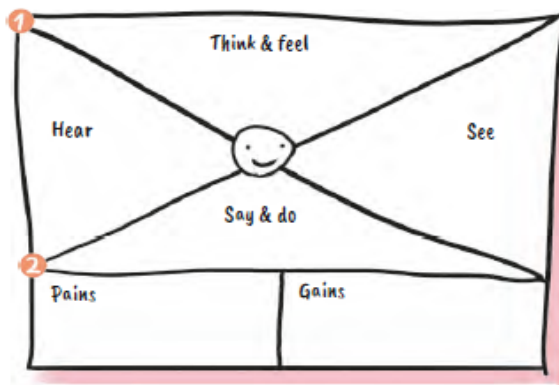
- Usually 20-30 minutes or as long as the interview or conversation lasts.
- The inference of a task to be performed can take some additional time since the "job to be done" is often not obvious.

Materials needed



- Print several empathy map templates in A4 or A3
- Pens and Post-its in order to write the essential points on the empathy map

Template: Empathy map



How the tool is applied...

- In the empathy map, we explore "needs." We think in terms of verbs (activities) for which the user needs help, not in nouns (solutions).
- Outline the layout on paper or use the empathy map template.
- **Step 1:** Fill in the fields in the template during (or just after) the interview.
 1. WHAT DOES THE CUSTOMER/USER SEE?
 - What does his environment look like?
 - Where is the customer? What does he see?
 2. WHAT DOES THE CUSTOMER/USER HEAR?
 - What does the user/customer hear?
 - Who influences him? Who speaks with him?
 3. WHAT DOES THE CUSTOMER/USER THINK & FEEL?
 - What emotions drives the customer/user?
 - What do the customers/users think?
 - What does it say about them and their attitudes?
 4. WHAT DOES THE CUSTOMER/USER SAY & DO?
 - What does the customer/user say?
 - What are all the things the customer/user must do?
 - Where does the user behave in a contradictory way?
- **Step 2:** Also fill in the fields PAINS AND GAINS
 - What are his/her biggest problems and challenges?
 - What are the opportunities and benefits he/she might have?

Figure 6 Empathy map (resource: (Lewrick, Link, Leifer and Schmidt, 2020).

An empathy map tool is a simple visual that captures knowledge about a user's behaviours. Commonly, empathy maps are split into 4 parts (Says, Thinks, Does, and Feels), with the user or persona in the middle:

- **"Think and Feel"** - encloses what the user is thinking: what matters to the user that he/she is thinking about it? Consider the positive and negative sides of thoughts. What makes his/her feel good or bad?
- **"Say and Do"** - captures the actions that the user takes: what are the users' behaviours and how does she/he conduct herself? What are attitudes and what she/he says?
- **"Hear"** - **What** is the user hearing? How does it influence his/her?
- **"See"** - refers to, for example, people, their activities, or things etc. that the user is encountering.

No matter which method you choose, remember that empathy allows you to understand and share the same feelings that others feel. During this phase, you can put yourself in other people's shoes and connect with how they might be feeling about their problem or situation. This is necessary to start the next phase - defining problems.



Chapter 2

Define

Techniques

After the first phase, once you have the observations about your users, you need to synthesize those observations to define a design challenge (problem). It is an integral part of the Design Thinking Strategy, which results in defining meaningful problem statements that you will try to solve. As mentioned earlier, this phase is an important part of the Design Thinking strategy, like the way you master the definition of a problem statement will significantly improve the whole process and results. A well-defined design challenge is guidance for a whole team and leads the ideation process in a good direction. It is crucial to remember that working without a well-defined problem, your team will be distracted and vagrant. To avoid that, you can begin by making your observations about the users more visible and arrange (Figure 4). You might “unpack” the user data and stories and together with your team organize them into categories.

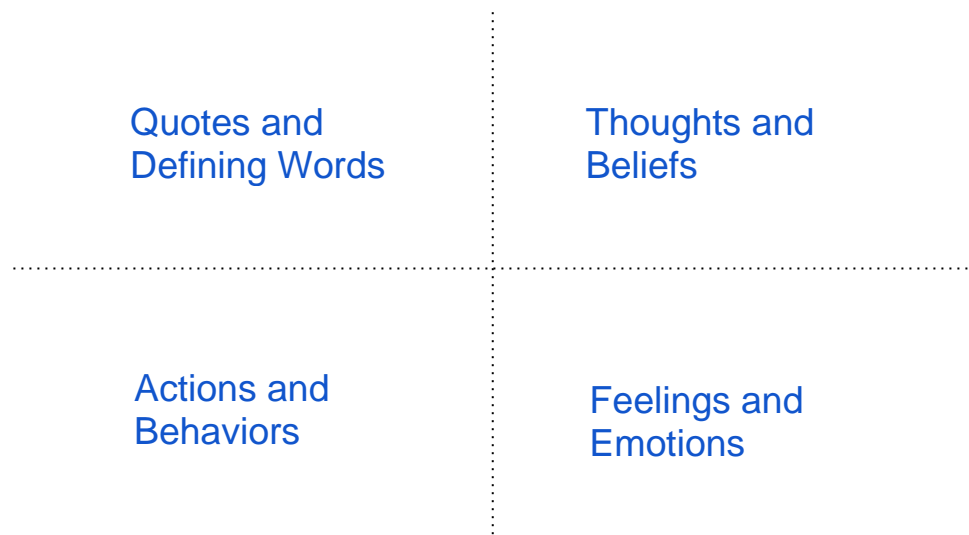


Figure 7 resource: (Lucas, 2021)

“HOW MIGHT WE...” QUESTIONS

One of the techniques that you can use in defining a process is asking specific questions, starting with “How might we?” Within that tool you transform the users’ needs into a real design problem; write down the goal of the later ideation and the goal of the design thinking team in a concrete sentence and define the extent and scope of the ideation process.

How Might We (HMW) opens up to the Ideation phase - it is a good way to start a Brainstorm session, as it prepares you for an innovative solution. The How Might We tool opens the field for new ideas, encourages a joint approach to solving them, admitting that we do not currently know the answer. It is an elementary component in the Design Thinking process that uses a special language that helps to switch to a different way of thinking. “How” implies that there are more possible ways to answer the question. “Might” creates a safe space in which we know that a potential idea might work. “We” reminds us that we solve the problem as a team.

How much time and what materials do we need?

Group size



3–5

- Develop each HMW question in groups of 3–5.

Typical duration



5–15 min.

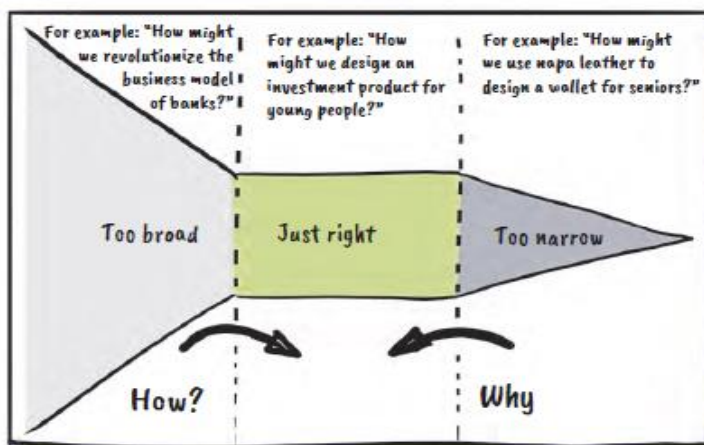
- The HMW question can be formulated quickly if good findings have been identified.
- The definition of an HMW question usually takes no longer than 15 minutes.

Materials needed



- Whiteboards or movable walls
- Post-its, pens, paper

Template: “How might we ...” question



How the tool is applied...

- Reflect upon the findings from the previous phases of “understand” and “observe.” The result is a synthesis of the insights.
- Determine what needs the team should address and what qualifying additional information is relevant in this context.
- Motivate the design thinking team to come up with several “How might we...” questions that address the identified needs or opportunity field.
- Each question should adhere to the logic of “How might we...” followed by a verb (e.g. design), a noun (e.g. investment product), and the type of user (e.g. name of persona).
- Read the HMW question aloud and ask if the team is inspired by the question to find many solutions. If not, the question might be too narrow (e.g. it already anticipates a solution or does not allow for further exploration). Or the HMW question is too broad, that is, the question tries to improve the world, and the team feels lost when confronted with the task.
- In order to counteract this dilemma, there are two question techniques: “WHY,” in order to expand the focus and “HOW,” in order to narrow down the focus of consideration.
- Once the HMW question is rolled out, the ideation phase can begin. Start, for example, with an open brainstorming session that generates initial ideas.

Figure 8 How might we (Lewrick, Link, Leifer and Schmidt, 2020).

For example, if your problem statement is “Our user (young female) struggles to eat healthily during the week because she is busy with work and children”. The HMW questions could be as follows:

- How Might We make healthy eating available to young women?
- How Might We inspire working women towards healthier eating options?
- How Might We make healthy food more affordable?

STORYTELLING

You can use storytelling to do research, talk with people, and have empathy to formulate profound stories. This tool helps you to highlight unexpected results and generate new perspectives. In general, designers use storytelling to share insights, ideas, and results (solutions) with others; build empathy and reach them emotionally. Storytelling is a helpful tool that can be used not only in defining phases but also at every stage across the design thinking process. Stories help us to share knowledge deeply and it helps us to connect to the team, to raise motivation, and generate incentives for creativity and empathy.




Storytelling can be used to present the observations and the user's research results in a more engaging way to gain empathy. This will help you control the design process. As a designer, you can:

1. **Define your target users with personas** – in order to imagine user's experiences and create empathy insights. An example persona might be “Anna”, a 34 years old small company worker that struggles with healthy eating habits and a sporty lifestyle. Feeling a little bit exhausted, she wants better control of her life.
2. **Create a plot, with conflict** – make a mapped-out journey or storyboard with each persona's aim/s clearly defined:
 - a. Anna discovers a “healthy app”, yet-to-be-designed by your team. She downloads it and answers your questions about lifestyle, eating habits, goals etc.
 - b. She starts **using your app**, letting it collect data from his phone and fitness tracker about time on various tasks/activities, stress levels, alertness, etc.
 - c. After a few days, your app charts her eating habits and the healthy changes that she made using it.
 - d. She has some healthy tips and nutrition suggestions.
 - e. Anna can continue using the app or suspend monitoring.

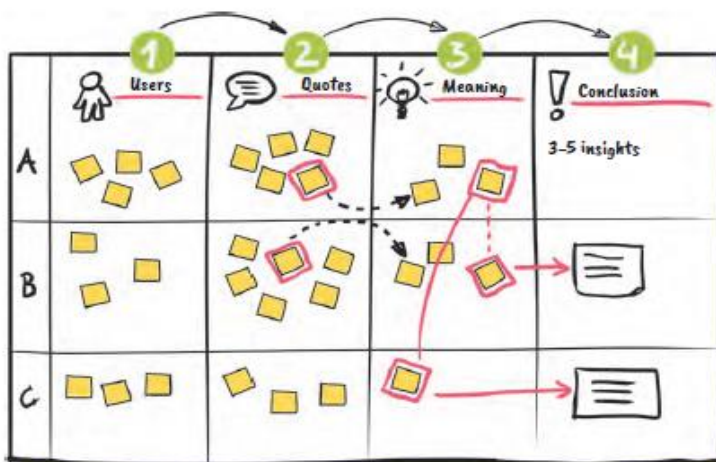
3. **Give your design the supporting role** – indicate that it improves your user's life and how easy it is to use.
4. **Work with the setting** – it is crucial for building empathy to show when and where users use your design.
5. **Tailor the look** – appearance is important regardless of its functions, so make it nicely designed (e.g. layout, colours).

While using storytelling, remember to always consider the users' problems you define, the users themselves and your story (from introducing the players towards their biggest problems and finish with design deliveries). Your design process should predict your target users' moves at every level possible. During the next phases - testing will help confirm how successful it is.

How much time and what materials do we need?

<p>Group size</p>  <p>2-5</p> <ul style="list-style-type: none"> • A team size of 2-5 is ideal for using storytelling. • For the discussion of the findings, each team member recounts the story he/she has observed. 	<p>Typical duration</p>  <p>10-30 min.</p> <ul style="list-style-type: none"> • Summarizing the findings and turning them into a story varies according to the design challenge and the number of findings (approx. 30 minutes). • The story per user should be no longer than 5-10 minutes. 	<p>Materials needed</p>  <ul style="list-style-type: none"> • Large whiteboard, flip chart or printed/painted template • Post-its, pens, markers
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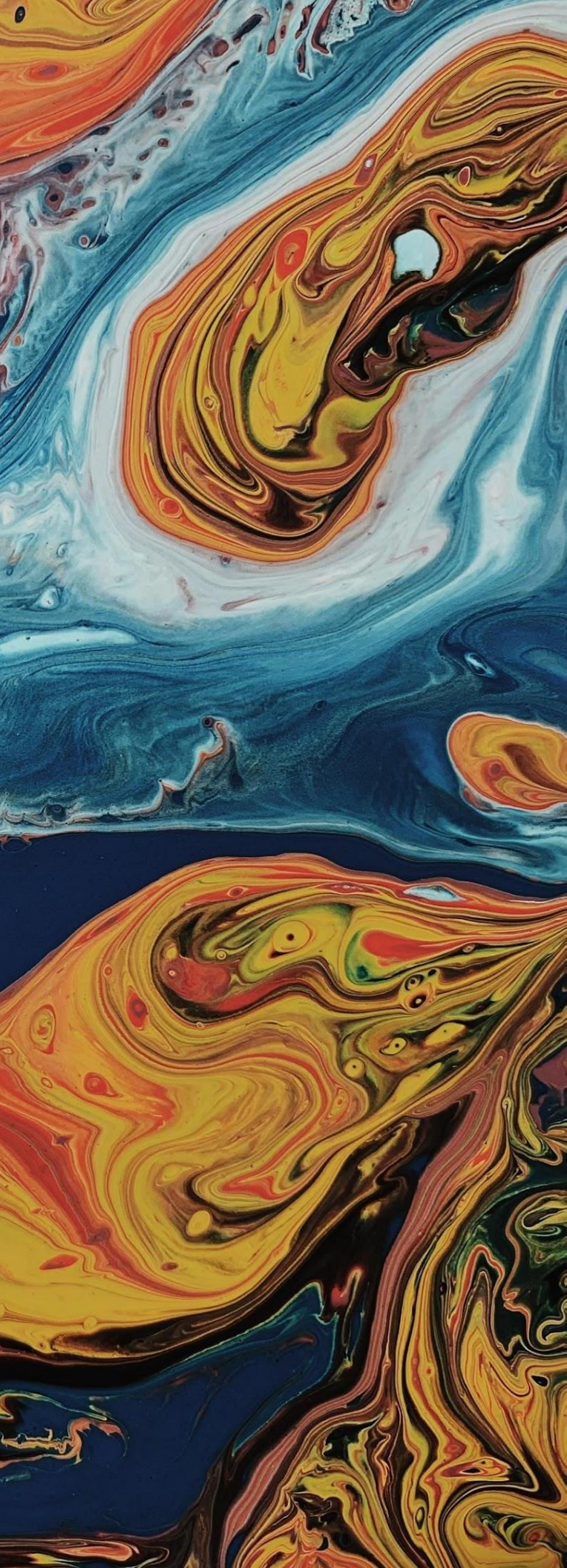
Approach and template: Storytelling



How the tool is applied...

- **Step 1:** Print the template or draw the structure on a flip chart or whiteboard. For the use of storytelling in the communication of results from the "understand" and "observe" phases, the following procedure is especially useful.
- **Step 2:** Encourage every member of the team to complete one line (e.g. per interviewed person), and then summarize the highlights and special features of the person or user (column 1). Add important quotes from the person.
- **Step 3:** Interpret the results on the team and define the meaning.
- **Step 4:** Draw a conclusion together with the team and summarize the key findings from the interview. This way, you have created a basis and are one step further toward sharing the results of the story with the team and the stakeholders. Formulate the draft of a story in bullet points, create a storyboard, or produce a short video that enacts the story.

Figure 9 Storytelling (Lewrick, Link, Leifer and Schmidt, 2020).



Chapter 3

Ideate

Techniques

Once you have defined the problem, it's the right time to start the ideation phase. This stage requires planning and preparation to ensure that the results are rich and interesting. For ideation, we need to establish a positive and constructive mindset, you need to adopt the right rules, locate the whole process in an inspiring place where data are displayed for everyone to observe, stimulate the creativity of the members, and follow a process by having a facilitator, and mixing individuals to collaborate effectively and creatively.

During this stage of the Design Thinking process, you are ready to generate ideas that address your problems. You should already understand the needs thanks to the Empathise stage and you should have analyzed and synthesized observations (Define stage), as well as human-centred problem statements. Ideation is one step toward finding imaginative solutions for your issue. Definitely, this is the phase that people enjoy most. With the problem defined, now is the time to dream up how to solve it. The main aim of this phase is to use your creativity and innovative mind in order to develop solutions. A creative mind is a crucial aspect in this phase, as thinking “outside the box” is required, in order to identify solutions that are new and alternative. Ideation is a step of the design process in which you focus on generating as many ideas as you can. Practically, it should encourage others to “go wide” in terms of concepts and outcomes. The focus is on the ‘what if’ or ‘what could be the future after having focused on what the current situation is in the Inspiration phase. After the ideation phase, you should have prepared prototypes and get innovative solutions.

There are many Ideation techniques that you can apply, such as Brainstorm, Brain writes or Worst Possible Idea. Brainstorm and Worst Possible Idea methods are typically used to encourage free-thinking and to expand the problem space. Brainstorming, another name used for ideating, dominates this phase of design thinking. To get the most out of brainstorming, you truly need to suspend reality, disregard the typical parameters for business operations. Usually, different forms of brainstorming, for instance, working with analogies are applied. At the beginning of the Ideation phase, it is important to get as many solutions as possible. You should pick some other Ideation techniques by the end of the Ideation phase to help you investigate and test your ideas so you can find the best way to either solve a problem or provide the elements required to circumvent it. For example, dot voting and similar tools can help you to select and cluster ideas.

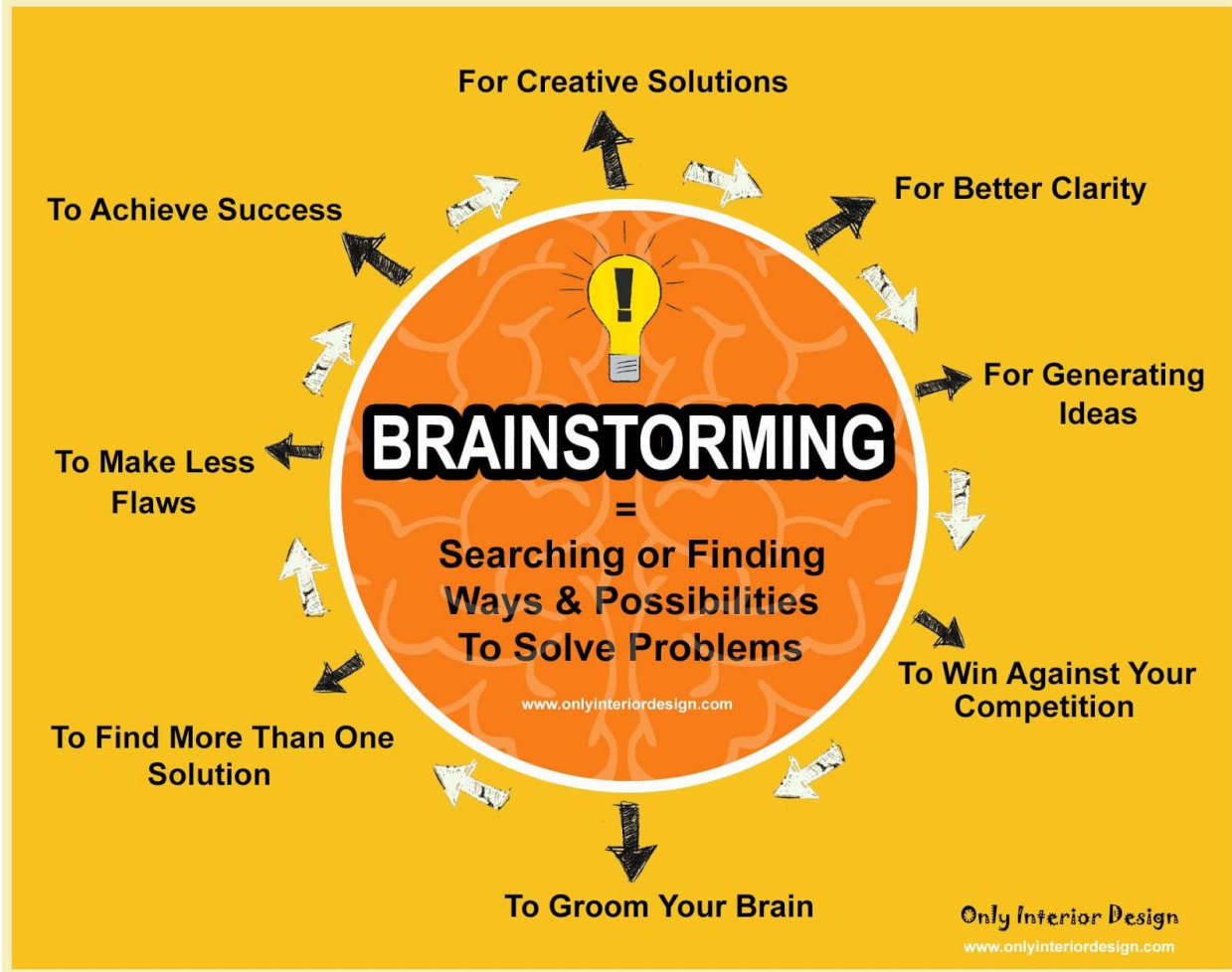


Figure 10 Resource: <https://www.onlyinteriordesign.com/2020/04/what-is-brainstorming.html>

BRAINSTORMING

The most classic way of ideating is the brainstorming method that is applied in the “ideate” phase differently. Brainstorming is an ideation technique in which all participants can contribute their knowledge, it is about generating as many ideas as possible before they are sorted, combined, or clustered. Often, brainstorming is used in the “ideate” phase in many different ways and with changing focus. Good sessions using that technique should stimulate creativity and allow all participants to propose their ideas, as all points of view are welcome and regarded as necessary to consider. The selection of preferred ideas usually takes place within the framework of an evaluation and vote on the team. For this, tools such as dot voting and the decision matrix are used. The selection of ideas is one of the most difficult elements in the design cycle since the earlier phases are characterized by a high level of uncertainty.

During brainstorming technique:

Generate many ideas that the team spontaneously comes up with.

Use the entire creativity potential of the design thinking team.

Have a high number of variants at hand in a short period of time.




Obtain an interdisciplinary perspective on a problem that represents

Collect ideas and viewpoints from a heterogeneous group.

Inspire enthusiasm and generate momentum.

Figure 11 presents the process of brainstorming technique in a simplified formula, its scope, general rules and steps that you can follow during the ideation phase. According to this, your brainstorming session should ideally involve 4-6 people and takes approximately 15 minutes. It is highly necessary to follow the rules, as it impacts the general mode of work. Also, remember to follow the rules of brainstorming sessions indicated below, for instance, you should avoid any prejudice towards ideas and it is advised to build up ideas based on others. Also, during the brainstorming session follow the steps: remember to prepare a “How might we” question; repeat the rules before the session; assess the thoughts with the team at regular intervals.

How much time and what materials do we need?

<p>Group size</p>  <p>4-6</p> <ul style="list-style-type: none"> Brainstorming sessions are most effective in groups of 4-6. For large groups or groups with hierarchical differences, make sure that everybody contributes. 	<p>Typical duration</p>  <p>5-15 min.</p> <ul style="list-style-type: none"> Usually a few minutes (5-15 minutes) After a certain amount of time, creativity declines and must be rekindled by new incentives (e.g. other methods and questions). 	<p>Materials needed</p>  <ul style="list-style-type: none"> Post-its Pens Wall or whiteboard
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Brainstorming rules

 <p>#1 Creative confidence</p>	 <p>#2 Quantity before quality</p>	 <p>#3 Visual ideas</p>
 <p>#4 Use gestures</p>	 <p>#5 Build on the ideas of others</p>	 <p>#6 Only one person speaks at a time always</p>
 <p>#7 No prejudices</p>	 <p>#8 Continue to brainstorm</p>	 <p>#9 Fail – often and early on</p>

How the tool is applied...

- Step 1:** Prepare a clear HMW question for the brainstorming session, for example, in the form of "How might we..." or "What possibilities are there..." (see page 125).
- Step 2:** Repeat the brainstorming rules before the brainstorming session. Try to motivate the group to give more ideas during the session and build upon the ideas of others. Make sure that all are heard and all ideas are written down. Point out that only one idea is to be written per Post-it and that it should be clear and legible. Instead of words, small sketches may be drawn on the Post-its.
- Step 3:** Cluster and assess the ideas together with the team at regular intervals.
- Step 4:** Make a judgment as to whether even more creativity is needed (e.g. to obtain even wilder ideas); or start a brainstorming session in areas where more ideas are sought in general.

Variant: Structured brainstorming

- All participants write their ideas on a Post-it.
- After a certain period of time, one person begins to stick his own ideas on a flip chart and explain them. If there is already a similar Post-it, another one is glued next to it.
- During the explanations of the other team members, new ideas are generated (ideation) and written on new Post-its.
- The result is a clustered collection of ideas, which can be later evaluated.

Figure 11 Brainstorming method (Lewrick, Link, Leifer and Schmidt, 2020).

DOT VOTING

Dot voting is an easy tool used to prioritize items or make decisions in a group in a democratic manner. It is a straightforward way to narrow down gathered alternatives and ideas to a set of concepts. The selection of ideas is a crucial step considering a large number of ideas that are developed during that session. The dot voting technique is one of the possibilities for the evaluation and clustering of ideas, the vote is quick and democratic. This tool allows the ideas to be heard and made based on reflection.

Dot voting technique:

- **Gather all materials you need to proceed with this technique** - it depends on what is voted on. Usually, this technique is used to vote on options represented. For example, dot stickers are commonly used due to their flexibility.
- **Specify voting constraints** - remember to remind all participants of the purpose and value of the voting exercise. Inform the group about the rules of voting, for example, how many votes they will have, what are the constraints.
- **Vote** - each individual should place votes quietly without interruption and discussion from others.
- **Calculate outcome** - once all individuals have voted, the group can converge and discuss the outcome. Depending on the purpose of using this technique, participants can discuss why they have chosen particular options.
- **Potentially narrow and revote** - if there are some doubts, the group can vote again.

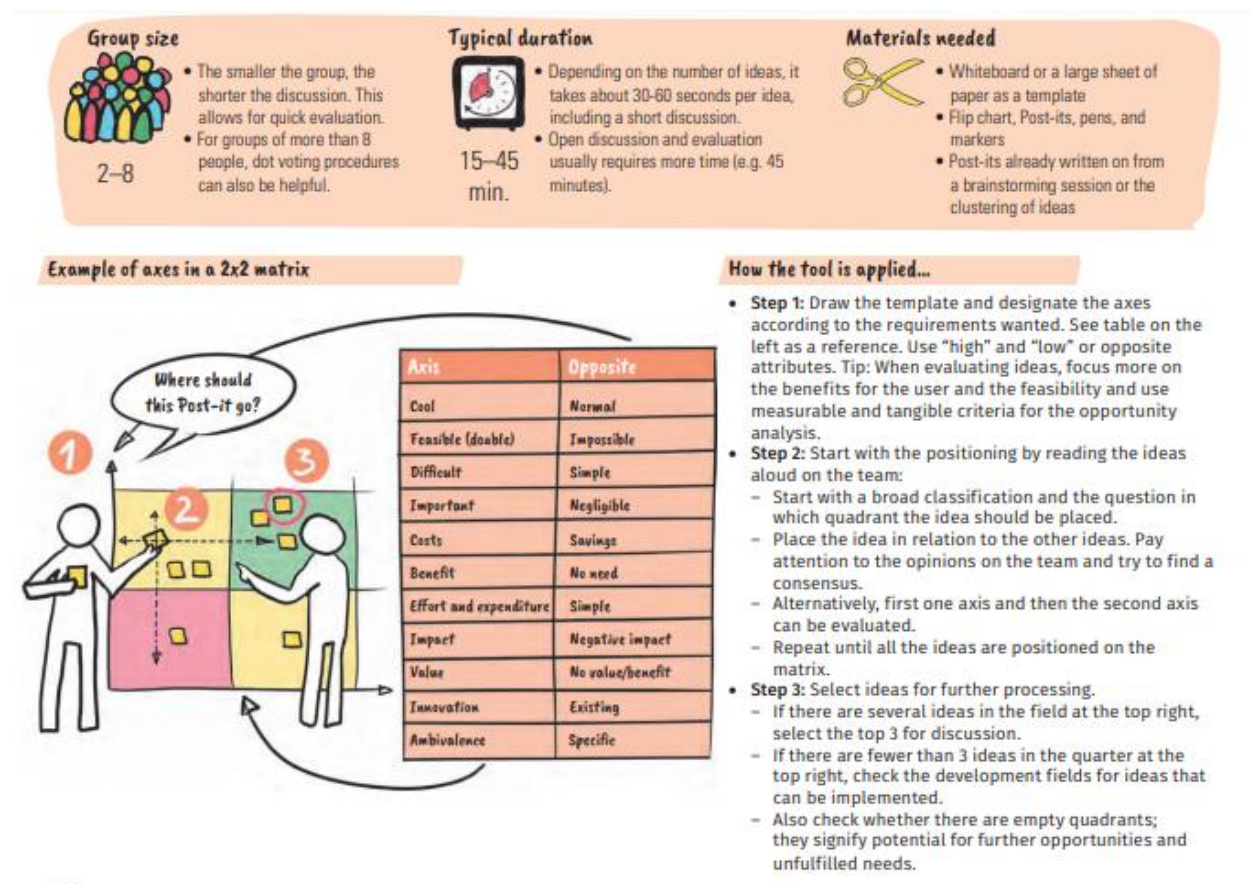


Figure 12 Dot voting (Lewrick, Link, Leifer and Schmidt, 2020).



Chapter 4

Prototype

Techniques

Prototyping is one of the best ways to gain insights into Design Thinking, as this method involves producing an early version of the product in order to see if there are any problems with the design. This phase offers the opportunity to bring your ideas to life, test the practicability and see what others think about a product. The early stages of a Design Thinking process do not tell you to give a comprehensive overview of solutions and possibilities that can be used in solving your problem. Even if you have conducted research thoroughly and gathered a lot of information, testing your ideas is still necessary. By prototyping and then testing those prototypes, you can reveal errors and wrong assumptions, uncover some different ideas to improve your solution or create new ones.

Guidelines for prototyping:

- 1 Just start building
- 2 Don't spend too much time
- 3 Remember what you're testing for
- 4 Build with the user in mind

You can use prototyping as part of various stages of Design Thinking. Prototypes are usually used in the last stage of a Design Thinking method - the testing phase, to reveal new solutions to problems to check whether the solution and ideas have been successful. The results generated from these tests are then used to redefine one or more of the problems established in the earlier phases of the project, and to build a more robust understanding of the problems users may face when interacting with the product in the intended environment. However, you can also use prototyping as, for instance, an ideation method to develop alternative ideas. Prototypes are great representations of your solutions and prototyping allows you to think by doing. Adopting a 'thinking by doing' mindset is very useful for researching, defining, ideating, and testing phases.

EXPLORATION MAP

Prototypes make the selected ideas more valuable and tangible, as prototypes range from a simple and easy to the final prototype. To build a prototype, you can use materials that are good enough to test a function or an experience. During this phase, you can use one of the strategies - the exploration map. This technique helps to keep track and organize all prototypes already carried out. As presented in Figure 13, the exploration map consists of an experience and a function axis. "The two axes symbolize known or existing as well as new or unexpected behaviours and functions. In addition, the feedback of the users/customers concerning the experiments can be entered on the exploration map. This way, it can be determined whether the expected user behaviour conforms to real-life experience. The exploration map shows – at the end of the entire design cycle – the path the team took to reach the ultimate solution" (Lewrick, Link and Leifer, 2020).

How much time and what materials do we need?



- Design thinking core team.
- Ideal are groups of 4-6 people.

Typical duration



10–45
min.

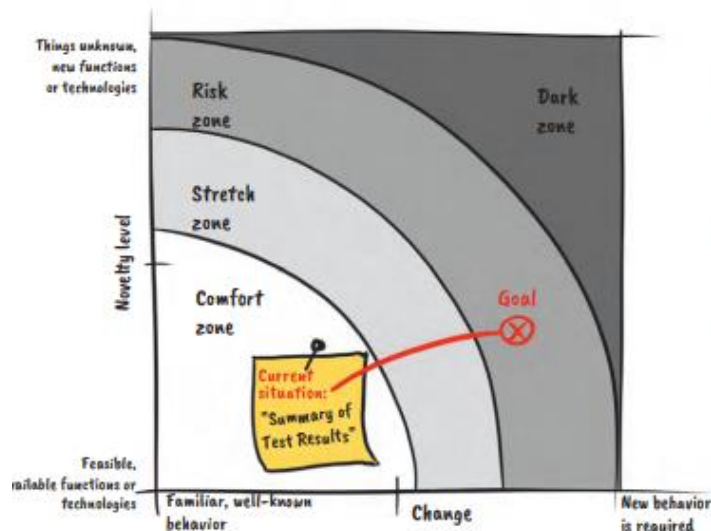
- The duration depends on the number of prototypes to be entered on the map and the intensity of the resultant discussion on the team.

Materials needed



- A large sheet of paper
- Post-its, pens, markers
- A lot of creativity and fun to realize something tangible.

Template: Exploration map



How the tool is applied...

The exploration map gives the team an overview of the experiments carried out and shows the areas in which experiments can still be made. It provides information on the expectations regarding an experiment and its effect on the target group.

- **Step 1:** Enter the experiments already carried out. They might have to be repositioned. Each experiment is recorded on the exploration map – it is best to do so with a name and an image (e.g. of the prototype and the testing).
- **Step 2:** Discuss the positioning of the experiment on the team. Have we really left our comfort zone? Based on the previous exploration and the previous experiments, the goal for a new experiment, for example, can be defined.
- **Step 3:** After the prototype has been built and the expectation regarding the result has been formulated, they are also entered on the exploration map and positioned accordingly.
- **Step 4:** After the tests, the reaction of the users and the findings of the tests can also be captured. The critical discussion of the feedback may change the position of the experiment on the exploration map.

The exploration map stimulates the discussion among team members, provides the basis for planning new experiments, and helps with the reflection after tests.

Figure 13 Exploration map technique (Lewrick, Link, Leifer and Schmidt, 2020).

The exploration map will help you to keep track of all the experiments and prototypes already carried out. It normally has an experience and a function axis. The two axes symbolize behaviours and functions (known/existing as well as new/unexpected). Also, the feedback of the potential users regarding the experiments can be entered on the exploration map. This way, it can be determined whether the expected user behaviour conforms to real-life experience. At the end of the design process, the exploration map shows the path that you took to have the solution.

SERVICE BLUEPRINT

With this tool you can: develop “the customer map” by applying, for example, technologies and customer interactions for each phase; manage key issues in the development of new solutions, for example, whether they address all customer needs; perform visualization of interactions with users at various levels.

A service blueprint is an easy tool that helps to improve the interaction with a customer and the interfaces in the entity (where the design process is carried out) as it can motivate the entire group because this tool also regards processes comprehensively and takes into account supporting processes, as well as important new regulations and technologies.

How much time and what materials do we need?

Group size



3–6

- The right group size is between 3–6 people.
- In the best case, take the relevant experts and process owners on board.

Typical duration



120–240 min.

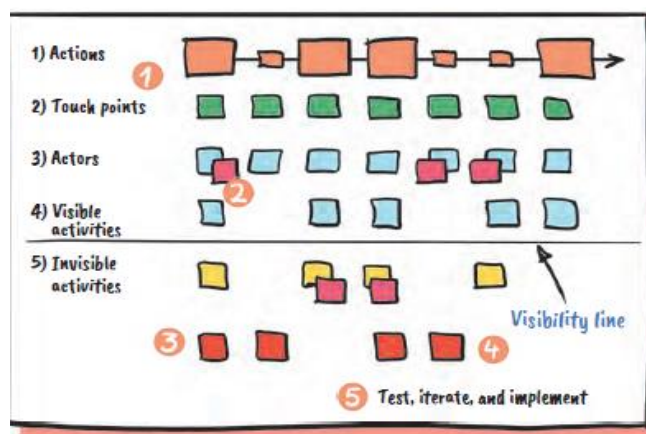
- As a workshop format, the creation of a service blueprint takes about 4 hours.
- Beforehand, it must be determined which specific service creation process is to be optimized or designed and where the process limits are.

Materials needed



- Large wall or whiteboard
- Paper, pens
- Post-its

Template: Service blueprint



How the tool is applied...

The service blueprint is a chronological representation of processes in which the respective effects are worked out with the customer. The discussions during the creation also help greatly to enhance the team's understanding of the context.

- **Step 1:** Look for a large wall and stick a long sheet of paper on it. Draw the lines (e.g. visibility line) and begin to fill in the steps and processes with Post-its. Start with the large blocks (actions and touch points).
- **Step 2:** Include the actual state of existing services. Create a rough process model for the design of new processes. Problems and errors are identified with color dots or Post-its.
- **Step 3:** Search for solutions together with the team in order to eliminate sources of error, streamline processes, and actively shape customer experiences. Use videos, images, sketches, and Post-its.
- **Step 4:** Distribute the open items to group work/working in private. By working in tandem with the time boxing method, results are achieved faster.
- **Step 5:** Integrate the partial results of the groups on the service blueprint. Once the new service blueprint has been sufficiently refined, the individual elements as well as the end-to-end perspective can be tested, improved, and finally implemented.

Figure 14 Service blueprint (Lewrick, Link, Leifer and Schmidt, 2020).

As it is shown in Figure 13 to apply the service blueprint technique, you need to: have a large wall that you can stick a long sheet of paper on; draw the lines and begin to fill in the steps. Then, you write down the actual state of your services and create a simplified process model. Finally, you can state your services and create a simplified process model. Finally, you can integrate your results of the groups on the service blueprint write down the actual state of your services.



Chapter 5

Test

Techniques

In order to test the constructed prototype, you need a potential user, so you can clean your view of the issue and the user. This means that we not only get feedback on the prototype but also improve our problem and user view. In addition, we are re-connected with "understanding" and "watch" the phases, which in turn can give you a new point of view - this process is repeated as often as you need. Tools and feedback techniques such as "Like, I wish, I wonder" support the testing. In addition, there are various test procedures. Which one is most helpful depends on the type of prototype. Of course, the presented testing tools overlap in terms of their intended use (testing); nevertheless, each testing approach and procedure provides valuable information that helps us to improve a given prototype.

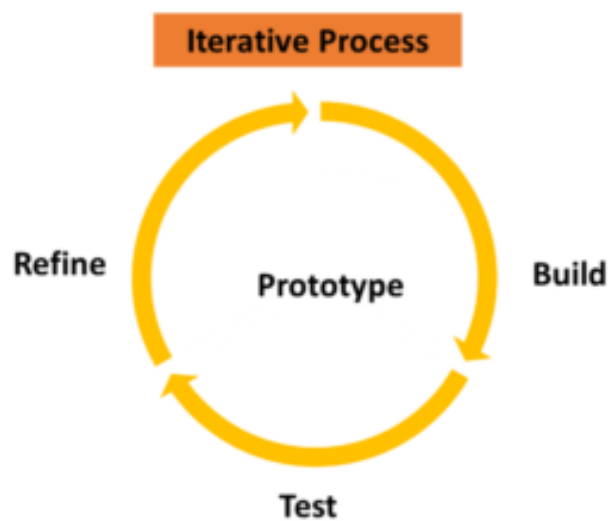


Figure 15 (Test Stage | Stage 5 in Design Thinking Process | Yukti, 2021)

TESTING SHEET

The purpose of testing is, among other things, to obtain as much knowledge as possible about the users and their needs through interaction between the user and the prototype. It is a good idea to plan your test situation and consider what the test sequence is, who plays what role, and what key questions should be asked. With the test sheet, you have a tool that allows you to learn a lot in a short time and check whether our assumptions and hypotheses are correct. A test run is usually performed by two or three people. Much more important is the documentation of the tests which allows you to share the results with the group.




What you can do with this tool:

- Plan your test systematically and define roles.
- Document the test and results for easy access to the next steps.
- Consider what the test criteria are and what are cases where the hypotheses are considered to be confirmed, verify the needs and check the assumptions.
- Develop empathy for the user.

As shown below, using this tool you can follow the steps:


1. Test planning.
2. Test procedure.
3. Test documentation.

How much time and what materials do we need?

Group size  2–3	Typical duration  10–30 min./test	Materials needed  <ul style="list-style-type: none"> • Notepad and pen • Camera (for photos and videos) • Prototype (which is to be tested) • Some prototyping material • Template for test documentation
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Template: Testing sheet

Test scenario		Test criteria	
1 Brief description of the test scenario			
Procedure	Roles	Questions	
Test results			
3 Documentation	Learnings		



How the tool is applied...

The prototype has already been built. Now the test scenario must be planned.

- **Step 1: Test planning:**
 - Think about where the test should take place. It is best to carry out the test in the context of the problem on site on the user's premises.
 - Define the test criteria prior to the test. What are the criteria for a thesis to be considered as verified?
 - Plan the sequence, assignment of roles, and the key questions of the test.
 - Define who will ask the questions, who makes notes and documents the test, and who observes.
- **Step 2: Test procedure:**
 - Run the test and observe the user keenly during the test. Ask for feedback. It is very valuable and constitutes the basis for further decisions on the development of the prototype.
 - Write down the most important quotes.
- **Step 3: Test documentation:**
 - Document the test with photos or, better yet, short videos of the most important statements.
 - Summarize the main findings and learnings.

Figure 16 Testing sheet (resource: Lewrick, Link, Leifer and Schmidt, 2020).