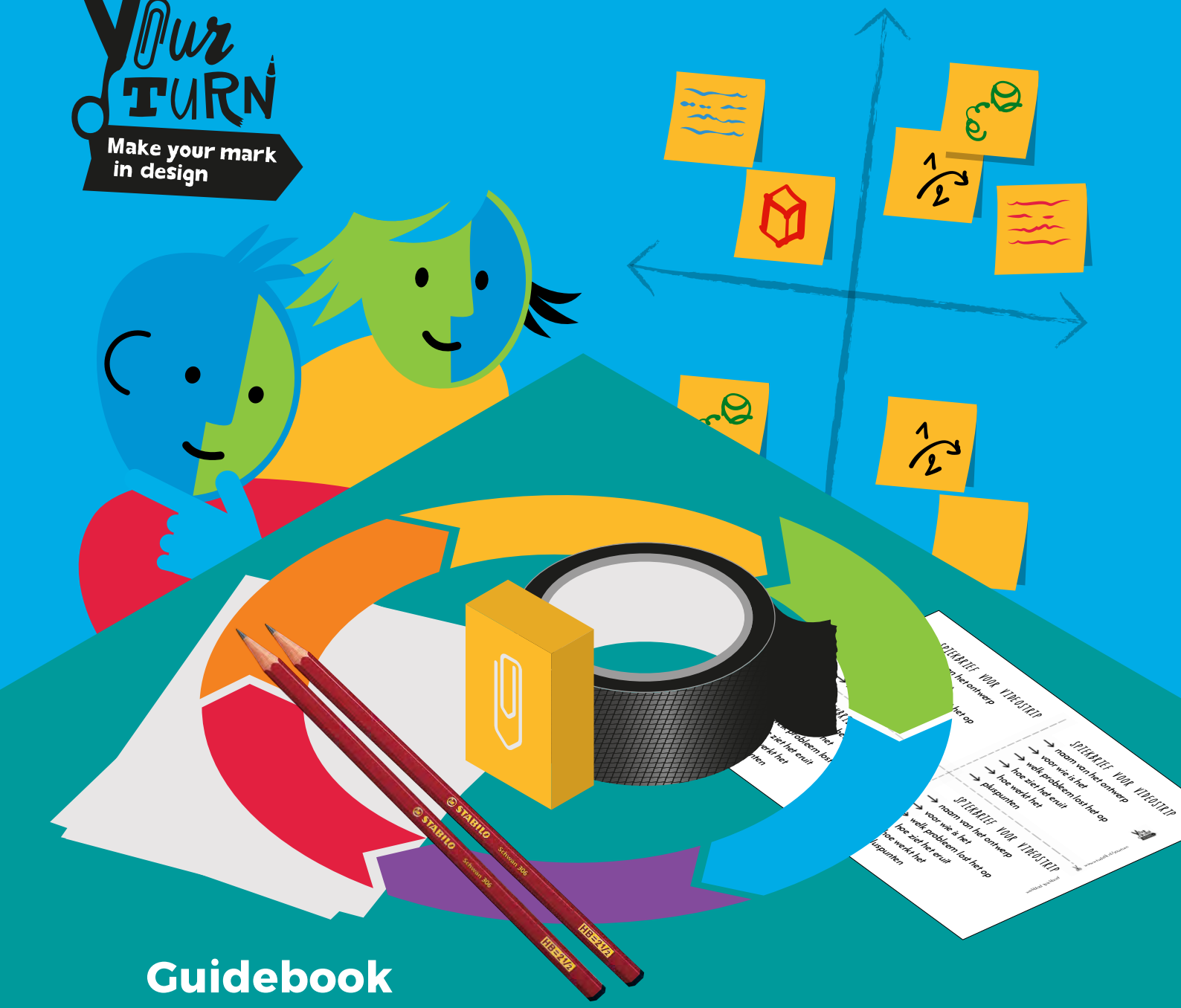
Your Turn

Make your mark in design



Guidebook

YOUR TURN FOR THE TEACHER

Guidebook to develop real-life design lessons for use with 8 - 14 year old pupils

GUIDEBOOK YOUR TURN FOR THE TEACHER

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The Your Turn guidebook is a step-by-step instruction for teachers (in training) to create and implement their own design projects for upper primary and lower secondary education. It provides an overview of the variety of tools for Co-design projects with children, a step-by-step guidance, advice on the approach and striking examples. Performing these kind of projects, students gain experience with designing around appealing themes from their daily life.

The guidebook is based on the results of the research project Co-design with Kids, funded by Dutch research organizations NRO and NWO. In this project researchers from Delft University of Technology and a large consortium of scientific and public partners have collaborated with teachers and pupils. This guide provides support for building co-design processes that benefit both designers and the participants.

The Your Turn materials are available on two websites: **www.tudelft.nl/codesignkids** (focusing on designers) and **www.tudelft.nl/en/yourturn** (focusing on teachers).

ISBN 978-94-6366-368-7

Februari 2021, © TU Delft

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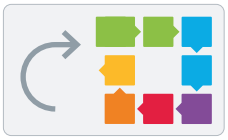
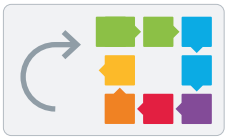


- Piecing together a design pitch
- Solution pitch
- Video roll

B Design skills
- Think in all directions
- Develop empathy
- Bring ideas to live
- Share ideas
- Decide your direction
- Make productive mistakes
- Make use of the process



INTRODUCTION

'Your Turn – Make Your Mark in Design' is a TU Delft programme for design-based learning with a great many innovative tools to promote creativity and empathy. Your Turn also supports pupils in communicating about their design with peers, teachers, clients and other interested parties.

This new edition of "Your Turn for the Teacher", full of practical tools and tips, gives busy teacher education students and teachers what they need to put together a lesson or series of lessons on their own theme in a short period of time.

The guide and tools allow them to key into how pupils perceive their environment and incorporate life around school into their lessons. A design lesson about a local topic opens ample possibilities of working with parents and carers of the pupils or experts from the local community, such as someone who works in healthcare or an architect who is designing a new building near the school.

This could result in a short design activity of an hour, a couple of lessons or a more extensive design project where pupils explore a design problem faced by people in their environment, generate solutions and develop, test, discuss and improve one or more ideas. Asking your pupils to make a location vlog or use all their senses in a brainstorming session – it is all possible with Your Turn.

This guide will take you, step by step, through setting up a design project and selecting the tools and activities for your pupils. You will start by choosing a theme and a design question, followed by choosing the learning goals that you wish to focus on in the design lessons. We describe these steps in chapter two. You will enter your choices in the **Design Topic chart**.

Depending on the time available and the choices that you have made, you will then choose tools for each stage of the design process. Chapter three provides tips for each stage for making your choice and filling in the **'Design Flow chart'**. Click on the icon in the upper right corner to go to this flow chart. The design tools and design skills are described In the appendices.

Design-based learning is a great tool for developing 21st-century skills. Studies show that proper guidance for teachers in this process is crucial.[1]

1 Lazonder, A. W. and R. Harmsen, Meta-analysis of Inquiry-Based Learning: Effects of Guidance, Review of Educational Research, September 2016, pp. 681-718.

This is why we suggest various kinds of teaching support during the activities – such as providing examples, clarification of the learning goals as well as using peer and other feedback.

In order to make the learning goals specific and clear to pupils, we have taken design skills as the basis for this teaching guide and other teaching materials. This is because for day-to-day lessons, 21st-century skills are too broad and therefore too vague to serve as learning goals for pupils.

The tools and design activities in this guide are mainly aimed at developing the following design skills:

- Think in all directions (divergent thinking)
- Develop empathy
- Share ideas
- Decide you direction

These design skills have a direct connection with the 21st-century skills of creativity, citizenship, communication and critical thinking and are explained in the appendix.

The development of design skills is important for all learners so that they can discover that they can make a positive contribution to solving problems in the world around them. Design projects also create a better balance between the development of higher-order skills and the focus on knowledge. Pupils learn how to apply their knowledge in a new situation and think further. Scientific studies also show that the inclusion of inquiry-based and design-based learning in the curriculum has a positive effect on language and maths. The effect is the strongest among pupils from less privileged groups and children who speak a different language at home[2].

The Your Turn approach is based on is based on the results of the NRO-NWO research project of Delft University of Technology (TU Delft), The Hague University of Applied Sciences, Inholland, partners from the business community and a large number of primary schools.

Tip: Many Your Turn tools are demonstrated and explained by children in an accompanying You Tube video. They can be found at **https://tinyurl.com/YourTurnDUT**

2 Smithsonian Science Education Center. (2015). The LASER Model: A Systemic and Sustainable Approach for Achieving High Standards in Science Education – http://ssec.si.edu/laser-i3

1 SETTING UP A REAL LIFE DESIGN PROJECT

BACK

DESIGN TOPIC CHART

Theme

- What is the theme of the design lesson(s)?
- What design problem is the focus?
- Who faces this problem? For whom will the pupils be generating solutions?
- What is the design question?

Scope

- How many teaching hours are you willing and able to spend?
- Which design steps will the pupils be performing?

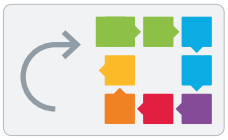
External parties

- Will you be involving an external party and if so, whom?
- Why does this external party want to be involved in design lessons?
- How will you come in contact with this external party?

Learning goals

- What are the primary design skills in the lesson(s)?
- Are there any important research skills? If so, which skills?
- Are you able to connect the design lesson with learning goals from language, maths and the subjects for which many facts must be learned (e.g. history, geography, biology)?

Design Topic Chart filled in? Use the 'Design Flow Chart' icon in the upper right corner to discover which Your Turn tools are suitable for your lessons.



1 – SETTING UP A REAL LIFE DESIGN PROJECT

Well begun is half done. Before choosing design activities and tools, it is often useful to have already taken several decisions about the design lessons in general and to fill in the adjacent Design Topic Chart. After introducing design learning in general, we provide several suggestions per group of questions.

1.1 What is Design and Technology Education about?

The following quotation, often attributed to Albert Einstein, emphasises the creative and generative nature of design:

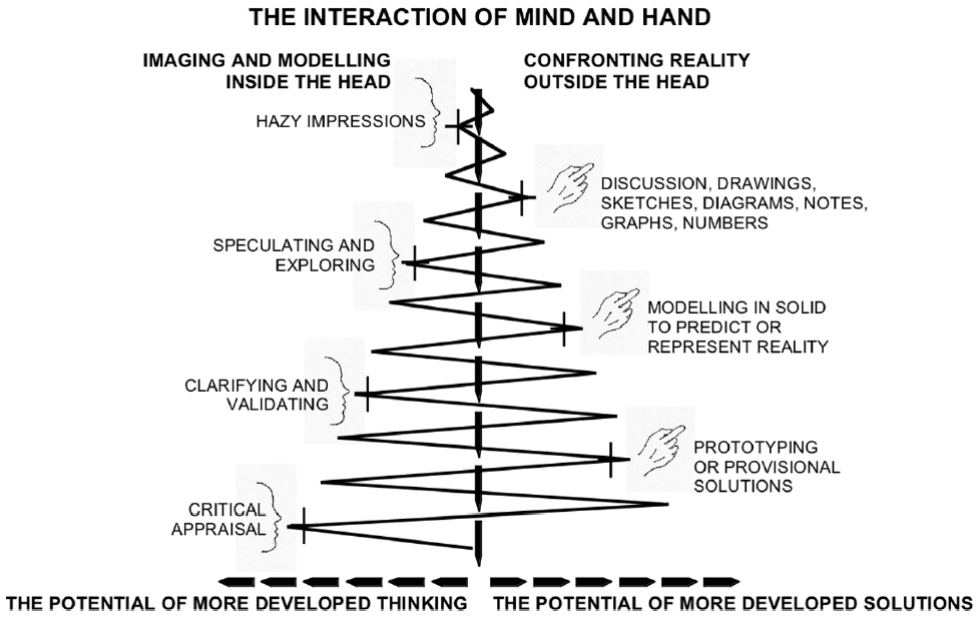
"Scientists investigate what already is, engineers create that which has never been"

Creativity is always about something that is not yet there; it is about the future. Designerly thinking is an excellent vehicle to develop creative thinking in classrooms and can be applied to any topic – from designing a digital game to learning mathematics, from developing an environment for polar bears to organising an Easter party for parents.

Through creative design and technology students learn to develop new or original solutions. The design outcomes do not have to be new in the sense that they have never been thought of before. Most important for the students' learning is that they create outcomes and solutions that are new for them. The result is not copied, but a result of the student's imagination and therefore authentic.

In these projects hands and minds interact continuously. Through iterations learners will develop their solutions. Investigation of the problem, idea generation and selection as well as developing, making and testing are important at all stages in a project.

As a teacher you guide your students in this creative process and give them the chance to use mistakes to improve their designs.



Source: Kimbell, R., e.a. (1991)[3]

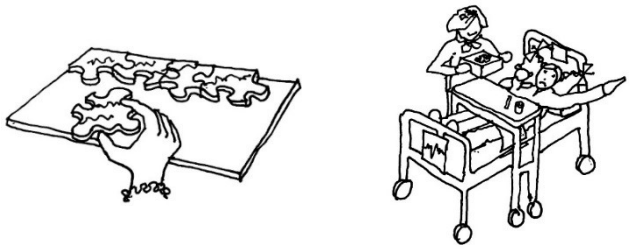
Design and technology projects usually contain the following elements:

- There are people who have a problem or wish;
- The design brief /question/scenario has an open nature: different solutions are possible;
- Different solutions are developed, made and tested;
- Iterations between hand and mind, thinking and doing, are important.

An iterative process

This short video from the Design and Technology Association (United Kingdom) introduces an iterative design process. It uses an example of helping a girl who has a back injury to do her favourite jigsaws from her hospital bed. How do ideas originate and develop through thinking, drawing, reflection and prototyping towards a well thought out developed outcome?

http://tv.data.org.uk/Home/Iterative-Design-in-Action-Iterative-Processes-of-Designing/139131



3 Kimbell, R., Stables, K., Wheeler, T., Wozniak, A. & Kelly, A. V. (1991), The assessment of performance in Design and technology. London: SEAC/HMSO. page 20.

Exploring, creating and testing

Exploring, creating and testing is central to the design process. Usually, the designer moves from one activity to another, depending on what is needed now. These activities can be depicted by a design cycle that starts with ex-ploring the current situation, problems and wishes of a certain target group and ends with a tested prototype that meets the needs of this group.

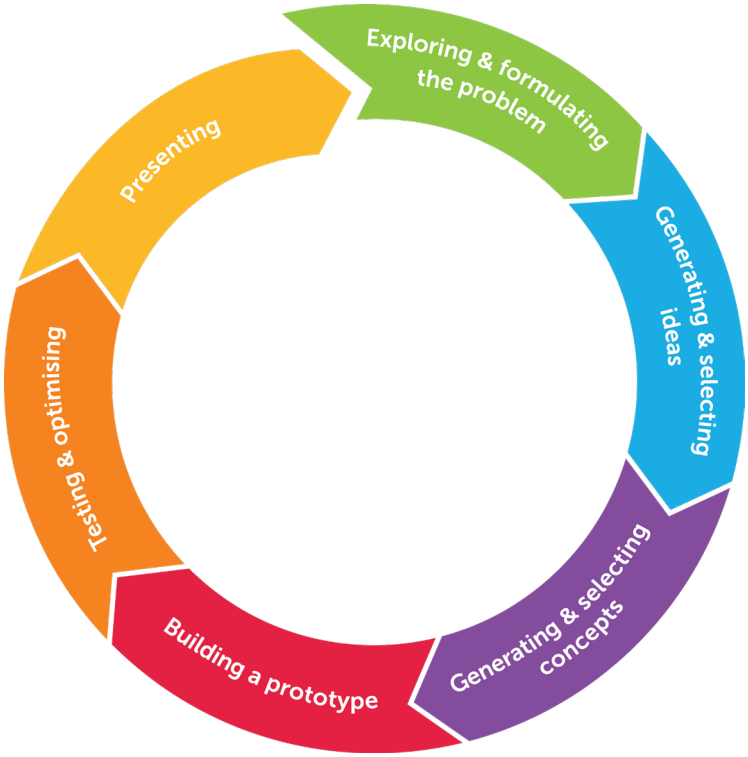


Figure 1: Different activities in the design process. Source: Klapwijk 2018

1.2 Theme, design problem and design question

What is the theme of the design project? What problems or design challenges are there within this theme? Choose a theme for which many interesting and/or fun design questions can be generated. Keep the following aspects in mind:

A Choose a theme:

- that is geared to pupils' real-world experiences;
- that takes place in the pupils' environment or around school;
- for which you can involve an external party.

Children are making a vlog of a playground.

B Formulate a design challenge within this theme.

Formulate a design challenge within the selected theme. This can be done as follows:

- Decide for whom you want to design: the target group;
- Think of what problems, needs or wishes this target group may have. Decide which problem or challenge you want to solve within the design project;
- Combine these two aspects in one sentence. For example:
  - People with a physical disability (= target group) are no longer able to perform daily tasks such as cooking or reading a heavy book (= problem)
  - Children in year four (= target group) find learning tables at school boring (= problem)

Tip: Many problems or challenges will apply to more than one target group. This makes the design project interesting and challenging. Can you find a solution that works for all target groups? In the above example of learning tables, the stakeholders are the pupils and teachers, each of whom has their own wants and needs.

c Turn the problem into a challenging design question

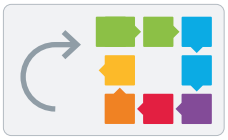
After you have chosen the design problem, you need to turn this problem into a stimulating, challenging design question. A design question guides the design project and is always about the future and the development of creative solutions.
The teacher often comes up with the overarching design question. The pupils can also formulate their own design questions within the theme. The overarching question that a teacher asked about biomedical design was, for example, 'How can people with a disability perform day-to-day tasks on their own?'. Pupils themselves chose a specific target group and task to design for. One of the design teams created the following design question: 'How can Grandma read a really thick book in spite of her rheumatism and painful hands?'.

A good design question meets the following criteria:
- The question calls up multiple solutions/problem-solving approaches;
- The question is geared to the skills of the pupils.

Some handy ways to start your design question:
- Design a way to... (cross the street, eat healthier, organise things);
- Design something that ...(ensures that children and elderly people get plenty of extra exercise together);
- Wouldn't it be great if...(maths was taught outdoors in future, and you could get plenty of exercise at the same time);
- How can you + verb + challenge (How can you ensure that children who do not like to compete at all also enjoy Physical Education).

During a design process, your pupils will also be involved in inquiry, such as investigating what is important to users, exploring the problem situation. So sometimes you will give pupils a research question at the beginning of a design process. This question will often be about the existing situation – what do children think about Physical Education? – and sometimes also a little about the desired situation – what could be an ideal place in the neighbourhood for children to play?

Tip: Have them investigate a very specific location or situation. The theme of sustainability is too broad for design-based learning; instead, choose collecting plastic rubbish in the Paddington neighbourhood in London or the problems faced by children and teachers in keeping the school tidy.



Physical Education in the future: Example of connection between designing and researching

The design question in the project on Physical Education in the future is 'Come up with a Physical Education lesson in which pupils in year four enjoy getting plenty of exercise'.
Pupils in year eight will work on this question and start by researching the target group. Their research question is 'How do children in year four play and get exercise, and what kinds of exercisers are there?'. The answers to the question will provide a good basis for coming up with a Physical Education lesson that is geared to year 4.

Note down in the Design Topic Chart the theme, design problem and design question.

1.3 The scope of the project

Decide how much time your pupils can spend on the project. Which design activities do you want to cover and which do you want to leave out?

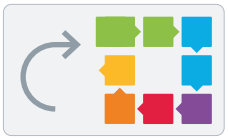
If pupils do not have any experience with design-based learning yet, a small project focusing on a few design activities is preferable. If they do have some experience, the advantage of a large project is that pupils will be able to go into greater depth and will also learn how they can use the results from one design activity in the next step.

Below we will give an example of a lesson or series of lessons about recycling in half an hour, three hours and eight hours.

Example: structure of design projects of different scopes

Recycling theme – in half an hour

Teacher Mrs. Smith is covering the theme of recycling waste materials, but she only has half an hour. She uses the tool **Choose your side** to develop a game where pupils discover how other people collect waste, what is important to them and the things they do not like doing. The pupils discover that everyone has different ideas about separated



collection, with different experiences and emotions. Mrs. Smith uses this to clarify the 'develop empathy' learning goal and spends the rest of the week on it, with a constant focus on how others think and feel. The focus is here on exploring the context of the problem.

Recycling theme – in three hours

Teacher Mr. Boutaleb is covering the same theme with his group and has three hours available for design-based learning. After the **Choose your side** game, pupils make a **Location vlog** about what they do with waste. They interview and film each other at home as well. In this way, the pupils develop empathy for the users and arrive at their own design questions. For the next lesson, Elvira's mother, who works for London's Waste Processing, comes to school. The pupils start with a **Picture brainstorm** of twenty minutes, after which each design group has generated about twenty solutions to their design question. After that, Elvira's mother talks about separated collection and includes the solutions that the children have come up with. The focus is here on exploring and creating design ideas.

Recycling theme – in eight hours

Mrs. Khunyakari has decided to go through an entire design process including making and testing prototypes and is focusing on the recycling of plastic waste. The design assignment is to design something from plastic waste. Her project starts with research into the waste materials and the **Choose your side** game. Her class brainstorms twice, with the **Picture brainstorm** and **Combine and fantasize**.

Out of the whole stack of possibilities, each team uses the **Choice-box** to select a surprising idea to develop into a prototype. An expert, who works for a Waste Processing Facility, is there to help with the lesson in which pupils are to develop and realise the idea by asking their fellow pupils good questions. The expert has read the **Forward with feedback** tool beforehand so that she can ask the pupils good questions that promote critical and creative thinking about their design. After the prototypes have been built and tested, the expert talks about the separated collection of plastic by her company and what a typical day at work is like.

During the next lesson, the pupils will continue working on their prototype. The teacher wants the pupils to learn how to clearly communicate a creative idea to someone who has never heard of the idea before. They brainstorm together on how you can clearly explain a good idea, after which they make a **Video roll** out of their idea and send it to the Waste Processing facility. After a week, they receive a video message from the expert on their ideas.

From the recycling lessons in the box above, you can tell that small projects focus only on a few design activities. Your Turn offers a choice of several tools for these steps.

Focus of the design lessons in relation to their scope

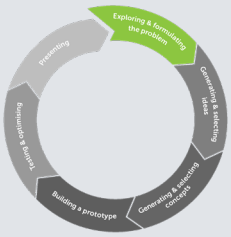
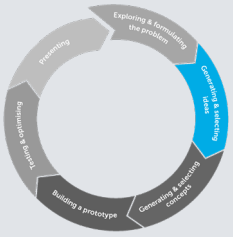
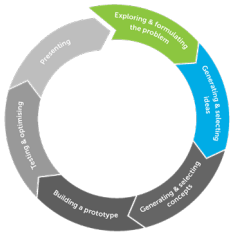
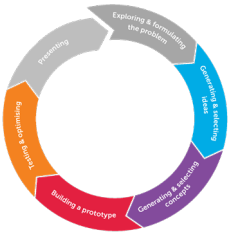
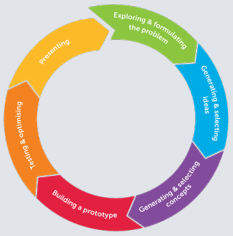
On the next page we provide several suggestions for the focus of the short design lessons; why not first practise only with exploring the problem and developing empathy and insight in users in a lesson of an hour and a half? If a tool takes a lot of time, you might include fewer activities from the design process in your lesson plan.

Tip: Watch the example of a design project concerning the 'multiplication tables' on You Tube. In this project the activities focus on 'exploring the problem' and 'generating ideas' (option 3 from the table on the next page):

- Lesson 1: **https://youtu.be/gGuG8Bb5Fpw**
- Lesson 2: **http://youtu.be/6bgHopWrPrg**

Don't forget to enable the subtitles!

Note down in the Design Topic Chart the desired scope and chosen focus.

Time available	Focus of activities in the design process	Phases design cycle
½ an hour to 2 hours	**Option 1 – Focus on 'Exploring the problem'** Choose tools from the two green design steps exploring the problem and finish with conclusions about the target group's problem.	
	Option 2 – Focus on 'Generating ideas' Introduce a problem that pupils recognise straight away and give them the design question. Choose a tool from the blue area come up with ideas and practise with it. Evaluate halfway through how they are doing with generating ideas and then have them generate ideas again. You might want to finish by having them pitch surprising ideas using tools from the yellow area "presenting".	
2 to 6 hours	**Option 3 – Focus on 'Exploring the problem' and 'Generating and selecting ideas'** The pupils explore the problem and generate ideas on the basis of a design question. Tools from the green and blue areas are used.	
	Option 4 – Focus on creating, making and testing Focus on generating ideas (blue area) and move quickly to working and testing materials (red and orange areas). If you have more time, you can also spend more time on selecting a creative idea (blue area 2b) or on further developing the concept (purple area).	
8 to 10 hours	**Option 5 – Entire design process** You can go through the entire design process, from exploring the problem to presenting the design. Often iterations are needed in such a process. Besides testing (orange), feedback from peers and/or the client *(purple area) help with identifying elements in the designed product that need improvement. Present intermediate and final ideas to the client.	

1.4 Involving an external party

Will you be involving an external party? What party can provide inspiration and foster deeper learning in your classroom?

A Why opt for a lesson with an external party?

- The external party is enthusiastic about the subject and knows how to bring it to life.
- Results are used by the external party in real life. The external party uses the children's solutions as inspiration or is better informed as to what children see as important elements of the problem. This motivates the pupils – what they think and do is important!
- The external party adds expertise and unique experiences. The external party can talk about their own design activities and give input for the pupils' design activities, for example in the form of inspiring feedback on an idea from the class.

B How to find an external party?

Sometimes an organisation or parent will approach you for a design project, but teachers usually go in search of an external party themselves.

- **Look for opportunities in the surrounding area** and walk, drive or cycle around the school neighbourhood sometime. What organisations are out there? Drop by sometime or send an email. You might find out that the bakery around the corner wants to come up with a new kind of healthy birthday treat or the neighbourhood centre is willing to give your class an assignment about how to involve elderly people in the community.
- **Ask parents and people that you know where they work** and whether they would like to be an external party.
- **Take a ready-to-use teaching guide with a current design question** to which you can easily connect an external party.

Example of a ready-to-use **design project on the circular economy** developed by the World Largest Lesson using the Your Turn approach.

- **Choose a theme and go in search of an external party** to make the theme concrete. Suppose you choose sustainability and find a company that recycles plastic bottles and is willing to involve the pupils in a design question that has yet to be solved.

A biomechanical engineer introduces the design problem within the classroom

c What interests does the external party have?

Education is important to many external parties, and they have the interests of your pupils in mind. In addition, they may have their own interest or needs in relation to the project. Ask them!

Possible reasons for an external organisation to take part in a design project at school:

- To get pupils' input and solutions on a problem faced by the organisation.
- Learning from pupils by giving them a design question. For example, because a design is going to be made and the designer wants to know what is important to children.
- Making the pupils aware of a goal in society such as living healthily or the importance of water management.
- Improving the organisation's own image.

If external parties want to use the results from the pupils, this will often be about discovering what children see as important in relation to the problem and taking inspiration from the pu-pils' solutions. This is often extra motivating for your class!

Make arrangements with the client and pupils to ensure that the results of the project are carefully documented and that the pupils' insights actually make it to the external party. The tools in Your Turn for presenting design ideas (design step six) are highly suited for this purpose. Share the interim results or invite the external party to a lesson in which the children are at work. In our experience, many external parties find the results from exploring the problem and the brainstorming session just as interesting as the final design.

Children making a Video roll from their design drawings

Discuss beforehand whether the external party is willing and able to be present during your lesson. Give the external party an active role in the teaching so that the pupils can learn from the external party, like in the example about recycling (& 2.2), but take overall responsibility for the lesson yourself.

Note down in the Design Topic Chart potential external partners and make contact.

1.5 Define the learning goals

Design skills as a learning objective

Pupils practise various 21st-century skills in a design project. The figure below show the design skills; select which design skills you would like to cover

Figure 2 Design skills (source: Klapwijk 2018; Klapwijk, Holla and Stables 2019)[4,5]

Not familiar yet with the design skills? Read the appendix with a more detailed description.

Research skills as a learning objective

Are there research skills that you would like to focus on as well? These are often important learning goals in exploring the problem and developing empathy for users, and in testing the design solution. Examples are: observing and collecting data, discovering patterns in data, critical thinking and questioning or being curious.

Learning goals from language, maths and the subjects for which many facts must be learned

Because a design project will always be about something specific, you may decide to connect the project with learning goals from subjects

4 Klapwijk, R.M., (2018). Formative assessment of creativity. In: De Vries, M. J. (Ed.). Handbook of technology education. Springer International Publishing, pp. 765-783.

5 Klapwijk, R. M. E. M. Holla & K. Stables, 2019. Make Design Learning Visible, Delft, Delft University of Technology.

such as history, geography, biology. Or to more content-related goals from science and technology, like understanding pulley's or friction. You can also purposefully use the project for language and maths goals. While this is not necessary, it is a good way to create coherence and get more out of the lesson.

Ask yourself the following questions:

- Are there goals from other subjects that can feature in the design project?
- What material from the teaching methods can be connected with this?
- Should you cover this material before the design project, or in parallel?

Children are brainstorming about a mathematics lesson which can be teached outside

Combining different learning goals in a design project

Mr. Gold plans to carry out a design project about developing tools for people with a disability such as rheumatism. This is a good opportunity to cover the human body and muscle groups during biology class in parallel to the design project. At the end of the project, the pupils will show the product to people with rheumatism and conduct a short interview with them. At the same time, Mr. Gold formulates a number of specific language goals.

Note down in the Design Topic Chart the chosen learning goals.

2 Selecting tools for each design step

DESIGN FLOW CHART

Theme

Target group

Design problem

Design question

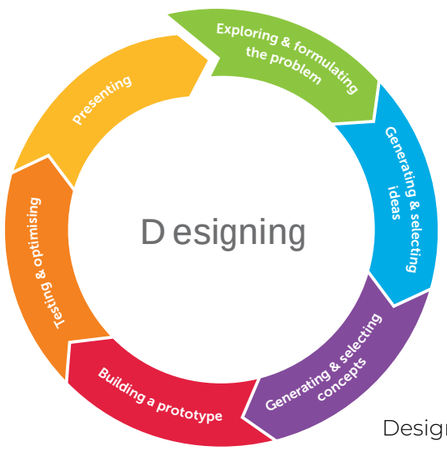
Duration of the lesson

Steps from the design cycle

Step to

External parties

Learning goals



Design cycle

Start

1a

Exploring the problem and developing empathy for users

Tools

- Location vlog
- Experience gatherer
- Choose your side
- Personas
- Other:

RESULT

Rich information on the problem/users

1b

Formulating the problem

Tools

- Empathic design challenge
- Other:

RESULT

Design question

2a **3a**

Generating ideas/concepts

Start with a warm-up exercise (energizer), continue with:

Tools

- Inverse brainstorm
- Combine and fantasize
- Open your senses
- Picture brainstorm
- Word brainstorm
- Other:

RESULT

Many and varied ideas

2b **3b**

Selecting ideas/concepts

Tools

- Yes/no list
- Choice-box
- Traffic light rating
- Dot voting technique
- Other:

RESULT

Selected ideas

Repeating/ deepening

Shortcut

Shortcut

Shortcut

2 **3** **4**

Giving and receiving feedback

Tools

- Forward with feedback
- Other:

RESULT

List of qualities, bottlenecks and follow-up questions

4

Building a prototype

No specific tools are yet included in Your Turn

Tools

- Other:

RESULT

Prototype

5

Testing a prototype

No specific tools are yet included in Your Turn

Tools

- Other:

RESULT

Test results

6

End

Presenting a design idea

Tools

- Piecing together a design pitch
- Solution pitch
- Video roll
- Other:

RESULT

Captured and communicated design

Repeating/ deepening

TERUG

How to use the Design Flow Chart

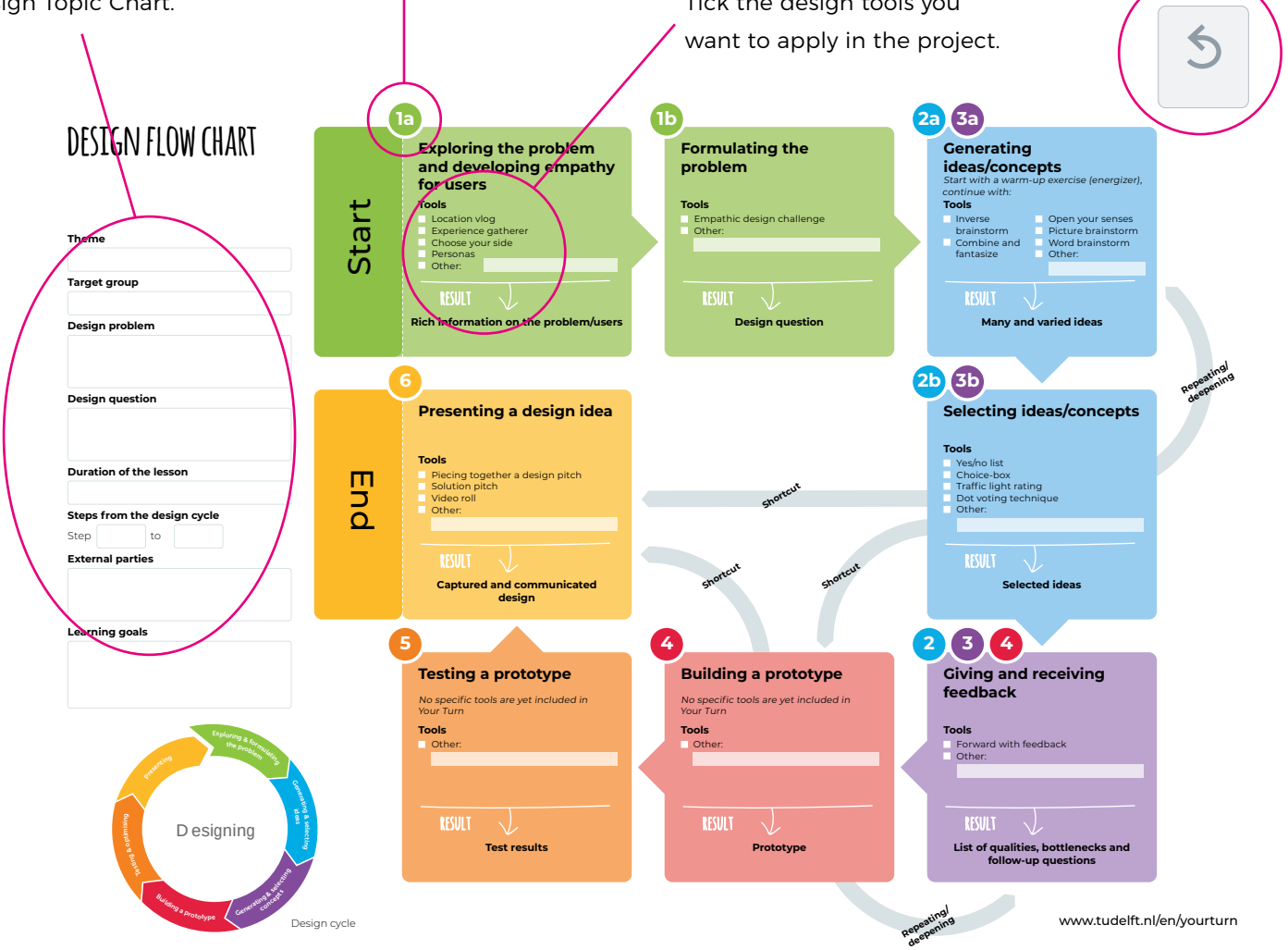
The flow chart on the previous page is an interactive sheme. By clicking in the scheme you can navigate to the design steps. With the box (in the top right corner of each page) you navigate back to the flow chart.

Enter the key information on your design lesson to summarize choices in your Design Topic Chart.

By clicking on the numbers of the design steps you go directly to the section with detailed explanation of this step.

This button takes you directly back to the page you were in the manual.

Tick the design tools you want to apply in the project.



2 – SELECTING TOOLS FOR EACH DESIGN STEP

You used the **Design Topic Chart** in chapter one to decide on the theme and which design steps to focus on in the lessons.

This second chapter is full of suggestions for developing each design step, as you discover which tools you can use. The **Design Flow Chart** is a (digital) help to fill in the activities during the design project. The numbers in brackets refer to the steps in this flow chart on page 00.

- **Step 1a** – Exploring the problem and developing empathy for users
- **Step 1b** – Formulating the problem
- **Step 2a, 3a** – Generating ideas/concepts
- **Step 2b, 3b** – Selecting ideas/concepts
- **Step 2, 3 and 4** – Giving and receiving feedback
- **Step 4 and 5** – Building and testing a prototype
- **Step 6** – Presenting a design idea

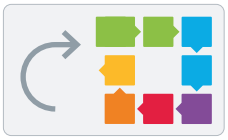
Each design step has a tangible outcome. This outcome is the starting point for the next step. Exploring the problem provides, for instance, the 'ammunition' for formulating a design question. The design question then takes centre stage in generating ideas.

2.1 Overview of the tools

All individual tools can be found on the website **www.tudelft.nl/en/yourturn**. On You Tube **https://tinyurl.com/YourTurnDUT** you find explanatory videos have been made for and by pupils for the tools with an *.

Step 1a – Exploring the problem and developing empathy for users

- **Choose your side***
  Participants realise that they differ from one another, and from the users they design for during this energetic exercise.
- **Experience gatherer**
  Map and reflect on your experiences in a playful and creative way.
- **Location vlog**
  By creating a vlog, the pupils map out the situation or environment that they are going to make a design for and they will see that everyone experiences the situation differently.



- **Personas***
  Gain insight of the target group by creating or using personas.

Step 1b – Formulating the problem

- **Empathic design challenge**
  Formulating a design goal base upon a story about users.

Stap 2a 3a – Generating ideas/concepts

- **Inverse brainstorm***
  Coming up with unusual ideas by inverting the current situation.
- **Picture brainstorm***
  Ambiguous and random pictures provide inspiration when coming up with new ideas.
- **Word brainstorm**
  Ambiguous and random words provide inspiration when coming up with new ideas.
- **Open your senses**
  Explore the design environment with all your senses.
- **Combine and fantasize**
  Coming up with new ideas by fantasizing about random combinations of objects and properties.

Step 2b 3b – Selecting ideas/concepts

- **Yes/No list**
  Making a quick, rough selection of ideas in order to continue with your designing.
- **Choice-box***
  A visual aid for working together to make a conscious selection of innovative and useful ideas .
- **Dot voting technique**
  As a group, making a selection of popular ideas to develop.
- **Traffic light rating**
  Rate ideas against criteria and quickly compare them with each other through the colour codes.

Step 2 3 4 – Receiving feedback

- **Forward with feedback**
  Formulating effective feedback through a standard routine.

Step 4 5 – Building and testing a prototype

No specific tools for building and testing prototypes are yet included in Your Turn at the time of its publication, but we are expecting to release two new tools. Go to the Your Turn website to see whether these have been released since then.

Step 6 – Presenting

- **Piecing together a design pitch**
  Pupils learn about the structure and important elements of design presentations.
- **Solution pitch***
  Using an appropriate story structure for presenting design ideas.
- **Video roll**
  Making a clear video about the design idea that can be easily shared with a client..

Please Note: As you can see from the chart, several tools can be used in different steps.

2.2 Exploring the problem and developing empathy for users

How will you introduce the problem to your pupils? How will the pupils explore the problem themselves?

Introducing and exploring the problem

- Use a video that paints a picture of the problem situation; when you want pupils to design an Outdoor Lesson in which users learn and move at the same time you could use a video about the importance of physical activity for brain health, **https://youtu.be/UzWd8ynGLEM**.
- Use a story that you have written yourself; the Experience Gatherer tool provides some writing tips. Or have an external party tell a story about the problems faced by the people for whom your class will be coming up with a design.

Please note: If you want your pupils to think about their own experiences first, you will need to keep the introduction very short. Otherwise you, as a teacher/external party, will influence them, and they will take the same perspective on the problem as you do. Have them examine their own experiences and those of others first and share this in a group discussion.

Developing empathy for users – gathering information

Your Turn contains many tools for developing empathy for users and to develop a broad understanding of how these users do or approach something at present and what their needs are. Pupils gather information about their own experiences and those of others that relate to the theme.

The following Your Turn tools can help:

- **Location vlog:** a vlog about your own environment. This works well if you limit the subject to something very practical. For example: do not base your vlog on 'sustainability', because that is far too general. One theme with a strong focus is 'how am I or how is my family mindful of the environment when shopping?'.
- **Experience gatherer:** a fun and creative way to think about your own experiences is often done as homework.
- **Choose your side:** quick tool that shows pupils that not everyone is the same.

Performing the Choose your side tool at the schoolyard

- **Persona:** Gain insight of the target group by creating or using personas: lifelike description of a character, representing a user group.

Children are creating a Persona

Other options:

- Visit to an external partner.
- Interviews with potential users.

Developing empathy for users – processing information

If you have gathered enough information about the users, organise an exchange of information in class. Then, have them make a drawing, for example of a fictitious user, and note down important experiences, so that they develop even more empathy for others.

Next, have the pupils create a **Persona**. If the class has little design experience, create a number of personas yourself.

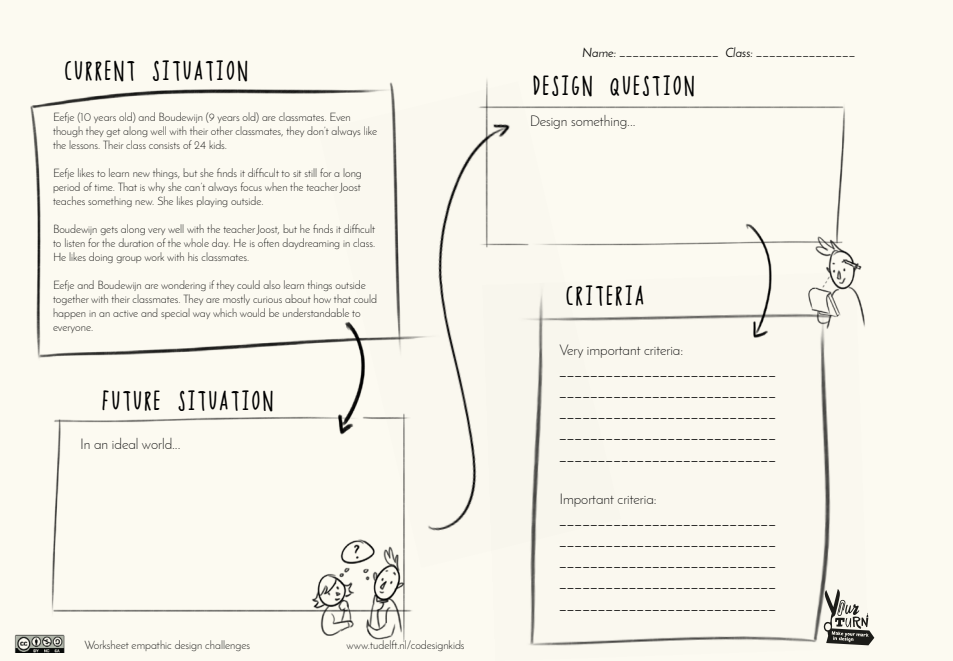
After this step, the pupils will know who is faced by this problem and they will also have gathered information about their living environment. They have a picture of different sides of the problem and understand the target group for which they are designing. Thinking in all directions and Develop empathy are often key learning goals in this step.

2.3 Formulating the problem

Formulating a design question

Will you ask the pupils to generate their own question on the basis of the problem exploration, or will the design question be given by the external person or the teacher?

The **Empathic design challenge** tool strikes a happy medium. The teacher or external party writes a short story that pupils use as a basis to generate the design question. Pupils often see different problems than adults, especially when their daily living environment is concerned. That in itself is valuable to the external client.



Example worksheet empathic design challenge

2.4 Generating ideas/concepts

How will your pupils generate ideas? Will they have one or more brainstorming methods at their disposal? And how will the pupils make a conscious selection from the huge stack of ideas?

Warm-up exercises (energizers)

- Have a warm-up exercise (energizer) ready before the pupils start brainstorming.[6] Scores of them can be found on the internet. Look on You Tube for examples like Squiggle birds and Gordion knot.

6 https://www.sessionlab.com/library/energiser

Tip: gear the warm-up exercise to the theme; for example, if the design assignment is about exercise, choose an warm-up exercise involving different kinds of exercise.

Tip: gear the warm-up exercise to the needs of the class at that time: could they use some mental relaxation, a physical way of release or humorous associations?

Generating brainstorming ideas

- If the class is still learning how to brainstorm, choose the **Inverse brainstorm** tool. By practising together with the whole class and working with opposing concepts, everyone will eventually manage to generate a different idea..
- If your question is related to a particular location, **Open your senses** and **Combine and fantasize** will be suitable. Studies show that pupils generate a relatively large number of original solutions when using these tools. That is great for external parties and useful for your class as well. However, you will need to tailor this tool; involve the external party and/or pupils in doing this.
- The **Picture brainstorm** and **Word brainstorm** tools can be applied to each subject and take relatively little time. And they can be applied to each theme without any changes.

Pupils performing the word and picture brainstorm

2.5 Selecting ideas/concepts

Choose one of the selection tools below. The main point of all four tools is to make pupils think consciously about the pros and cons of each idea and get everyone on the design team to say something in the exchange of ideas.

- **Dot voting technique:** quick selection method.
- **Yes/No list:** first selection round if there are lots and lots of ideas. Use one of the other selection methods after that.

Pupils applying the Choice-box tool

- **Choice-box:** ensures plenty of dialogue about the originality of ideas and whether an idea fits in with the design question. That makes it particularly useful.
- **Traffic light rating:** selection method that is useful for selecting the best idea from a set of 2-5 ideas. The pupils will fine-tune their idea by assessing it in terms of their wants and needs!

Tip: have experienced pupils choose a selection method on their own.

2.6 Giving and receiving feedback

In a design process, you want pupils to be able to develop their own creative idea rather than forcing them in one particular direction. Nevertheless, it is important for pupils to receive feedback from you as the teacher, from the external party or from their fellow pupils. This feedback is not meant to restrain them or tell them what won't work – its purpose is to provide inspiration. So the message is not that 'this is bad or still not working' but rather 'based on these needs or these wants, here are some ways to improve your idea'. So don't be afraid to give feedback on their actual design ideas and what they are thinking.

Pupils will benefit from your input as long as you keep them responsible for the final decisions, e.g. "Is there another way to keep this together?" or "What if you used magnets instead of strings?". In other words: do not limit yourself to feedback on the design process but stimulate divergent and convergent thinking on the design itself.

After presenting their design solution pupils are giving and receiving feedback

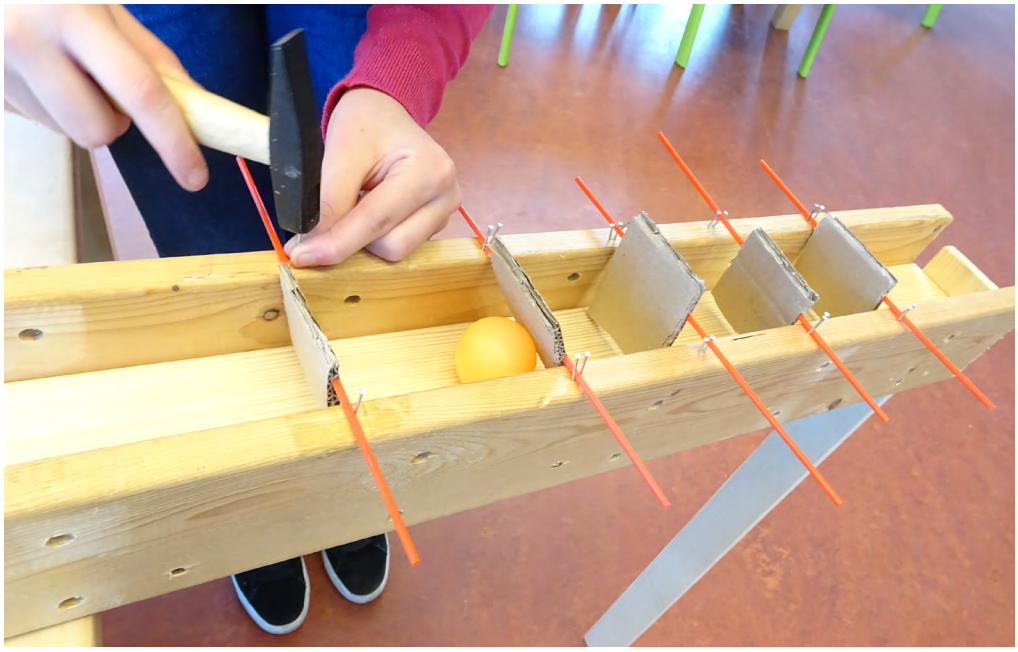
With design-based learning, even though the outcomes cannot be defined beforehand, there is always room for communication about the quality of the results. That helps pupils to learn and improve their design skills. First of all, it is good for pupils to get specific compliments and to find out what others see as great qualities of their design. Second, it is important for them to know where there is still room to improve their ideas.

Often it is easier to evaluate the design of a peer, than one's own design. However, as scientific studies have shown giving and receiving effective feedback on creative products is not easy for both adults and pupils

alike.[7] Feedback can easily create resistance and even impede the creative process. This is why we have included a feedback tool in this guide: **Forward with feedback**. Pupils and/or external parties can use this to provide input about the design at different times in the process and learn how to formulate their feedback so that it gets the recipient's ideas flowing. Use this method yourself to give feedback in a design project, to set an example for the class. Let peers and external parties use the feedback approach as well, to give inspiring feedback.

2.7 Building and testing a prototype

Think about how the pupils can move their idea one step forward and turn it into a physical prototype. At the start of the process, ensure that materials are available so that pupils can build their prototypes without having to wait. Organise extra materials if you want them to go through several iterations – assess what the different groups need.



Building prototypes within the "How to make time visible?" design project

No specific tools for building and testing prototypes were included in Your Turn at the time of its publication. Go to the Your Turn website to see whether these have been released since then. Several tips from our projects are given below.

7 Schut, A., Klapwijk, R., Gielen, M., van Doorn, F., & de Vries, M. (2019). Uncovering early indicators of fixation during the concept development stage of children's design processes. International Journal of Technology and Design Education, 1-22.

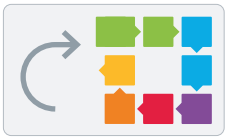
Building a prototype

- Let the pupils see the materials that are available at school beforehand. This can be done with a couple of pictures in a PowerPoint presentation, an overview table or a short tour of the materials. Have pupils think of which materials can be used for building a prototype rather than having them grab the most desirable material immediately.
- Ask pupils to make a 'shopping list' for extra materials and discuss whether and how they can be gathered. Ask whether there are any parents who can easily procure materials, for example via their work.

Pupils discovered a lot building and testing the prototypes within the "How to make time visible?" design project

Testing a prototype

- Test the prototypes using the list of wants and needs or by using common sense. If necessary, ensure that there is a test set-up where the pupils can test the product.
- Organise a feedback round so that everyone gives their input; see section 3.6. If is often easier to see a problem with the design of another team than with your own design. You might want to have them start by giving a quick presentation about their idea and prototype. Divide the class up to keep this going quickly or form groups of two teams.
- Bring in the design question, wants/needs and, possibly, the personas: what would you still want to improve in this case?



Develop one of the class's prototypes in more detail

Developing an idea into an increasingly better concept can take a great deal of time. So one option is to select a promising prototype to develop with the whole class rather than trying to improve all the prototypes. This will show pupils what it is like to turn an idea into a prototype that can be used in real life, and they will be able to demonstrate this to the school or an external party.

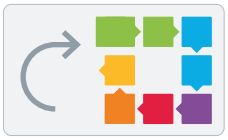
Use the following tools:

- **Choice-box** and **Traffic light rating**: useful methods to decide together which concepts and prototypes the class wants to work on.
- Or ask the external party: make a **Videostrip** of all the options and ask the external party which prototype they would like to see developed and why.

Involving the external party in the selection process

No less than six new Physical Education lessons and several special gym apparatuses were conceived in the Physical Education in the Future design project. Pupils in year 8 used a **Video roll** sto send a video about their initial prototype to Mrs. Aboutaleb, their school's regular Physical Education teacher. They asked her if she would teach one of the Physical Education lessons to pupils in year 4 and which idea she preferred.

A week later, the pupils received a letter from the Physical Education teacher in which she explained what she found interesting about each idea. At the end, she selected two ideas because she thought that even pupils who do not really fancy Physical Education would like this kind of Physical Education lesson, and because these ideas were the most special. Mrs. Aboutaleb also pointed out a number of problem areas and worked with the class's own teacher to formulate a couple of questions using the **Forward with feedback** tool.



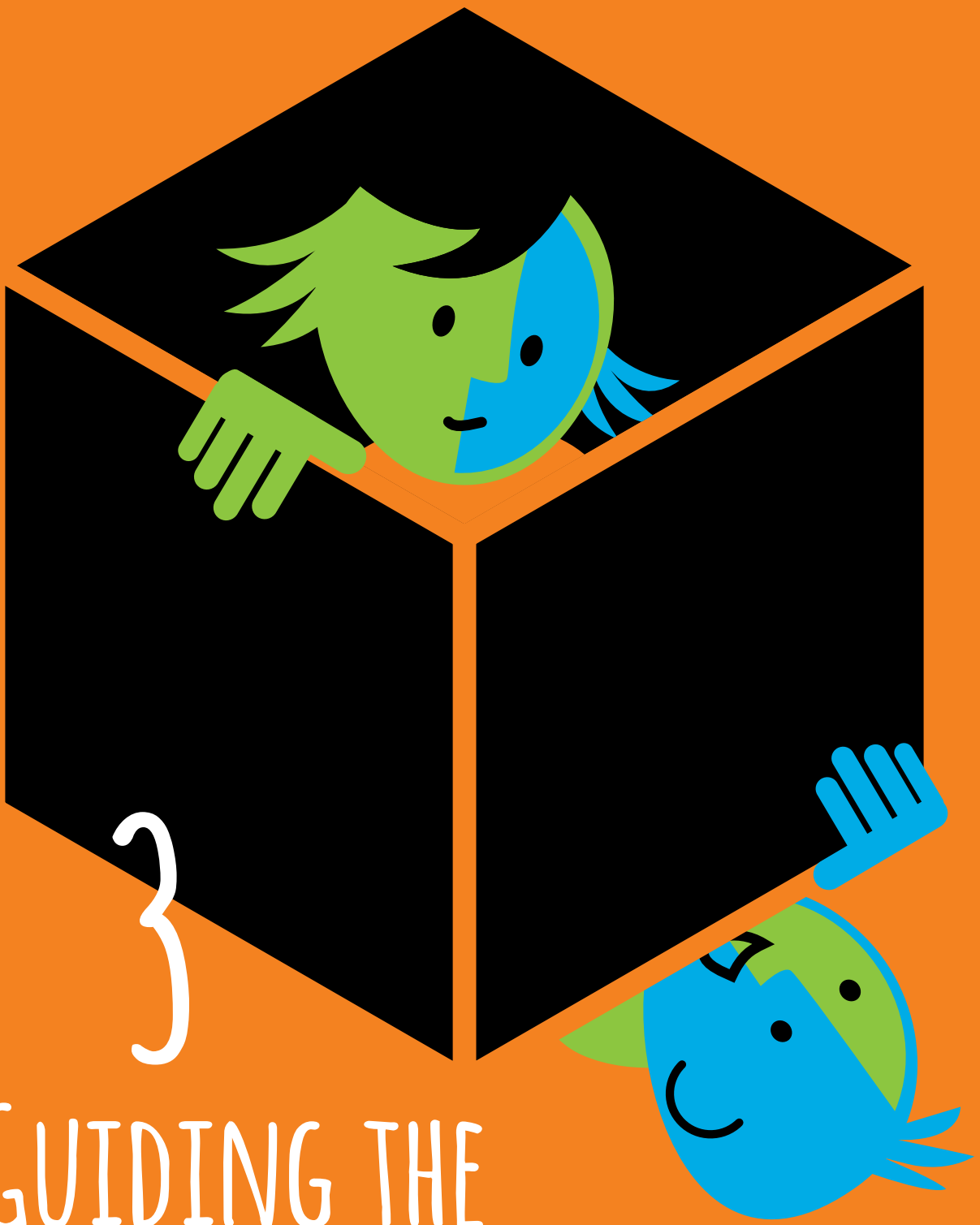
2.8 Presenting

At various times in a design process, it can be useful for pupils to give a presentation to people who are not directly involved in their design, e.g. users, clients or parents.

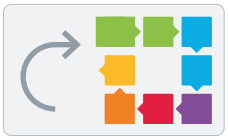
This is to make others enthusiastic about the idea while getting their constructive and critical input.

Accompanying Your Turn tools:

- **Piecing together a design pitch**; quick exercise where pupils learn what parts make up a presentation about the design idea;
- **Solution pitch**: pupils use help sentences and drawings to make a story about their solution in a workbook, which they use to present their solution. The workbooks support the oral presentation and are suitable for sending to an external party as well;
- **Video roll**: tool where pupils use the materials that they have made and a crib sheet to record a video for an external party in one quick take. This is useful if you want to provide the external party with information but have little time to prepare a presentation.



3 GUIDING THE LEARNING PROCESS



3 – Guiding the learning process

Pupils will learn a great deal during design projects. They learn about the theme or content of the design project and they will develop their creativity, empathy and other design skills. This learning process can be consciously guided and promoted by applying the following strategies during the design activities:[8]

1 Clarifying learning goals and success criteria.[9]
2 Demonstrations and practising with the aid of examples.
3 Feedback so that pupils can take the next step.

3.1 Clarifying learning goals and success criteria

A specific learning goal is given for each tool or activity. By sharing and clarifying this learning goal with the pupils, they will understand better what they are learning. Before the design activities, discuss the relevant learning goal and make the success criteria as specific as possible. If you will be brainstorming, you might want to give them the criterion of 'as many ideas as possible' and 'ideas that other children probably would not think of'. You might also engage in dialogue with the pupils about the learning goal, such as teacher Mrs. Young does below.

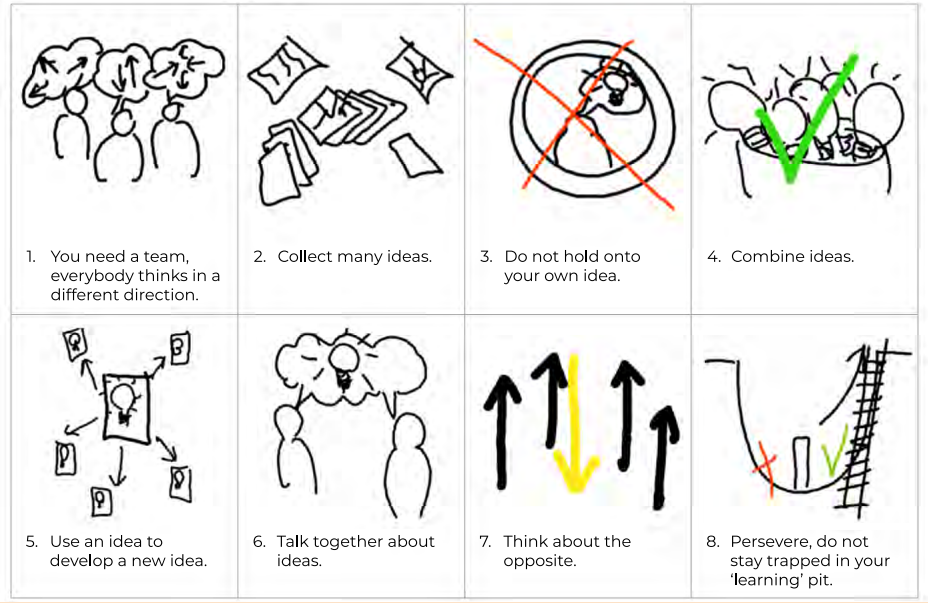
Think in all directions during brainstorming

Mrs. Young has her pupils brainstorm about a new Physical Education lesson that is fun for everyone, whether they like to compete or not. Think in all directions is an important objective, and she explains that the point is to generate many different ideas as well as ideas that other children probably would not think of.

8 Gielen, M. and R. Klapwijk, 2020. Skilful Co-design. In: Van Boeijen, A., Daalhuizen, J., & Zijlstra, J. (2014). Delft design guide: perspectives- models- approaches- methods, Delft University of Technology, Faculty of Industrial Design, Bispublisher.

9 Klapwijk, R. and N. Van den Burg. Involving students in sharing and clarifying learning intentions related to 21st century skills in primary design and technology education. Design and Technology Education: an International Journal, v. 25, n. 3, p. 8-34, oct. 2020. ISSN 1360-1431. <https://ojs.lboro.ac.uk/DATE/article/view/2788>.

Mrs. Young asks the class what it looks like if you really think in all directions and notes down all the children's suggestions in a simple sketch. This produces the following 'recommendation' for the pupils:



Halfway through the brainstorming session, the pupils assess whether they are managing to think in all directions. This often goes well, but Ilse tells the pupil next to her that 'she's still stuck on the same idea'. All her ideas are about dodge ball. Nina gives her a tip: look around the classroom and try to use what you see. Or think of exactly the opposite and use that to generate an idea. In the second round, Ilse manages to generate quite varied solutions.

Tip: Within an activity, choose one skill to focus on and formulate this in terms of visible behaviour. Gear your choice to the design project and the pupils. Tip: formulate several success criteria for your pupils to determine for themselves whether they have achieved the goal.

Tip: Check the design skills in Appendix A.

3.2 Demonstrations and practising with the aid of examples

For many pupils, designing is a new activity. That is why it is a good idea to learn an activity beforehand by practising with an example. Examples about Ben have been included for several tools. Ben is a boy who rides to school on his bike and does not like to get wet in the rain. After practising a tool together with this example, the pupils will use the tool for their own project.

Tools with a practice exercise about Ben

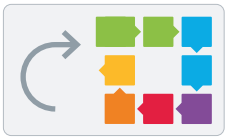
- Empathic design challenge
- Choice-box
- Traffic light rating
- Forward with feedback

The examples have been included along with the relevant tool in the material for pupils. Also download the useful PowerPoint presentation 'Ben has a problem' with extra notes.

You could also demonstrate a design activity. With the inverted brainstorm, you could, for instance, select two words aloud from the pupils' brainstorming session and generate a couple of ideas to demonstrate it to your class.

3.3 Feedback so that pupils can take the next step

Hold a short break now and then to determine with the pupils what is going well and what still needs more work. Use the previously mentioned success criteria for this purpose. After that, ensure that as many pupils as possible have the chance to practise a point that they still find difficult, and celebrate their success once they have mastered it.



Example of feedback in learning how to interview someone they know

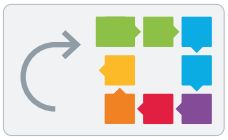
Pupils practise in interviewing someone they know in groups of three. They have prepared questions for other members of their family or for neighbors and practise formulating open-ended questions, pausing and pressing for more information.

One group practises with the class and the teacher gives feedback so that they get better at pressing the interviewer for more information. Then all the pupils form groups and practise interviewing someone they know. After five minutes, all groups stop the interview and discuss how well they have done.
Mary was the interviewer in one of the groups. She pauses often enough – she still has a hard time pressing for more information. John from the same group shows how it is done and presses Ilse for more information about one of her answers. Then Mary gives it another try and manages – with a little help from John – to ask Ilse a good follow-up question.

The above three strategies – clarifying learning goals, using examples and giving feedback – are some of the strategies for formative evaluation. They provide support in learning how to design. These strategies have been included as a standard element in several of the Your Turn tools.

See where it would be advisable to offer this support to your pupils. In some cases, this will take hardly any time at all. Sometimes you can recoup almost all of the necessary time because the pupils will understand much better what good work looks like.

In our experience, when learning how to design, it is better to carry out a limited number of design activities with support than a great deal of design activities without that support. Pupils will learn more if they understand the success criteria and practise with the aid of examples beforehand. Their design skills will develop even faster if they subsequently evaluate their own work and receive tailored advice.



Appendix A

Design Skills

- Think in all directions
- Develop empathy
- Bring ideas to life
- Share ideas
- Deside on your direction
- Make productive mistakes
- Make use of the process

Appendix B

Tools (including worksheets)

- Location vlog
- Experience gatherer
- Choose your side
- Personas
- Empathic design challenge
- Inverse brainstorm
- Open your senses
- Combine and fantasize
- Picture brainstorm
- Word brainstorm
- Yes/no list
- Choice-box
- Dot voting technique
- Traffic light rating
- Forward with feedback
- Piecing together a design pitch
- Solution pitch
- Video roll

Tip: Many Your Turn tools are demonstrated and explained by children in an accompanying You Tube videos. They can be found at **https://tinyurl.com/YourTurnDUT**

Colophon

This guide is one of the results from the research project Co-design with Kids, funded by The Netherlands Initiative for Education Research (NRO), The Dutch Research Council (NWO), Zuid-Holland Science and Technology Expertise Centre (EWT-ZH) and the Delft University of Technology.

The project researched the promotion of the 21st-century skills of empathy, creativity and communication in primary education through design projects for external clients.

The following consortium partners contributed to the research project and the development of tools.

Research institutions
TU Delft, faculty of Industrial Design Engineering / section Design Conceptualization and Communication.

TU Delft, faculty of Applied Sciences/department of Science Education and Communication and Science Education Hub TU Delft.

The Hague University of Applied Sciences, research group Healthy Lifestyle in a Supporting Environment.

Inholland University of Applied Sciences, research group Pedagogic Didactic Action in Education.

English translation in association with Goldsmith University.

Education partners
SCO Delft school board
Octant school board

Business and society partners
Jantje Beton National Youth Fund
UMC Utrecht Wilhelmina Children's Hospital
Yalp BV

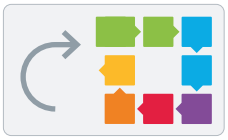
Financiers
National Board for Educational Research (NRO)
Netherlands Organization for Scientific Research (NWO)
Center of Expertise for Science & Technology South Holland (EWT-ZH)

Other partners
Eindhoven University of Technology (TU/e)
Center of Knowledge for Sports & Exercise
TU Delft, Sports Engineering Institute, supported this project application with seed funding

Pilot schools
Octantschool de Ackerweide, Pijnacker
De Akker, Rijswijk
Het Galjoen, Den Hoorn
Pius X, The Hague
Het Palet, The Hague
Panta Rhei Plusklas, The Hague
Eerste Westlandse Montessorischool, Monster
Prinses Máximaschool, Berkel en Rodenrijs
Daltonschool Rijnsweer, Utrecht

Researchers
Alice Schut, Fenne van Doorn, Maarten van Mechelen, Debbie Buchner, Danica Mast, Niels van den Burg, Miroslava Silva Ordaz e.a.

Scientific support
Pieter Jan Stappers, Marc de Vries, Remke Klapwijk, Mathieu Gielen, Jeroen Onstenk, Sanne de Vries



Scientific publications about Co-design with children and the Your Turn guidelines and tools

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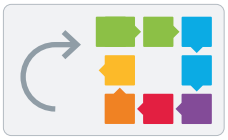

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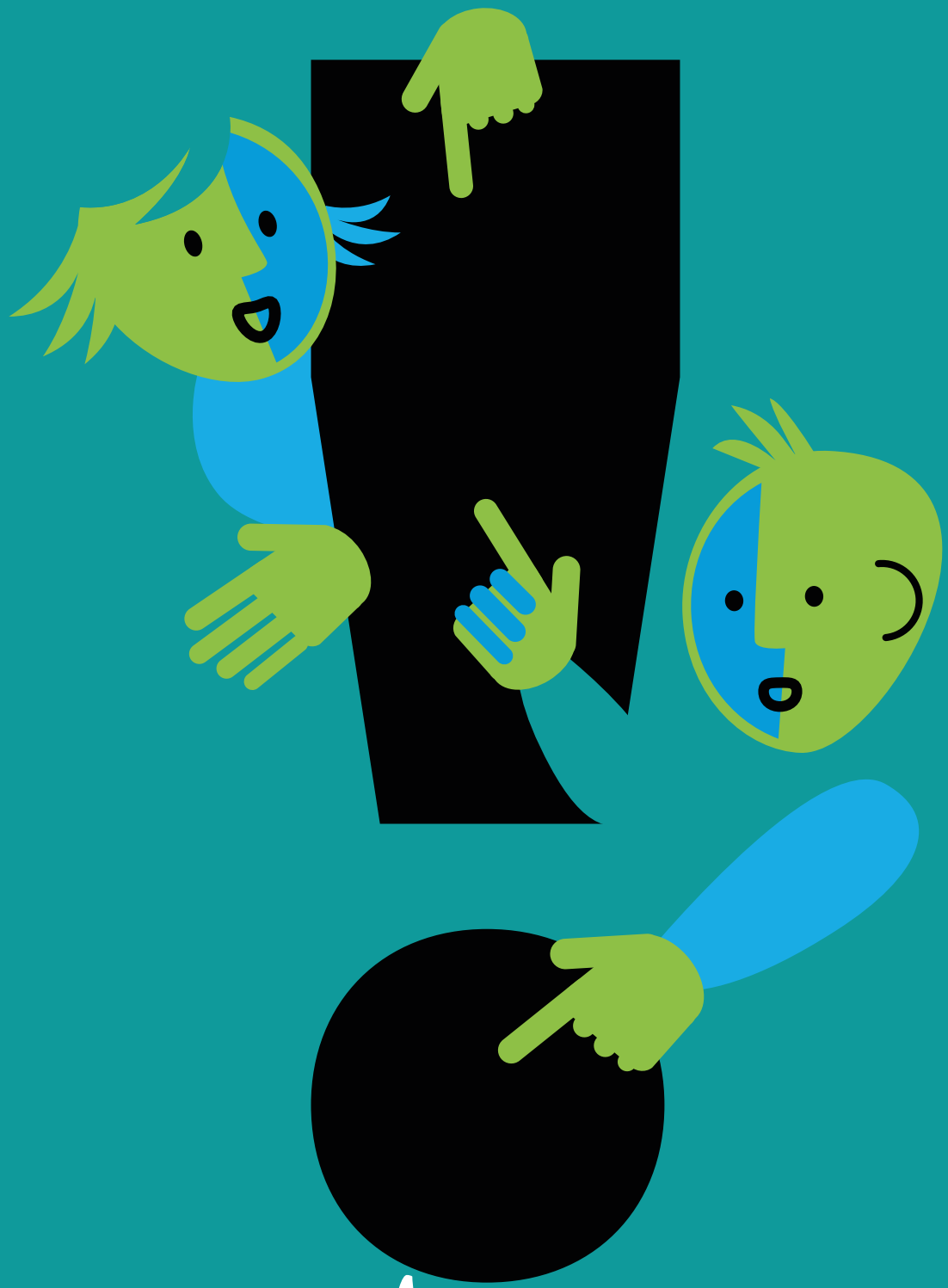
The Your Turn materials are available on two websites: **www.tudelft.nl/codesignkids** (focusing on designers) and **www.tudelft.nl/en/yourturn** (focusing on teachers)



APPENDIX A: DESIGN TOOLS

LOCATION VLOG

By creating a vlog, the participants map the situation or environment that they are going to make a design for, and they will see that everyone experiences the situation differently.

Participants
Duos

Design skill
Develop empathy

Prior design experience
None

Duration
60 minutes

Design step
Explore the problem

Description

Pairs of participants make a vlog about the location of a design problem. They film short clips with a telephone or camera where they show the surroundings of the design assignment. They are given the role of reporters and the participants explain how the place is used, who is usually there and which objects are around. In addition, the participants can incorporate their own opinion about the environment.

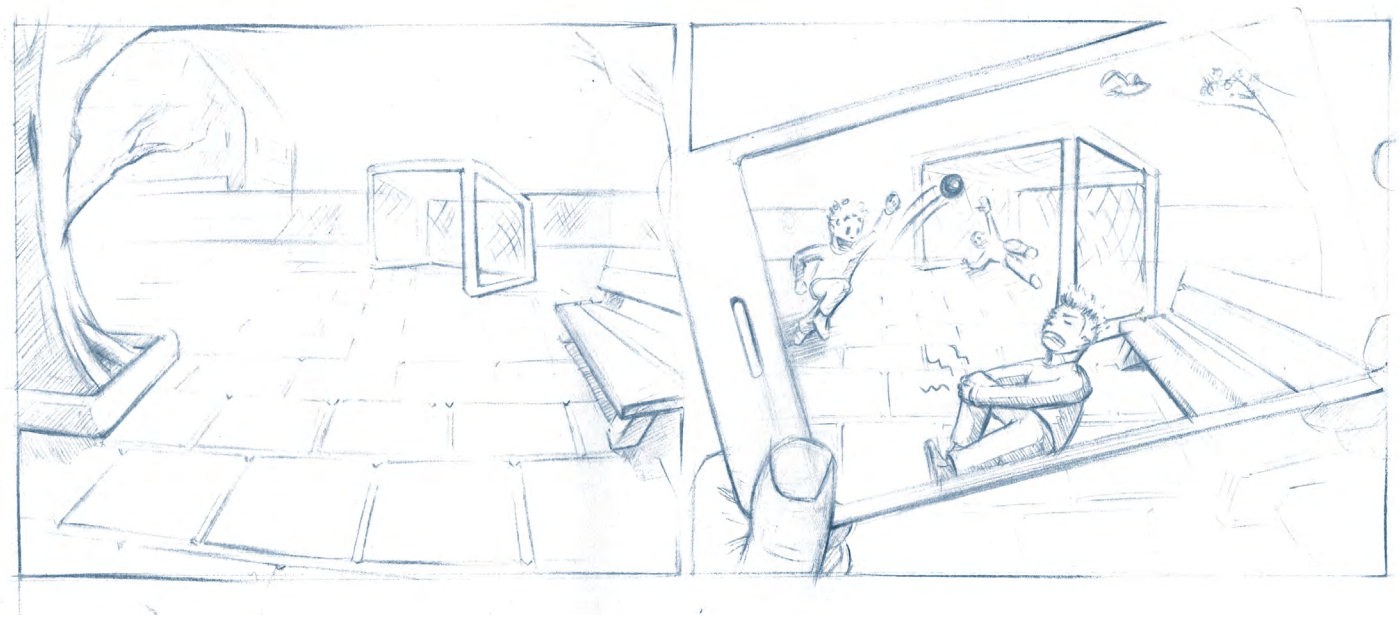
After filming, the participants have a short time to merge the clips into a vlog. They select the best material and ensure that the different clips form a logical vlog.

After editing the material, the participants view each other's vlogs and talk about the environment with each other. This helps them to use the videos to look for similarities and differences between their experiences.

Effect

Creating a vlog helps participants to be more aware of the design environment and helps them to view the environment differently. Watching other people's vlogs shows participants how they can experience their environment differently than their peers.

Without the Location vlog *With the Location vlog*



Example

Year 6 is going to make a new design for the schoolyard. Before the students get started with inventing ideas, they visualize the current environment of the school playground by creating a vlog. Joy and Rosa work together. Rosa films Joy as she explains what you can do on the horizontal bar. Joy says that the horizontal bar is her favourite place. While hanging and moving, she says that she feels free at the horizontal bar. She thinks the green bushes are also nice. When Joy is finished, they change roles and Rosa shows the best place for a quiet chat on the school playground.

After filming, Joy and Rosa choose the best clips and edit them into one video. When the vlog is ready, they watch it with Tommy and Axel. It strikes Rosa that the boys only spoke about football and using the horizontal bar as a goal. During the class discussion, she decides to share this insight. The other groups also noticed that there are major differences in the favourite spots and activities of each student on the school playground.

Step by step

1. Consider in advance the preconditions the vlog must meet. Decide what the vlog should be about, what the maximum length of the vlog is and the area in which the participants can film. In addition, make a schedule for creating, editing and discussing the vlog.

2. Make sure there are enough cameras for one camera between two participants. A vlog can easily be recorded with a mobile phone.

3. Before the participants start filming, discuss the preconditions for vlogging with the class. Agree on how much time there is for filming, editing and discussing the videos. Encourage the participants to record everything in one clip, this saves a lot of time when editing.

4. Have the participants view and discuss their vlogs in groups. Have them write down on paper the similarities and differences between their perception of the environment.

5. Discuss the most striking similarities and differences with the whole group. Emphasize that the participants do not all experience the environment in the same way and that it is good to take this into account when designing.

Tips

- Creating a vlog can take a lot of time, so discuss the time schedule in advance. For example, take 20 minutes for filming, 10 minutes for reviewing and editing the vlog, and 15 minutes for discussing the vlogs. If necessary, omit editing, asking participants to make a vlog in one take.

- Do you want the participants to edit the vlog? There are various apps available for editing the videos on a mobile phone. Ask the students if they are already familiar with a software for editing as this is preferable. Most mobile phones have simple video editing functions. Otherwise, search for a suitable app to edit the videos. iMovie works well or use the YouTube editor.

EXPERIENCE GATHERER

Map and reflect on your own experiences in a playful and creative way.

Participants
Individual

Design skill
Develop empathy

Prior design experience
None

Duration
70 minutes

Design step
Exploring the problem

Description

Participants individually do creative assignments in an environment related to the design assignment. In a follow-up session, they discuss the results of their assignments in groups. This allows them to compare their own experiences with the experiences of their peers.

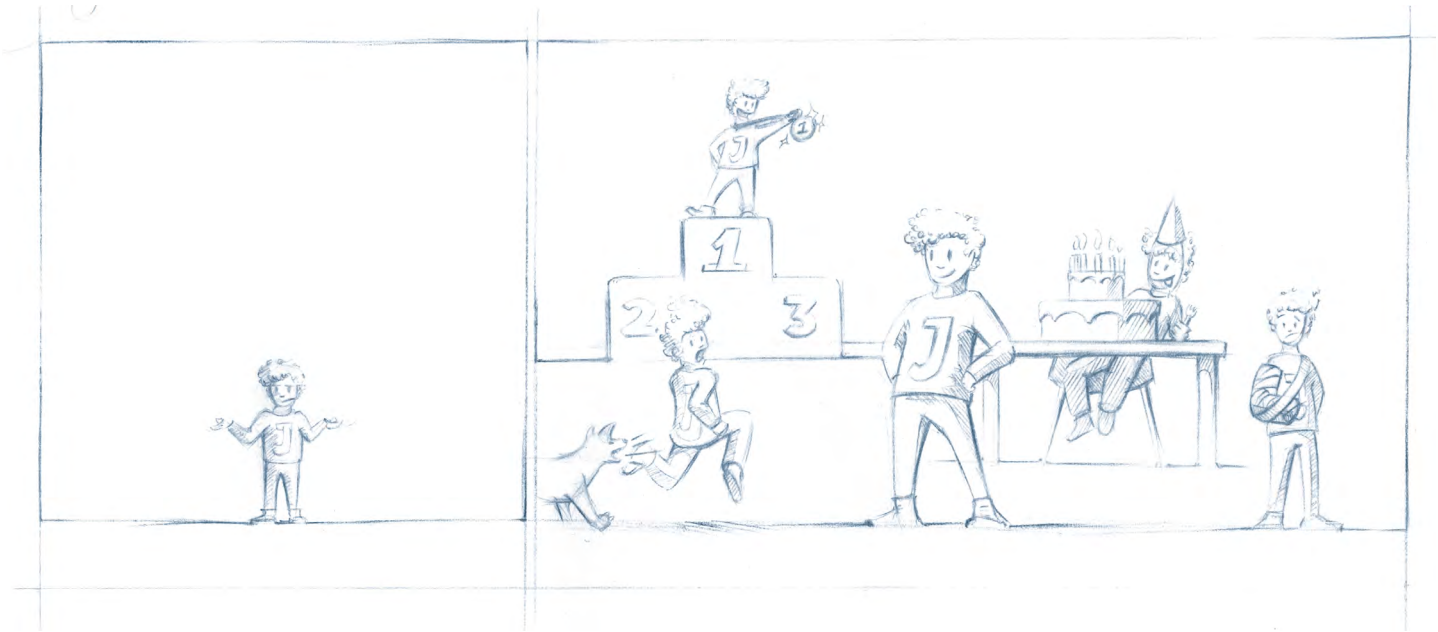
Each participant takes some experience assignments home, for example, in a small booklet, and carries out the assignments independently over the course of a few days. The various assignments make use of a variety of skills, such as drawing, craft or writing. For example, the participants draw their favourite playground or they keep a record of what they eat in a day. Other types of assignments include taking photos, making a vlog or writing a diary. In the session, they discuss their results in groups and look for similarities and differences between other participants experiences.

Effect

Through the Experience gatherer, participants become aware of their own experiences and the experiences of others. Talking about these experiences ensures individuals engagement and reflection. It also stimulates the feeling of empathy for the target group. A benefit of this is that participants start getting ideas for solving the design problem.

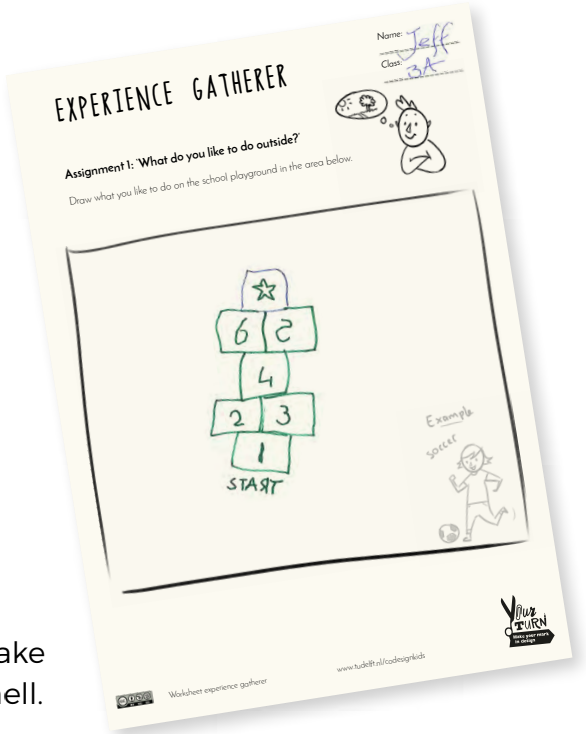
Without the Experience gatherer

With the Experience gatherer



Example

Year 6 students are coming up with an outdoor lessons for year 3 pupils. The design assignment is commissioned by a national foundation that advocates playing and teaching outside. Mrs. Adams gives her students a booklet with two drawing assignments and an interview assignment to take home. Straight after school, Kim runs to the school garden, it is her favourite area of the playground, and she makes a drawing of it. Back in the classroom she tells her group that the school garden is her favourite place because she likes to take care of the plants. She likes the herbs smell.



She is happy to hear that Yunia also likes to play there. Yunia counts the yellow flowers every day and her friend counts the red ones. The loser has to fill up the watering can. Kim does not like competitions, but the conversation with Yunia gives her the idea of a competition involving calculations about the flowers, for the outdoor lesson of group four.

Step by step

1. Think of several different assignments to do with the design theme where participants can recall and express their own experiences. Inquire about past experiences rather than future wishes.

2. Explain to the group that the assignments are meant to discover what the subject of the design assignment means for themselves and for other people. Tell them that these experiences will help them to understand other people and help them to come up with ideas.

3. Have them carry out the assignments at home and bring them to the session.

4. Have them discuss the assignments in their group one by one. Appoint one participant to lead the discussion. The discussion leader ensures that every participant has an opportunity to tell the group about their own experiences from each assignment.

5. Then have the participants cluster their experiences thematically, identifying similarities and differences.

6. If the participants have also collected experiences from a different target group, allow them to add these insights to their own conclusions.

Tips

- Make sure that the assignments look nice and are not associated with school work. Think of an attractive frontpage and a playful lay-out for the exercises.
- Add assignments where the participants have to speak to a trusted person form their own environment such as a parent, grandmother or neighbour and ask them about their experiences. Think about people from the target group of the design project in particular.

- The assignments can be broader than the design theme. This provides new contexts and gives more inspiration.
- Participants could also make a vlog as part of the exercises. Look at the tool 'Location vlog' for more tips.

Materials

- Booklet with experience assignments. The worksheet gives a very simple example of a drawing exercise for a young and slightly older child, and an extra assignment for older children to compare the drawings. Many other options are possible (timelines, diaries, rating lists, photo assignments, etc.)
- Materials for the assignments such as coloured pencils, pen, paper, a mobile phone for photos, videos and audio recordings

References

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EXPERIENCE GATHERER

Name:

_____

Class:

_____

Assignment 1: 'What's your experience with .....?'

Draw and write your own experiences concerning [the subject on the dots] in the area below.

Your Turn
Make your mark in design

Choose your side

Participantealise that they differ from one another, and from the users they design for.

Participants
Class

Design skill
Develop empathy

Prior design experience
None

Duration
10 minutes

Design step
Exploring the problem

Description

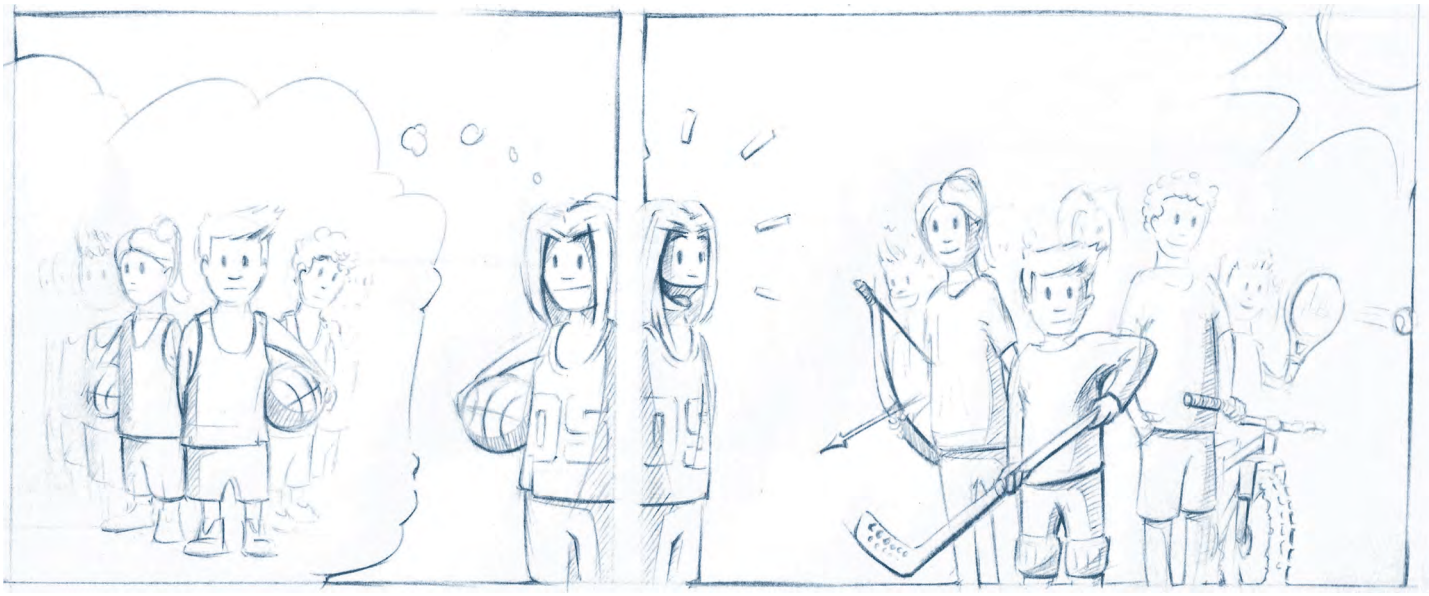
A space is divided into two clearly separated areas. The facilitator defines what each area presents, such as 'playing indoors' in one area and 'playing outdoors' in the other. Each participant moves to the area with the concept that best suits them. This is repeated a number of times, and the participants choose a side each time. They will see each other walking and standing. Through this, they will discover who likes what and how they differ from each other.

To start the participants will do a few rounds without paying attention to others. In the latter rounds, they will look closely at who is in the opposing area and start to discuss how they differ from each other. Proving not everyone likes the same thing!

Effect

This exercise helps participants to empathize with someone else.
The differences between participants are made very visible so that the participants get to know each other better. They will also understand that there are differences between users. The exercise also strengthens the group dynamics.

Without the Choose your side *With the Choose your side*



Example

The students of Mrs. Smith worked on the project 'An exercise game for everyone'. They had to think of something that would make young people exercise more. Because people are quick to think from their own perspective, Mrs. Smith started with the 'Choose your side' exercise as an energizer.

By presenting two opposite ideas each round it, quickly became clear that there were major differences between the students. For example,: computer game - board game, individual sports - group sports and dog - cat. It was especially interesting when students did not expect certain responses from others, the surprise was great.

'We will have to consider these differences when we start designing. Because not everyone likes the same thing', says Jesse.

Step by step

1. Think of at least ten opposing concepts pairs. Choose some of these pairs at random and some relating to the design theme.

2. Create the two areas in the room where the participants can walk to and mark two boxes on the floor with masking tape, this is the most fun. More simply the left and right side of a room works.

3. Explain to the participants that they will need to choose from two opposing concepts and move to one area of the room according to what suits them best.

4. Perform the exercise. Name the opposite concepts and let the participants walk to the area of their choice. Invite some participants to explain their choice. Focus on discussion especially when there is a remarkable distribution.

5. Go through all opposite concept pairs. In the last few rounds, invite the participants to take a good look at who is on the other side.

6. Have participants form pairs with someone who is often on the other side. Give them a few minutes to discuss the differences between them.

7. Discuss with the whole group what the participants noticed.

Examples of opposite pairs

Play indoors	⟷	Play outside	Reading	⟷	Watching TV
Work individually	⟷	work together	Orange juice	⟷	Cola
Climb	⟷	Crawl	Green	⟷	Blue
Beach	⟷	Mountain	Morning	⟷	Evening
Sun	⟷	Moon	Skipping rope	⟷	Baseball
Running	⟷	Hopscotch	Football	⟷	Hockey
Soft	⟷	Hard	Paint	⟷	Clay
Computer game	⟷	Board game	Math	⟷	Language
Camping	⟷	Hotel	Light	⟷	Dark
Typing	⟷	Writing	Music	⟷	Movie

Tips

- Choose contradictions that will actually show differences in the preferences of the group; also consider differences that are related to the intended end users.
- Use the contradictions between participants to form the design teams. Partner two pairs together. Variation in a team often produces better results.

Materials

- Tape and space to make two areas
- A list of contradictions, including some related to the design theme

PERSONAS

Gain insight of the target group by creating or using personas.

Participants
Group

Design skill
Develop empathy

Prior design experience
None to limited

Duration
20 – 40 minutes

Design step
Explore the problem

Description

A persona is a lifelike description of a character, representing a user group. Participants will create one or more personas for their design project. There can be multiple types of users. Users have some similar attributes but can also differ from each other. Everyone is different, however, patterns between people can be recognized. For example, in a design project about sports there are people who always want to win and others who play just for fun.

For each type of user, participants create a realistic persona, not a caricature. A persona consists of:

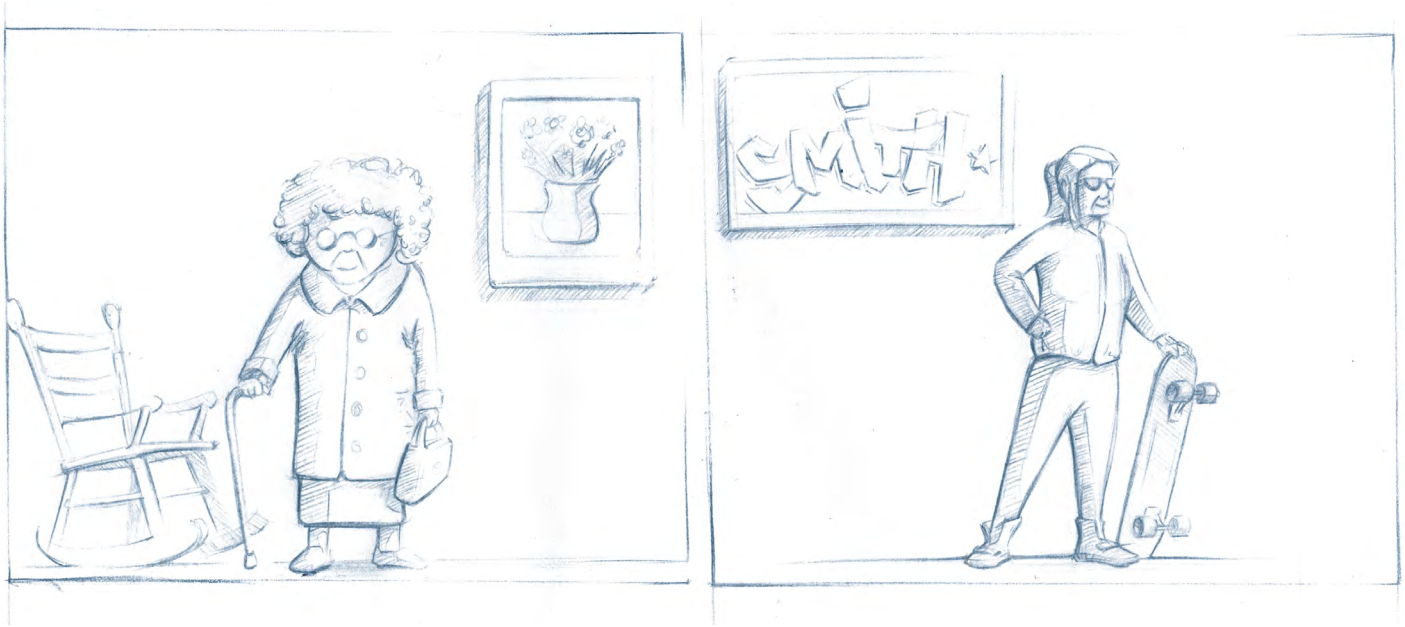
- a name and age
- a photo or drawing
- background information (hobby, living situation, dreams, etc.)
- information, disires and needs of the persona that are related to the design theme
- a few striking details that bring the persona to life

In preparation, the participants collect information about real people. They think of people they know and what they know about them. They can observe them or interview them about experiences related to the subject of the design project. Alternatively, they look for information in magazines. Because a persona is based on real people, stereotypes are avoided. The aim is to present a real person on a deep and meaningful level.

Effect

Insights about a user group are brought to life in a persona. Personas help participants realize that everyone is different. This helps the participants to develop empathy for different users and helps them tailor their designs to the desires of the target group.

Without the Personas *With the Personas*



Example

In a Biomedical design project about elderly people with arthritis , the teacher mr. Lee shows a drawing of a grandma Elsie. He then says that Elsie is 76 years old and lives in a cosy little house on the edge of a large park. Every day she goes out and takes her dog Fifi for a walk in the park. Elsie has arthritis which gives her stiff and painful hands. She loves to read books, family novels and also the Harry Potter books. But now the pile of books from the library hasn't changed for a long time. Holding a book for a long time so she can read is no longer possible now that Elsie's hands are hurting more and more.

The participants empathise immensely with this persona 'grandma Elsie'. They think about what they can do to make sure Elsie can still read. Achmed designs a book chair with a special armrest for the book to rest on. Chantal opts for a rolling book stop . Fatima thinks that slicing potatoes is also difficult for Elsie so she comes up with a solution for that.

Step by step

1. Start with a design project then create relevant personas yourself so that participants become better acquainted with the personas. Have participants compare their own experiences with those of the persona.

2. In the subsequent design project, have participants collect information about the target group or provide them with this information.

3. Have the participants exchange and cluster their information. Tell them to look for differences and similarities between groups of users. They can also discover different user groups that are relevant to the design question.

4. Discuss the intended target groups and their characteristics. What would their concerns be?

5. Have participants choose up to three distinctive user groups and create a persona for each group using the Persona worksheet.

6. Display the personas on a visible spot in the room. Through the personas, the participants are aware of who they are designing for throughout the design process. They can refer back to the personas to test how good an idea is.

Tips

- Use the Persona worksheet and adjust the questions to the theme of the design project.
- Participants with design experience can create personas themselves, based on information they have collected about the target group. Show them some examples of personas with rich information for inspiration.

Materials

- Worksheet Persona (adapt the topics)

References

van Boeijen, A., Daalhuizen, J., van der Schoor, R., & Zijlstra, J. (2014). Delft Design Guide: Design Strategies and Methods. BIS Publishers, p95.

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Name: _____ Class:_____

MY HOME:

THINGS I DO:

I LIKE TO:

I HOPE THAT:

FUN FACT ABOUT ME:

I STRUGGLE WITH:

DIARY/CALENDAR:

Your Turn
Make your mark in design

EMPATHIC DESIGN CHALLENGE

Formulating a design goal based upon a story about users.

Participants
Group

Design skill
Develop empathy

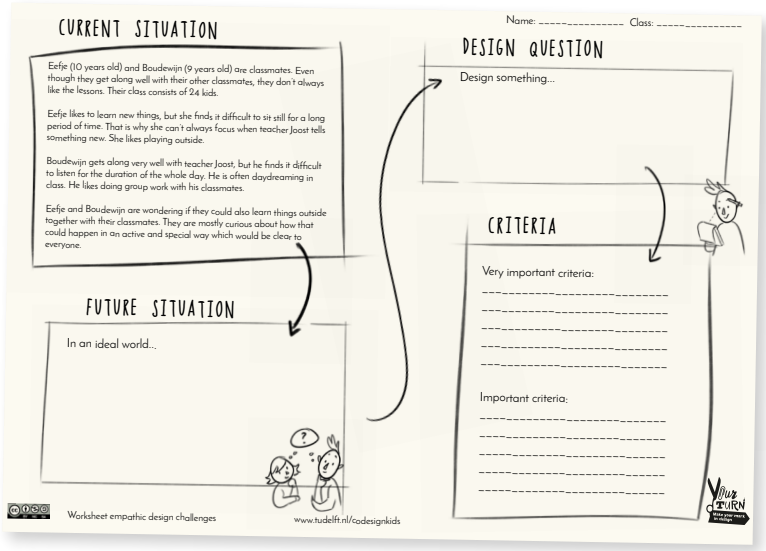
Prior design experience
Average

Duration
15 minutes

Design step
Formulating the problem

Description

The participants listen to a story where some characters experience a problem within their daily lives. The story focuses on detail and emotions, to stimulate the participants' empathy. Based on the situation described, with the help of a worksheet, the design teams then think of a desired situation. They develop an appropriate design question and define the requirements and wishes that the solution to the problem must meet.



They come up with the desired situation by completing the sentence 'In an ideal world ...'. Completing the sentence 'Design something that ...' guides them in formulating their vision for the solution of the problem.

They consider and refine the design goal by reflecting on the wishes of the person experiencing the problem and formulating requirements and wishes for the design. The participants constantly refer to the story extracting information and actively processing it.

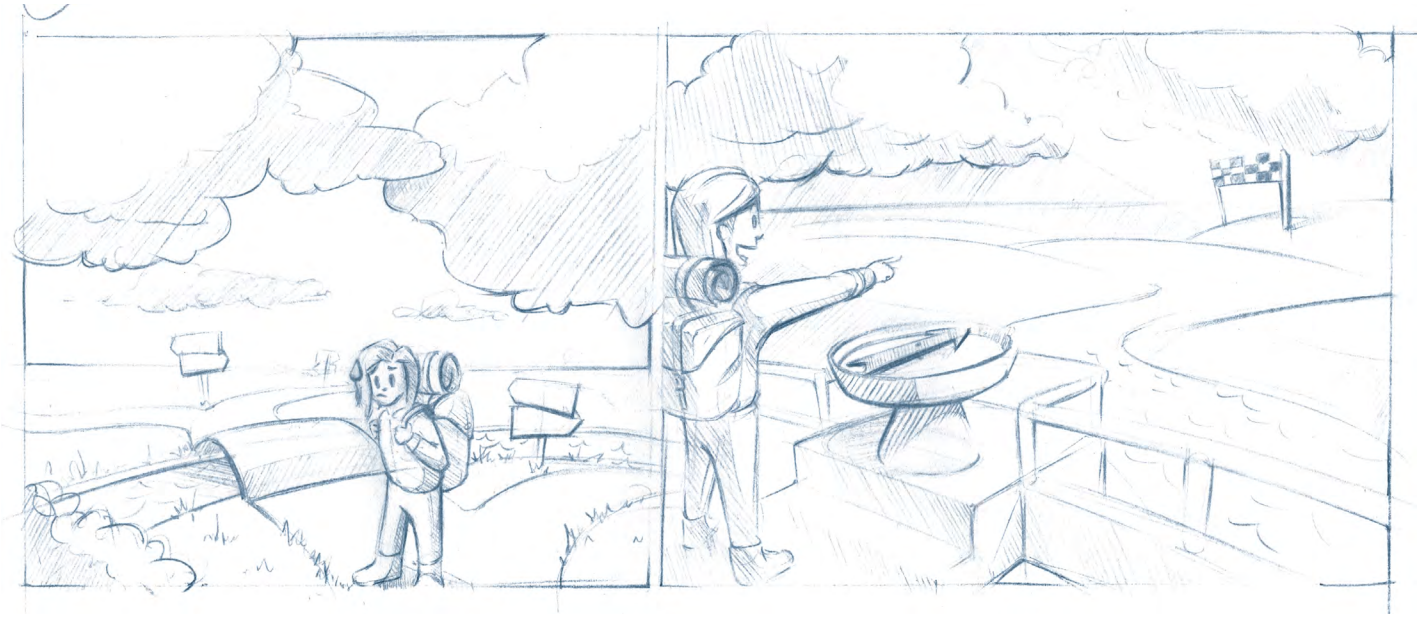
Effect

A story ensures that the participants empathise with real world users. By actively processing the story, the participants think about what they want to achieve with their design for the users. Through this they feel involved in the problem and responsible for the result.

The group also determines which direction they want to come up with ideas and what criteria their design must ultimately meet before thinking about solutions. This aligns the visions of the participants.

Without the Empathic design challenge

With the Empathic design challenge



Example

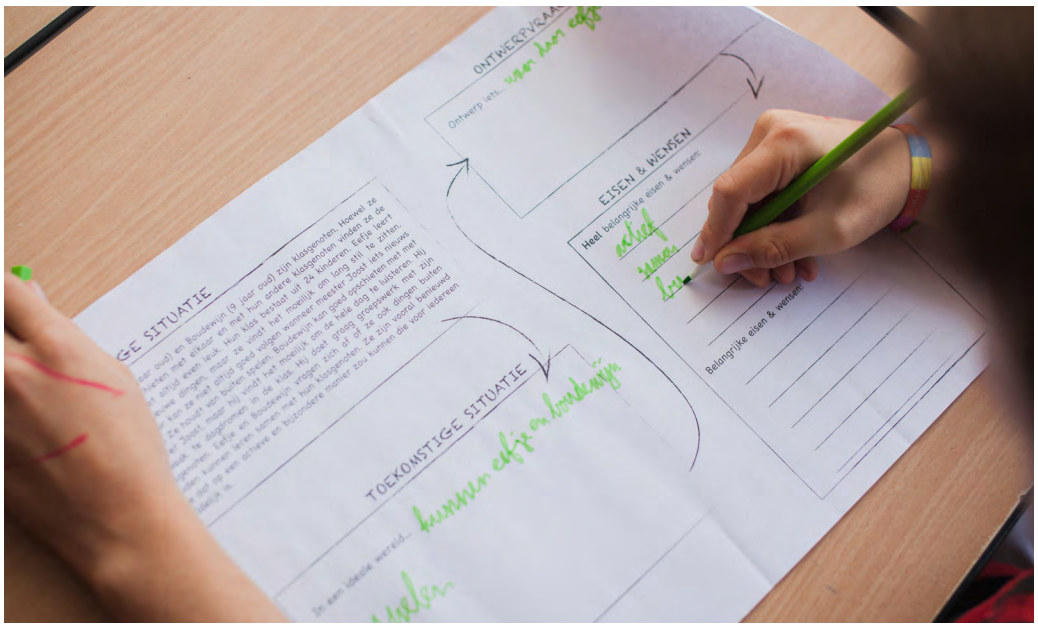
Mr Williams wants the participants to think about the design problem themselves. To achieve this, he comes up with a short story about Ben who enjoys going to school by bike, but not when it rains. Mr Williams describes in great detail how Ben is affected by the rain. He tells them that he shivers all day from being wet and cold.

After hearing the story, the participants want to do something to help Ben. First they think about the future situation. Josephine's group formulates the definition: 'In an ideal world you can cycle to school through the rain and stay dry'. The design question they come up with are: 'Design something so that the raindrops don't get Ben's clothes wet when he cycles.' Later in the project, Josephine's group came up with an idea for a handlebar mounted fan that blows raindrops past Ben! This will allow Ben to cycle through the rain comfortably in the future.

Step by step

1. Think up a short story about the design problem, include details about the problem and emotions of the characters.

2. Place (a summary of) the story in the worksheet. Add photos or illustrations that enrich the story and make it ecognizable.



3. Tell them the story. Get the participants retell the story in their own words. Explain to them that in the story a character has a problem, ask the participants to start thinking about a world where this problem doesn't exist or is experienced as something positive.

4. Give the participants the worksheet and let them fill in the future situation.

5. Tell the participants that a design question states what the design should be able to achieve and who it is for. It should not describe a concrete solution or design idea. Let them come up with a design question.

6. Let them formulate the criteria (requirements and wishes).

7. Discuss the future situation, the design question, the design requirements and check with each group whether they have a clear picture of their design challenge.

Tips

- Perform this method with a class where the participants have little design experience, or practice with the example in the worksheet of Ben cycling through the rain.

- Encourage teams to formulate design questions that differ from other groups. This is helpful! A personal point of view helps participants to take ownership of the problem.

- Do not limit the problem of the characters so only a few solutions are possible. Do not make the problem too broad either. This will cause the participants to no longer have a hold over the problem.

Make your story compelling

How do you make a story about a design problem compelling?

- Choose one or more characters in your story and write the story from their point of view.
- Consider the problem the protagonist has to deal with and what he or she would desire.
- Create a situation and action: where does the problem occur and what does the main character do? What do the other people do?
- Add solutions that the character has already tried and explain why they don't work.
- Add details that stimulate their imagination and make the story lifelike. That's how listeners develop empathy.

Materials

- Worksheet 'Empathic design challenge', adapted to your design theme
- Optionally: example worksheet about Ben cycling through the rain, to practice with
- Drawing and writing material

References

van Boeijen, A., Daalhuizen, J., van der Schoor, R., & Zijlstra, J. (2014). Delft Design Guide: Design Strategies and Methods. BIS Publishers. p100-101

Name: _____ Class: _____

CURRENT SITUATION

DESIGN QUESTION

Design something...

CRITERIA

Very important criteria:

_____

_____

_____

_____

_____

Important criteria:

_____

_____

_____

_____

_____

FUTURE SITUATION

In an ideal world...

Your Turn
Make your mark in design

INVERSE BRAINSTORM

Coming up with unusual ideas by inverting the current situation.

Participants
Group/ class

Design skill
Think in all directions

Prior design experience
None

Duration
20 minutes

Design step
Generating ideas

Description

When participants often struggle to move away from the existing situation when coming up with ideas to solve a problem. The reverse brainstorm enables participants to consciously think about unusual solutions.

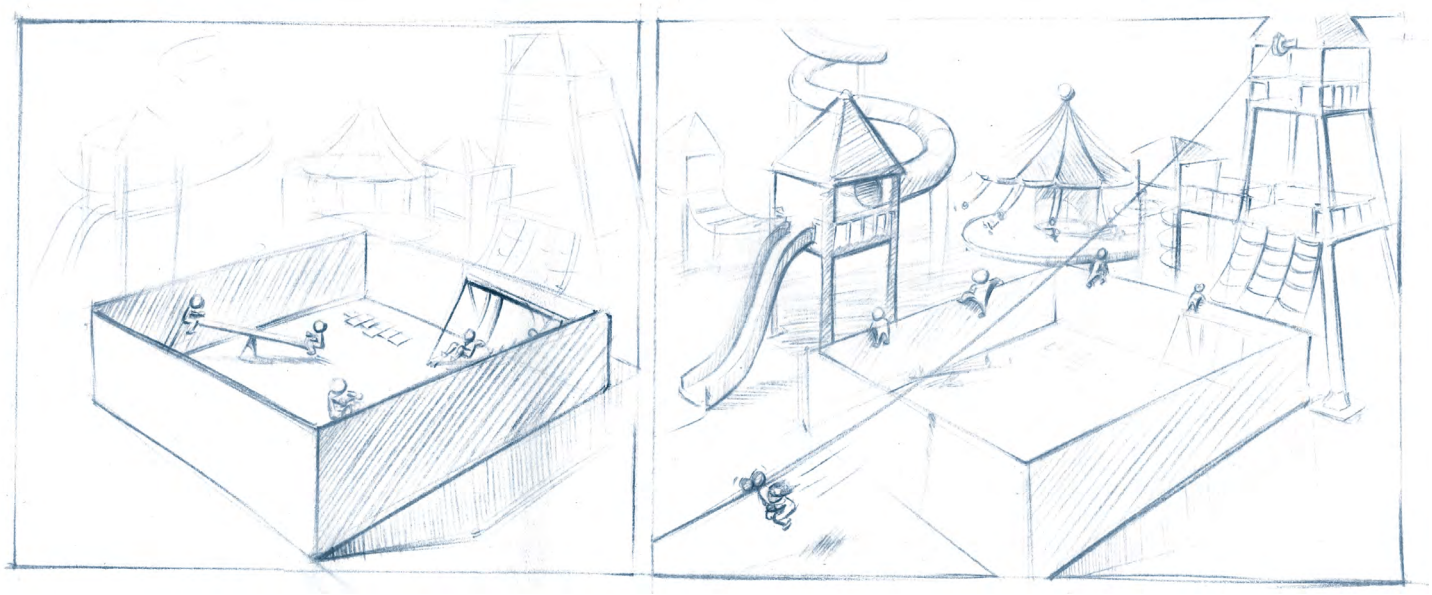
Participants make a list of words about the normal and typical elements of an activity using questions such as 'How would you describe this activity? What is typical for this activity? Which items do you use? What does the space look like now?'

The facilitator writes the 'normal words' on the whiteboard. The participants then come up with the inverse of each normal word. Using the inverse word list, the participants think of new ideas. Because the activity focuses on the inverse, unusual and crazy words are good.

Effect

The inverse words stimulate participants to let go of the existing situation and to think outside the box. They discover that surprising solutions arise when stereotypical thinking habits are broken and that the resulting ideas can also be realistic.

Without the Inverse brainstorm *With the Inverse brainstorm*



Example

Mrs. Murray's class is thinking about new playground equipment for their school playground. But they always think of existing objects: slides, climbing structures, football goals. The teacher asks the class to list what is typically associated with a playground. 'Many colours,' says Abdel, 'and you feel safe'. 'Being together,' says Sara. The ideas form a long list. 'And what is the opposite?' The teacher asks. The students answer: 'Grey, unsafe, alone.' The teacher challenges them: 'Think of something unexpected for a playground that is grey, unsafe and alone. Abdel comes up with an underground system of mole tunnels, Sara suggests a cloud of fog where you lose each other. These ideas are very different to a slide!

Step by step

1. Write the central question on a whiteboard or flipover, for example, 'What is the gym class?' Draw a table with the columns Typical and Inverse below.

2. Ask the participants what they are thinking about and write down the answers in the Typical column.

3. Then ask the participants what is the inverse of each word. Have them write this down for themselves and choose a random participant to give a class answer. Note that word in the second column. Ask if there are other answers.

4. Choose one or two words from the Inverse column and give an example of an inverse idea.

5. Choose another word and have each participant come up with something and write it down. Emphasize that every idea is good even if it may be strange or unrealistic. Have another participant tell their idea. If necessary, ask two more participants to share their ideas.

6. Pick a few words from the Typical list and have them come up with any ideas for these. Speak to each participant to guide them and enjoy the process together.

7. Have the participants share the best and weirdest ideas with each other. This creates a sort of benchmark: are they thinking up strange ideas or are they still copying common examples? Ask the participants how they could come up with something even crazier and give them a few more minutes to think.

Move a lot	⟷	Sit still
Play together	⟷	Play alone
Indoors	⟷	Outdoors
Gym equipment	⟷	Empty space
Dangerous	⟷	Safe
Becoming flexible	⟷	Stay stiff
Get strong	⟷	Become weak
High ceiling	⟷	Low building
Rectangle	⟷	Organic shape
Lines on the ground	⟷	Nothing on the ground / drawings
Sporty clothes	⟷	Own clothes
Posts and nets	⟷	Projections
Waiting for instructions	⟷	Start right away

Quarrel	⟷	Peace
Gym teacher	⟷	Do it yourself
Groups	⟷	Everyone for themselves
Losing and winning	⟷	Cooperation
Getting tired and sweating	⟷	get a lot of energy and smell good
Listen	⟷	Ignore
Be the best	⟷	Be the worst
Help each other	⟷	Working against each other

Tips

- Fill in the inverse column and come up with the first ideas as a class if participants find it difficult to get started.
- Make it clear that it is not about the perfect opposite word, but about 'something that is completely different'.
- With participants who find it difficult to think outside the box, Try to identify the problem and practice the Inverse brainstorm with a different topic.
- When peaking about what is common, pay attention to various aspects, such as: what it looks like, how it is used, the environment, who uses it, the experience. Look for adjectives.

Materials

- Whiteboard or flipchart
- Writing and drawing material for each participant

OPEN YOUR SENSES

Explore the design environment with your senses: vision, hearing, touch and smell.

Participants
Group

Design skill
Think in all directions

Prior design experience
None

Duration
15 – 45 minutes

Design step
Generating ideas

Description

Participants explore the target groups' environment with their senses. They (re)discover the environment by looking, hearing, feeling, smelling and maybe even tasting. They perform different assignments in groups of three or four.

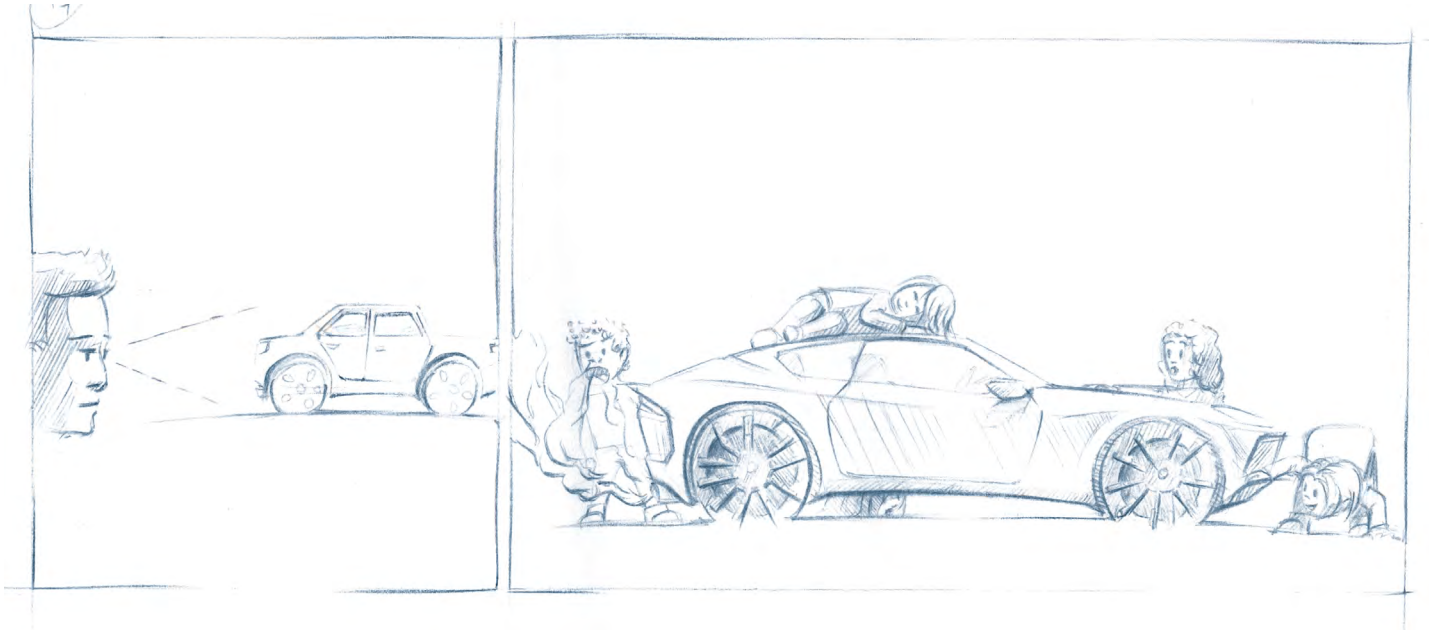
They look at shapes, materials, odours and colours. They touch materials feeling how hard or soft they are. They listen to sounds and the lack of sounds. They describe and draw their experiences and discoveries. They can also take photos.

The participants also explore the environment in their own ways. Once all of the assignments have been completed, the participants review what they have collected. They highlight what inspires them. Using this information they come up with design ideas and write them down on individual idea cards.

Effect

The environment of use for a design project is an important element of a design process. Being physically present at that location and experiencing it in various ways, lets participants properly (re)discover that environment. They get unexpected, nuanced and detailed images of the environment that they would not realise otherwise. This stimulates their curiosity and informs their creative thinking.

Without the Open your senses *With the Open your senses*



Example

Year group 7 pupils thought about the design question: 'How can year 3 pupils both play outside and learn to count?' With 8 different assignment cards, the design teams went to explore the school playground.

They carried out the assignments and wrote their answers on a large sheet. Then they sat down in a quiet place to come up with new ideas. The ideas they came up with were calculations using pavement tiles, calculations with the sand from the sandpit and calculations with the climbing frame.

The year 3 teacher was pleasantly surprised and let her students play outside even more!

Step by step

1. Create assignment cards based on the 'Open your senses' worksheet (and possibly add cards for tasting, or for free play and exploration) which the participants can use to explore the environment of the design project.

2. Create a stack of varied assignment cards for each design team. Arrange a different order per stack so that each team always works on a different assignment. Put a staple or string through the piles.

3. Prepare an A4 sheet and clipboard and empty idea cards.

4. Take the teams into the design environment.

5. Give the participants the following instructions:

- Work in design teams.
- One of the participants reads an assignment out loud at a location of your choice.
- The other participants answer the assignment.
- Write down the answers, or record them in another way.
- Write or draw ideas for the design problem on the separate idea cards.
- Another participant reads the next assignment, in a new place. Follow the same steps for this assignment.
- Repeat the procedure until all assignments have been completed.

6. Afterwards have the participants look at the answers again. Let them highlight the things that they find inspiring.

7. Then give them time to come up with solutions to the design problem.

Tips

- Allow participants to spend some extra time in the design area. For example, letting them play freely or looking around in silence. This promotes creativity.

- Get inspiration from example questions from another design project (in Dutch): visit www.eurekianen.nl.

Materials

- A bundled set of assignment cards (A6 format) per design team
- A4 sheet with writing board
- Empty idea card sheets (A5 format) to write or draw ideas

References

This tool was developed by designer Madelinde Hageman and teacher Marloes Nieuweboer from Eurekianen - an initiative focused on design learning, see www.eurekianen.nl.

LOOKING ASSIGNMENT

WHICH SHAPES DO YOU SEE IN THIS AREA?
WRITE DOWN 4 ANSWERS.

LOOKING ASSIGNMENT

WHICH MATERIALS ARE PRESENT IN THIS AREA?
TAKE PICTURES OF A MAXIMUM OF 3 MATERIALS
FROM UP CLOSE.

FEELING ASSIGNMENT

DESCRIBE WHAT THE MATERIALS YOU CAN TOUCH IN THIS AREA FEEL LIKE.
IN A FEW WORDS

SMELLING ASSIGNMENT

WHICH SCENTS DO YOU SMELL IN THIS AREA?
TELL EACH OTHER
WHICH SCENTS
YOU SMELL.

LISTENING ASSIGNMENT

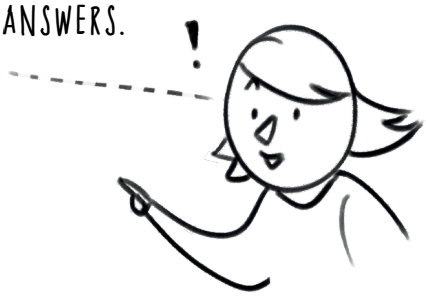
WHAT SOUNDS WOULD YOU HEAR IF NOBODY WAS IN THIS AREA?
THINK OF A SOUND
AND TELL IT TO
EACH OTHER.

SMELLING ASSIGNMENT

WHAT SMELLS DO YOU THINK YOU MIGHT SMELL IN THIS AREA BUT CAN'T RIGHT NOW?
THINK OF A SMELL
AND TELL IT TO
EACH OTHER.

LOOKING ASSIGNMENT

WHICH COLOURS DO YOU SEE IN THIS AREA?
WRITE DOWN 4 ANSWERS.



LISTENING ASSIGNMENT

LISTEN CAREFULLY. WHICH SOUNDS DO YOU HEAR IN THIS AREA?
WRITE DOWN 4 ANSWERS.

COMBINE AND FANTASIZE

Coming up with new ideas by fantasizing about random combinations of objects and properties.

Participants
Group

Design skill
Think in all directions

Prior design experience
None

Duration
15 – 30 minutes

Design step
Generating ideas

Description

In the 'Combine and fantasize' game, participants create imaginary situations by combining an object and an objects property. They then consider what would happen as a consequence of the special situation and create short detailed stories about the situation.

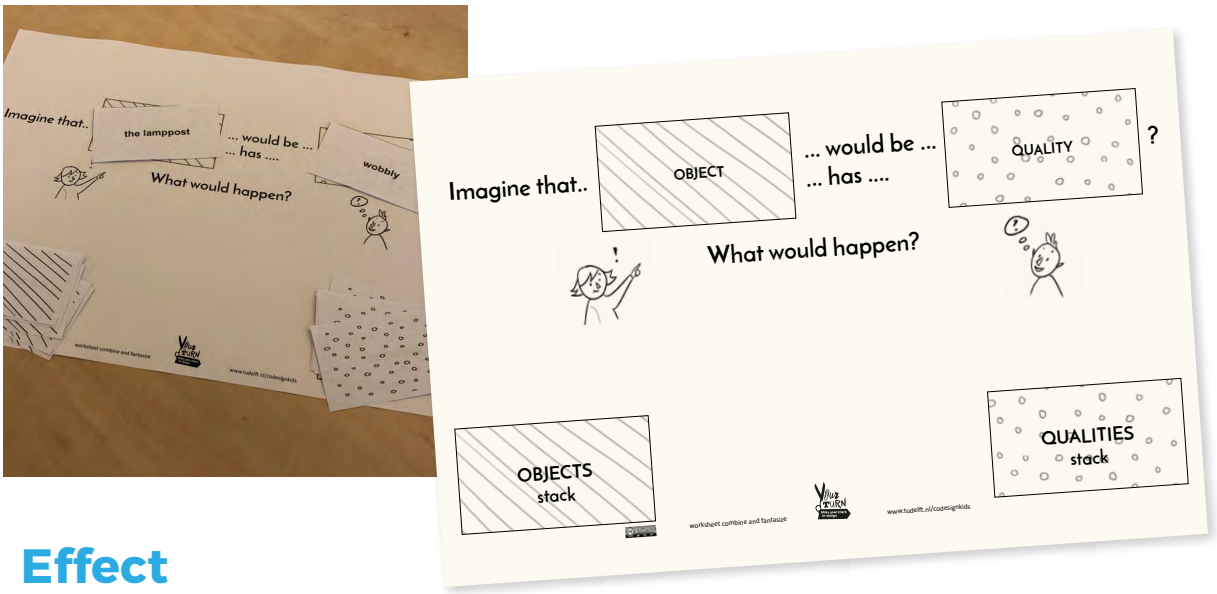
The participants play the game within their design team. They place 'a card with an object' and 'a card with a property' in the empty boxes on the game board to form a sentence.

Imagine that < … object … > would have < … property … >. What would happen?

Objects for this game are based on objects from the physical space of the design question. In the (re)design of a neighbourhood, the objects could be streets, walls, trees and sidewalk tiles. Properties are adjectives such as large, small, heavy, light, soft, hard, transparent, woolly, floating, smooth, sticky, mobile, round or square. These form a

sentence such as: Imagine that pavement tiles are floating? What would happen?

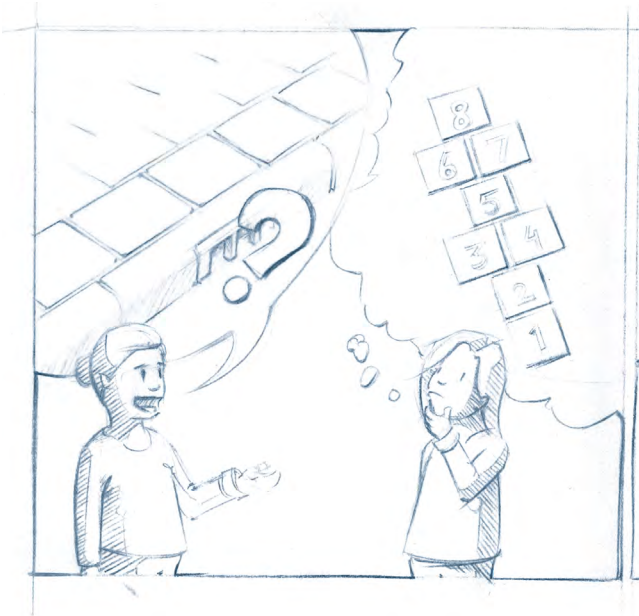
Objects are given unusual properties. Pavement tiles become soft; trees become very small. These non-realistic situations stimulate the imagination. During or straight after the game the design teams come up with ideas for the design question. They write the ideas on separate cards.



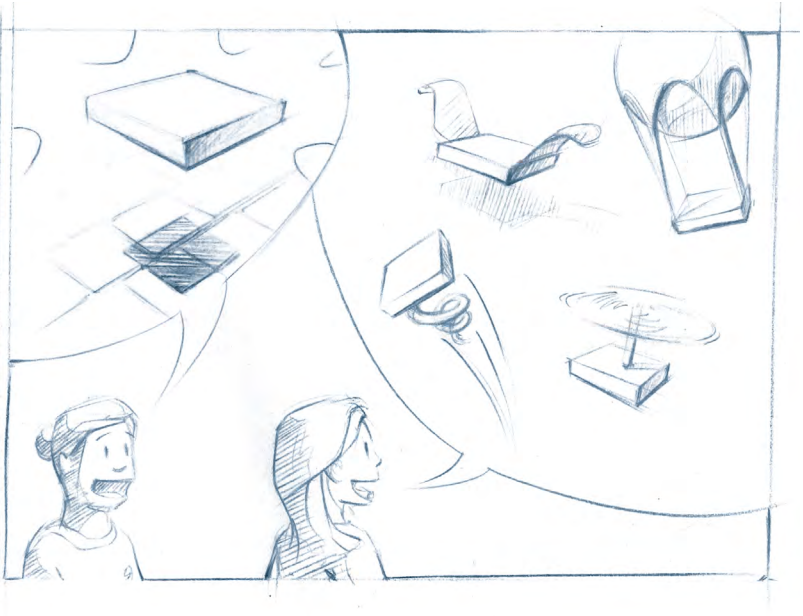
Effect

This game creates unusual situations. These situations stimulate the participants imagination. This enhances creativity in coming up with solutions for the existing situation. The more ideas, the better chance of innovative designs.

Without the Combine and fantasize



With the Combine and fantasize



Example

Year 7 students were thinking about the design question: How can pupils from year 3 both play outside and learn to count? Once the students had explored the problem environment, they played the Combine-Fantasize game. They combined pavement tiles, puddles, walls and the sandpit with properties such as round, floating, light, etc.

One design team was inspired by the word sticky. They fantasized about what would happen if the pavement was sticky. This situation helped them to come up with the idea for a math game, where the legs of two pupils were stuck together. Because glue would be problematic they decided to tie the legs together with a scarf. They tested the idea as an educational outdoor play assignment. Two pupils from year 3 were tied to each other and had to search for answers to calculations that were hidden on the school playground.

Step by step

1. Make a list of properties and objects at the design brief location. If necessary, go to the location for inspiration.

2. Print the properties and object words using the template file and cut them out. The reverse side of properties are circles and the rear side of objects are stripes.

3. Give each design team a game board page, a stacks of object cards, a stack of property cards and a stack of empty larger cards or paper.

4. Go to the design brief location.

5. Give the design teams the following instructions:
   - Place the stacks of cards upside down on the game board so that you cannot see the words.
   - Take an object card and a property card and place them on the game board to form a sentence. One participant reads the sentence aloud and then asks, 'What would happen?'
   - The other participants answer.
   - Write down the resulting design ideas on the separate idea cards.
   - Repeat the procedure until all of the cards are used up.

6. Have the participants look at the answers again afterwards. Let them highlight things that they find inspiring.

7. Give them time to fantasize about imaginary situations and come up with more solutions to the design problem.

Tips

- Have participants come up with a number of properties themselves.
- Stimulate the forming of small stories with some details about each situation.

Materials

- Worksheet with the game board per design team (A3 format, sturdy paper)
- Small cards with the object and property words
- Larger cards (A5 format) or empty A4 sheets to draw or write down ideas
- Pencils, pens or felt pens to write and draw

References

This tool was developed by designer Madelinde Hageman and teacher Marloes Nieuweboer from Eurekianen - an initiative focused on design learning, see www.eurekianen.nl.

Imagine that..

OBJECT

... would be ...
... has ....

QUALITY

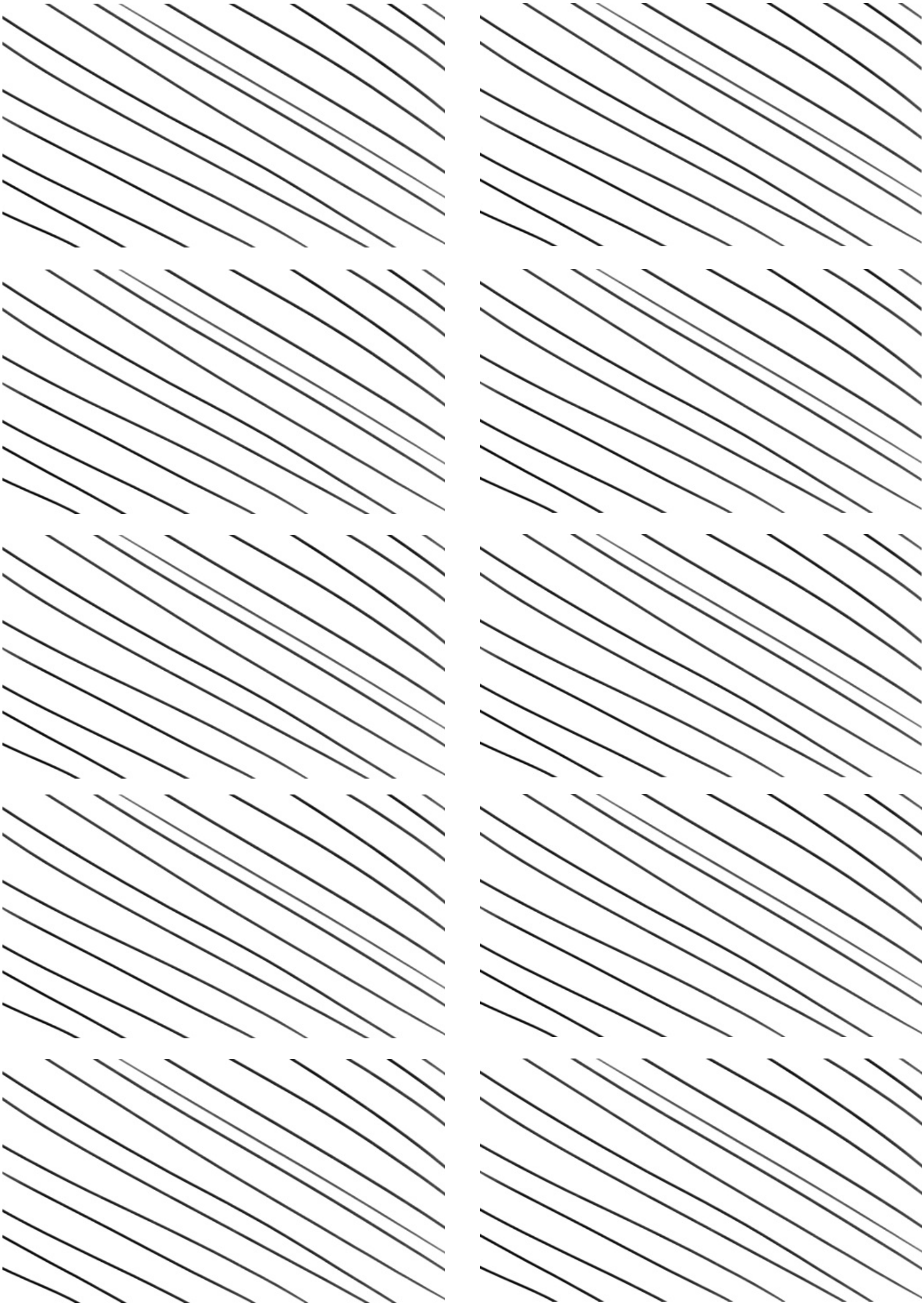
?

What would happen?

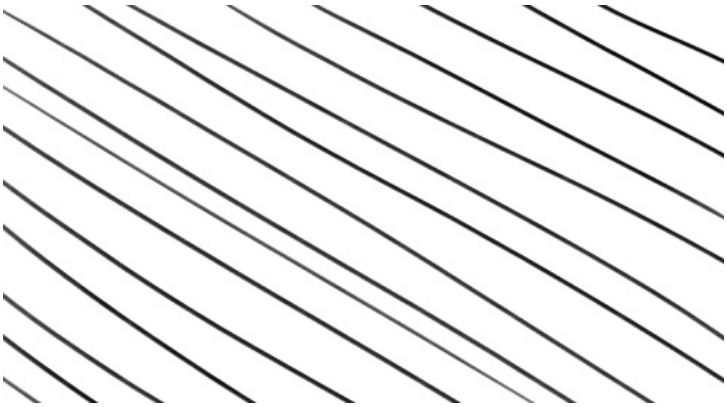
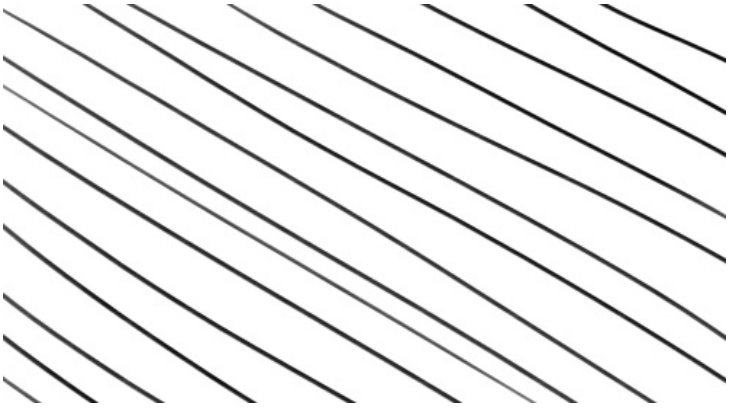
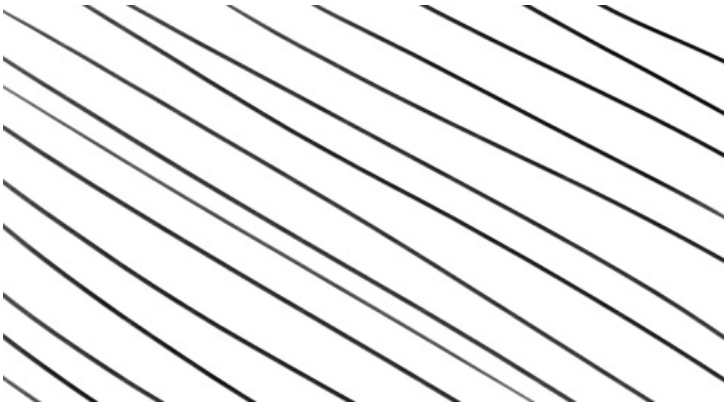
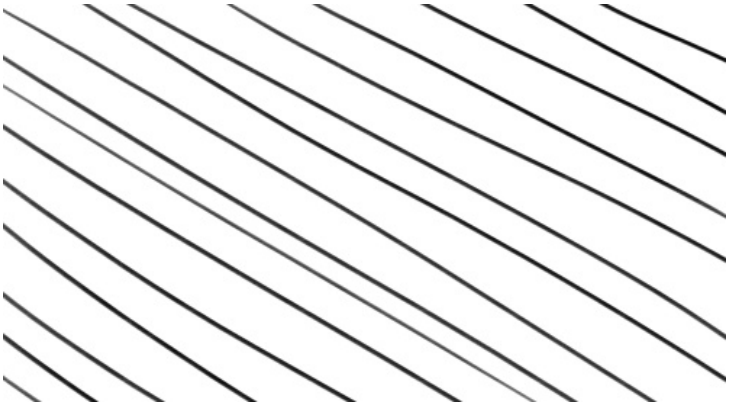
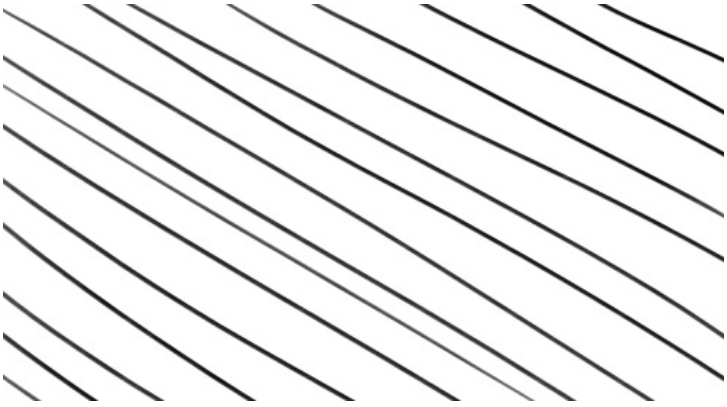
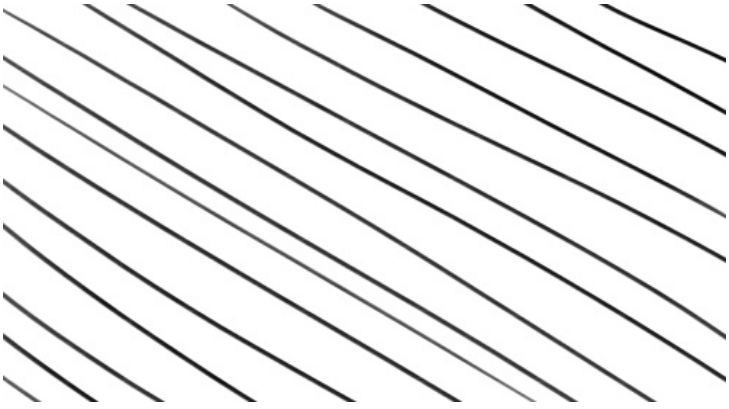
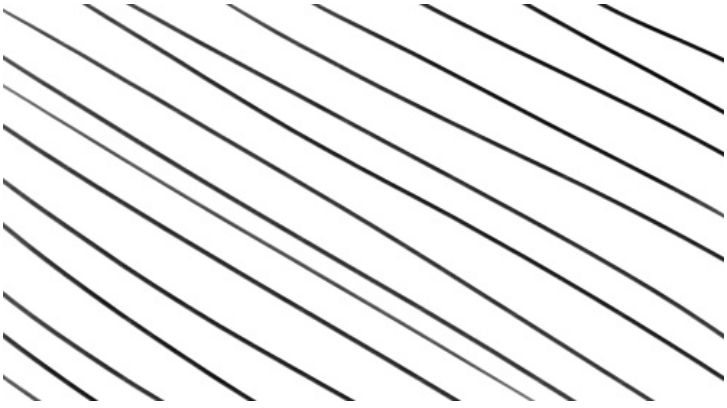
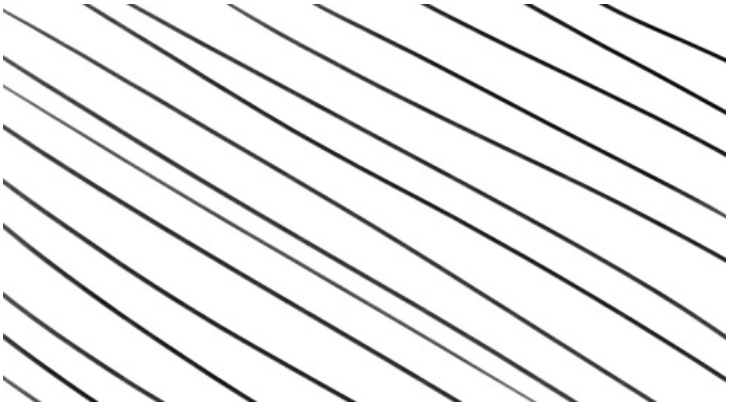
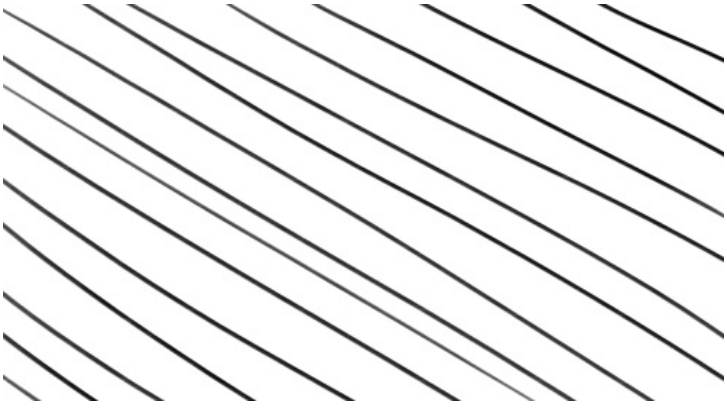
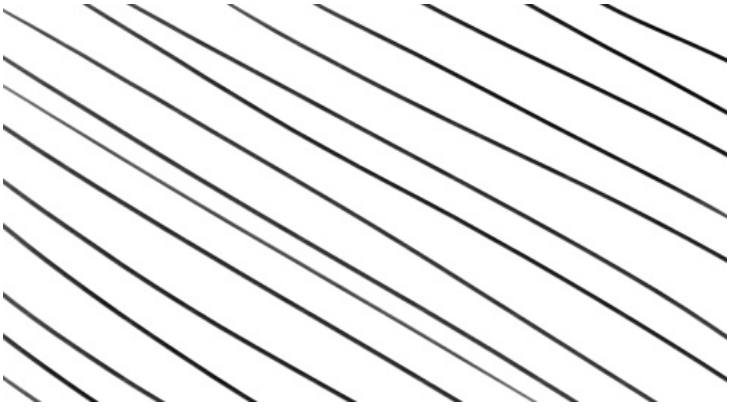
OBJECTS
stack

QUALITIES
stack

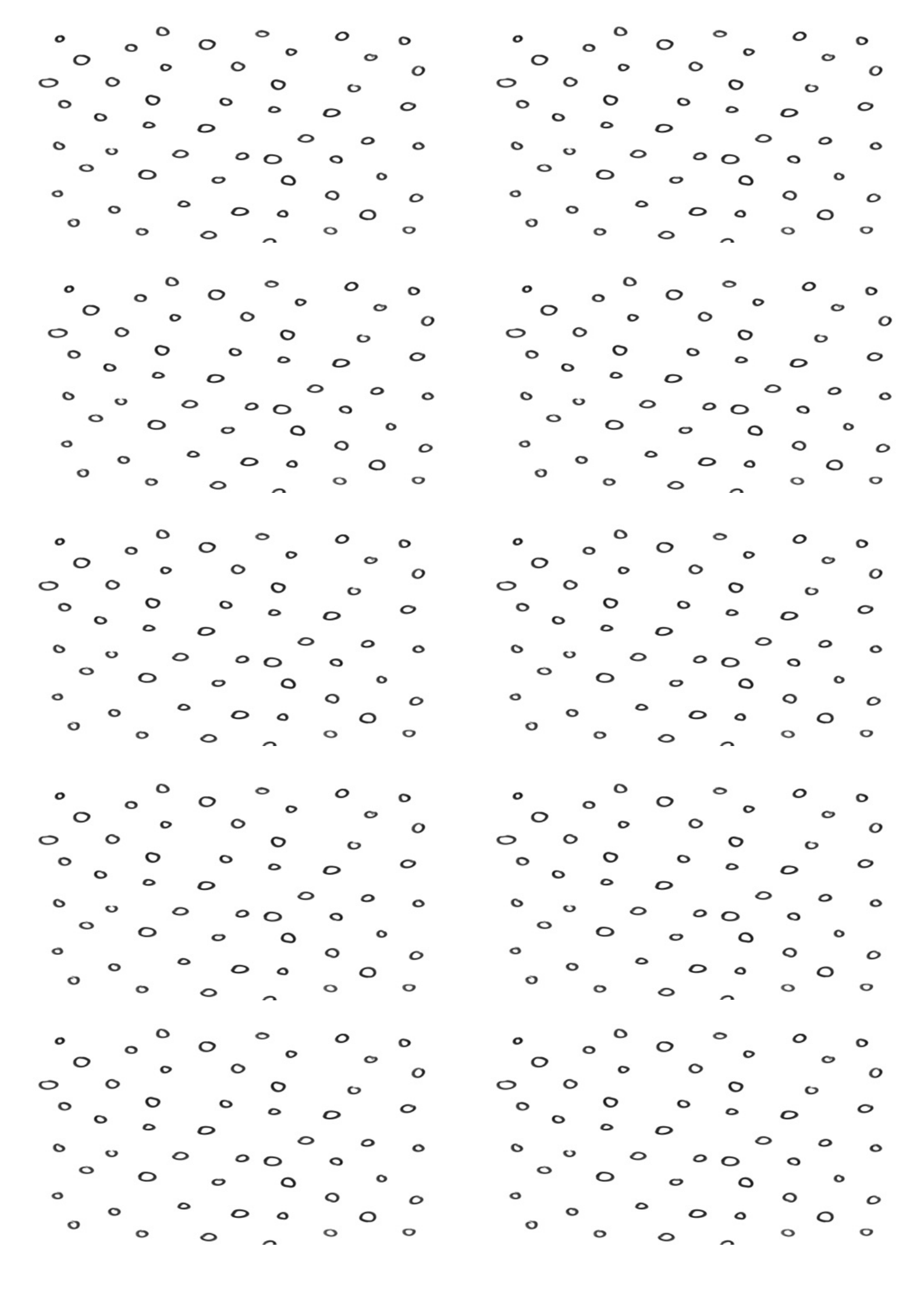
the pavement tiles	the plants
the sand	the grass
the square	the lamppost
the monkey bars	the bench
the marbles hole	the soccer goal



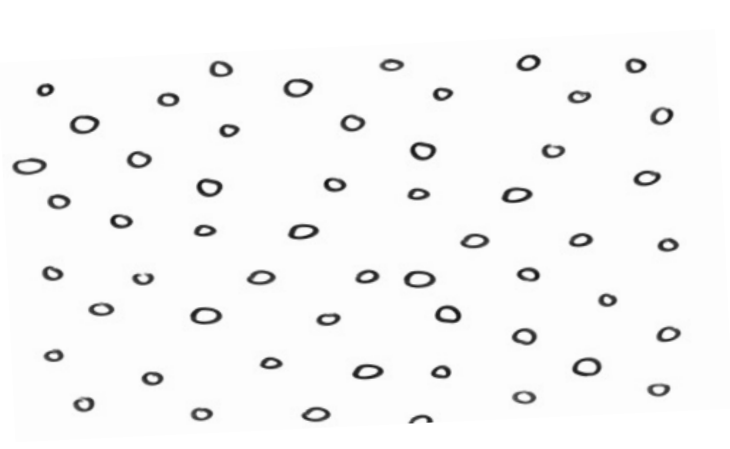
the bike rack	the basket
the hopscotch	the leaves
the fence	the grass
the plants	the table tennis table
the slide	the walls

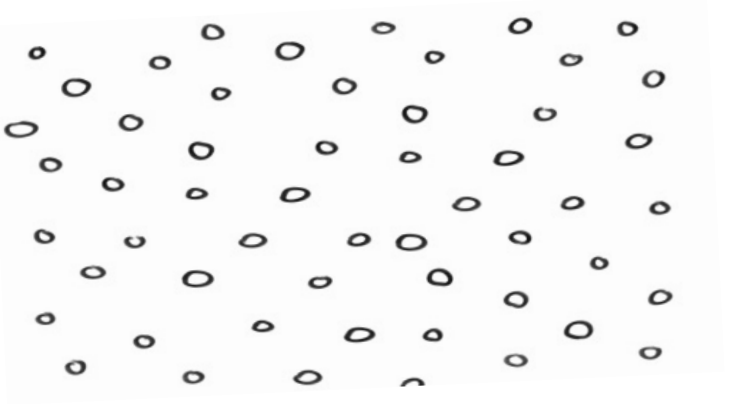











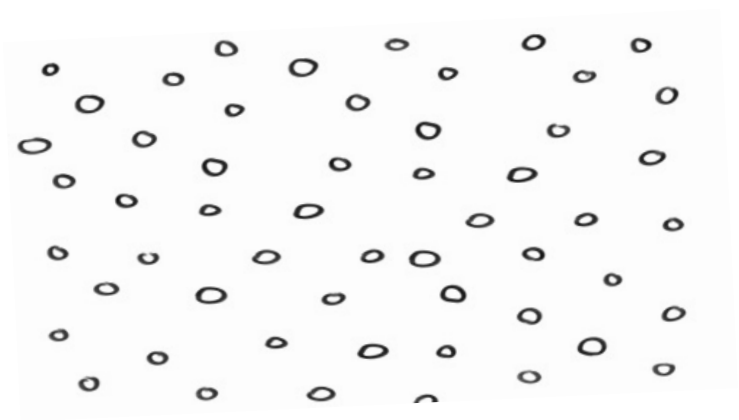
round	**vibrating**
square	**twisting**
luminous	**wobbly**
soft	**floating**
hard	**screaming**

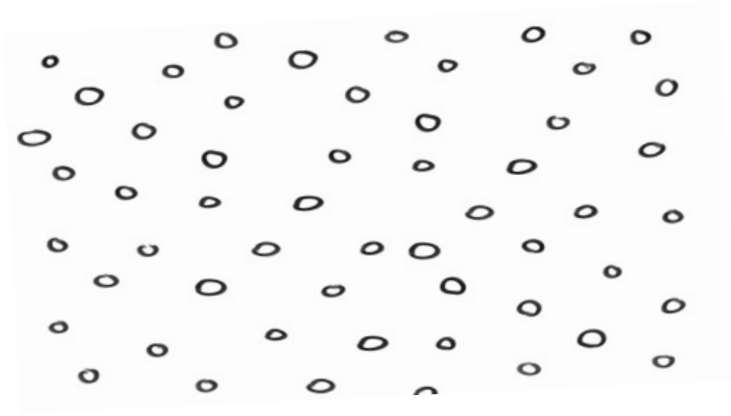


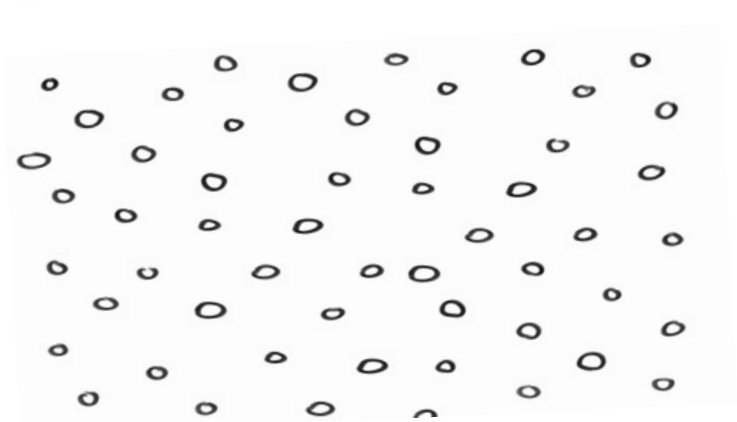
elegant	**very high**
weightless	**flashing**
very heavy	**in slow motion**
see-through	**very low**
…	**…**

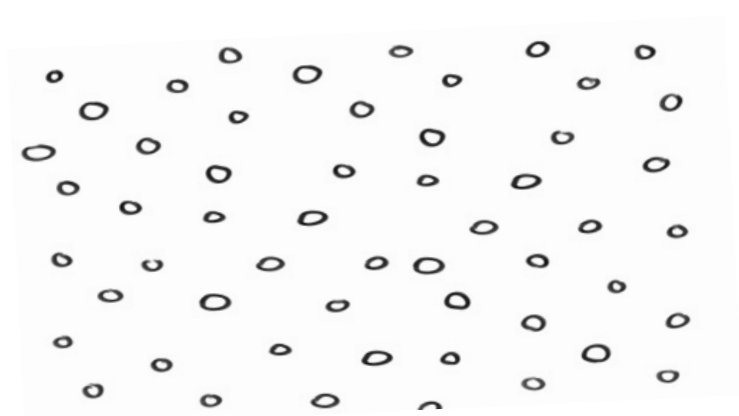


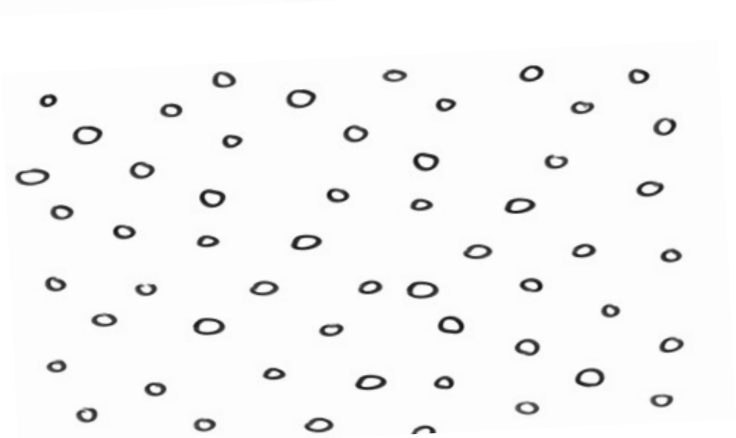


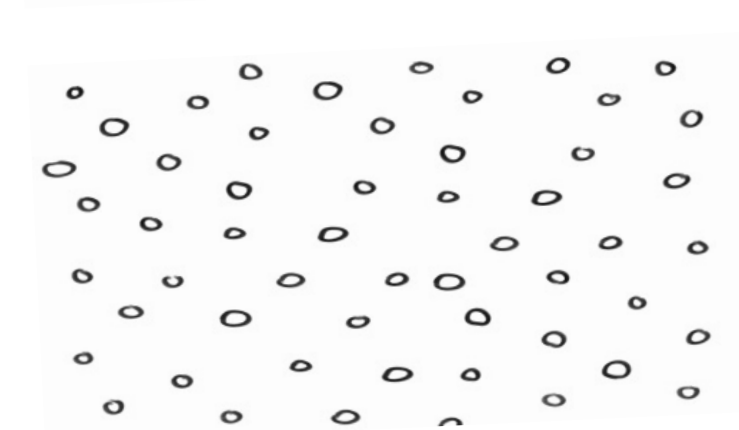


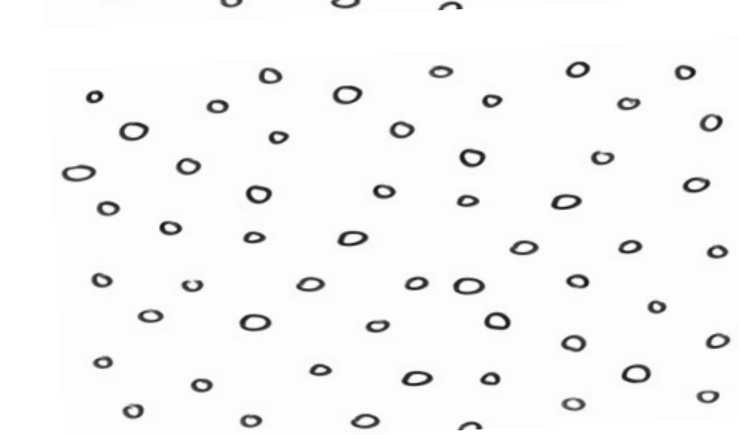












PICTURE BRAINSTORM

Ambiguous and random images provide inspiration when coming up with ideas.

Participants
Individual

Design skill
Think in all directions

Prior design experience
None

Duration
10 – 30 minutes

Design step
Generating ideas

Description

Once the participants have put their first ideas on paper, each participant or team receives a set of varied images. This happens when participants get stuck with coming up with ideas. This applies works for participants who have difficulty getting started, and for participants who linger at one idea for a long time.

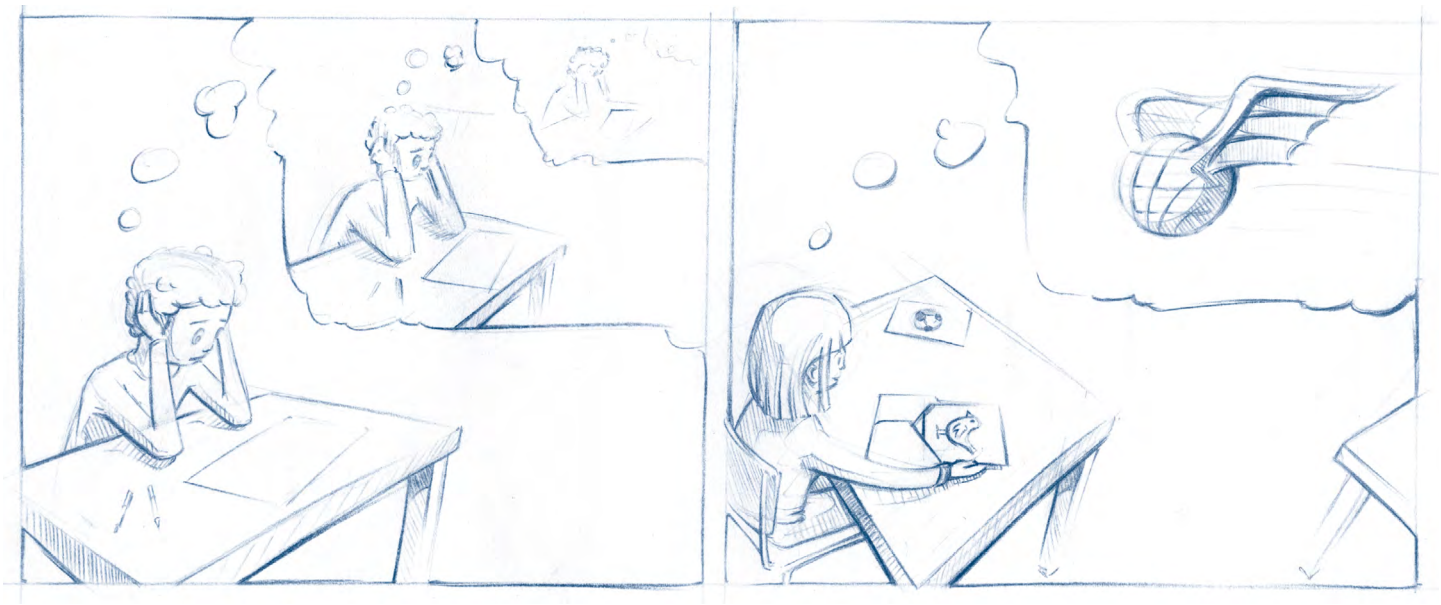
The pictures give the participants new inspiration, reminding them of something random. Variation in pictures gives them a new direction of thinking. Randomly offering images helps participants to come up with new ideas. Ambiguous images trigger personal memories and experiences more easily.

Effect

A larger variety in images increases the chance of good ideas. The Pictures brainstorm stimulates lots of different idea directions. Participants often come up with unique and surprising ideas through these associations.

Without the Picture brainstorm

With the Picture brainstorm



Example

Year 4 primary school students were asked to think of a new game for interactive playground equipment. Creating innovative game ideas was difficult for them. Most solutions were variations of existing games with minor adjustments.

To improve the quality of ideas, the facilitating designer used the Picture brainstorm activity. When Max saw the picture of a guitar, he was inspired to create a game where players form an orchestra or band and can earn points. Yasmin was inspired by a picture of a bear and created a zoo game. Through this technique lots of innovative ideas were created.

Step by step

1. Choose 24 different images with varying content, from the Picture brainstorm worksheet or compile your own set. The images are not related to the design problem but are used to inspire different associations.

2. Print the images, cut them out and put them in envelopes. Give an envelope to each design team.

3. Decide how you want the participants to work in advance. E.g. Do you let them brainstorm individually or in a group?

4. Introduce the Picture brainstorm and explain how it can help the participants create new and surprising ideas.

5. Give them the pictures, but only after the participants have started putting initial ideas down on paper.

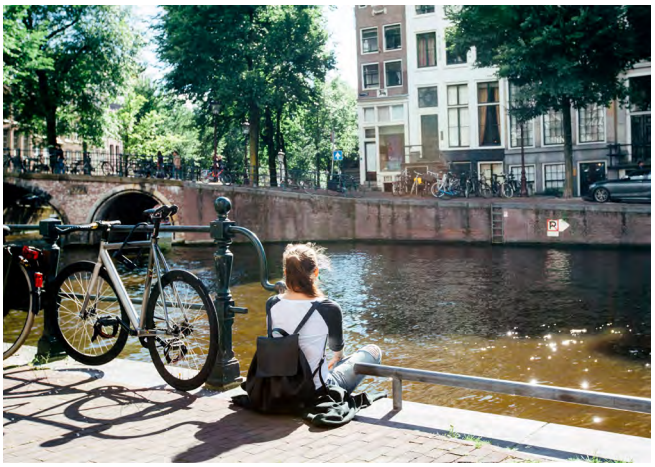
6. Ask the participants to pull out one picture at a time from the envelope, and to come up with at least one new idea for each picture. This will force them to think beyond their existing ideas and trigger the flow of their imagination.

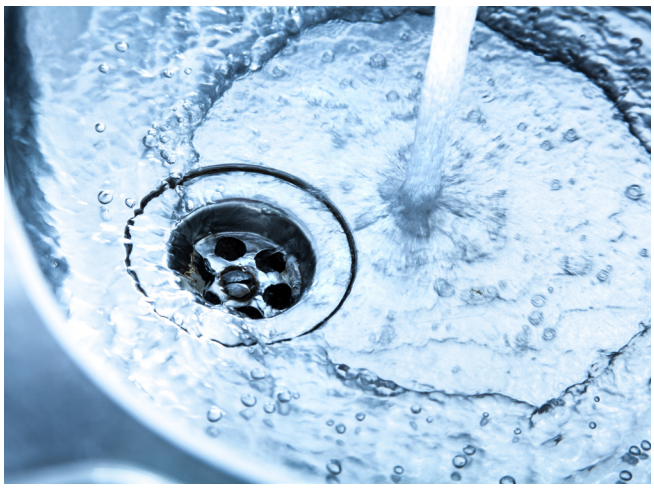
Tips

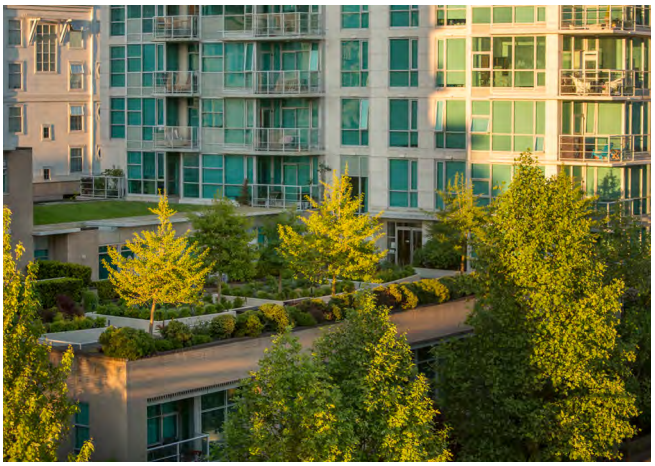
- Discuss a number of ideas in class and let participants tell everyone how the pictures inspired their new idea. The added value of the tool will become clear.
- Vary the Picture brainstorm with the tool Words brainstorm or combine both tools. Words inspire language-oriented thinkers, images inspire visual thinkers.

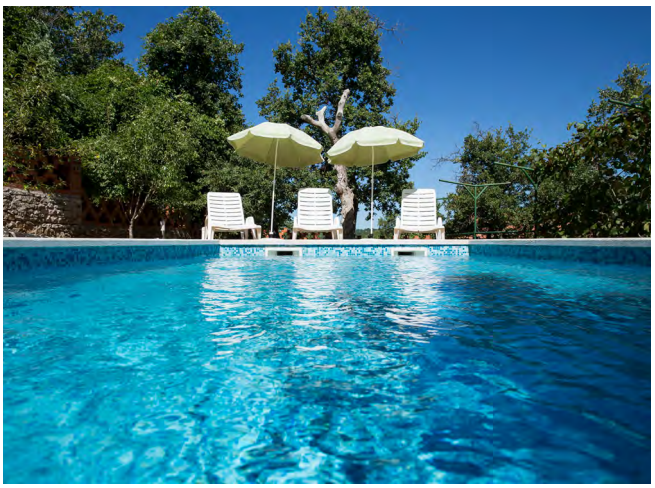
Materials

- A set of 24 loose images in an envelope for each design team, selected from the worksheet 'Picture brainstorm' or your own selection









WORD BRAINSTORM

Random words provide inspiration when coming up with new ideas.

Participants
Individual

Design skill
Think in all directions

Prior design experience
None

Duration
10 – 30 minutes

Design step
Generating ideas

Description

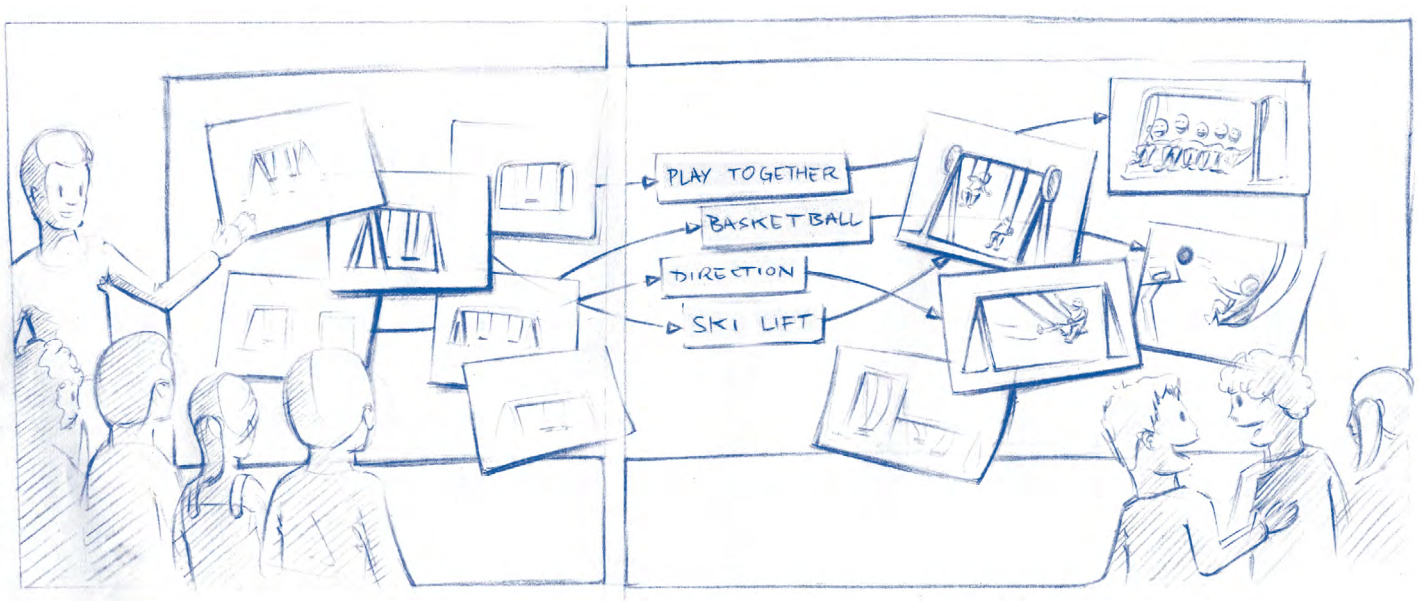
Once the participants have put their initial ideas on paper, each participant or team receives a set of pre-selected word cards. This happens when participants get stuck with coming up with ideas. This works for participants who have difficulty getting started, and for participants who linger at one idea for a long time.

The word cards give the participants new inspiration, reminding them of something. Variation in words gives them a new direction of thinking. Randomly offering different words helps participants to come up with new ideas.

Effect

A larger variety in words increases the chance of original ideas. The Words brainstorm stimulates participants to create new ideas from different perspectives.

Without the Word brainstorm *With the Word brainstorm*



Example

Year group 6 pupils were asked to design a new playground for the school. A key design requirement was that the playground would make children share knowledge and experiences with each other whilst playing. Most of the students' ideas involved a standard playground game with some sort of quiz. Most of the students were able to come up with some variation, but nothing innovative and special.

The teacher Mrs Green used the Words brainstorm to help the children to invent new ideas. Through words such as 'whisper' and 'cartoon character' the students were able to come up with completely different ideas. For example, they came up with solutions that focused on different modes of communication. The word 'sidewalk chalk' made Achmed create a game with digital tiles.

Step by step

1. Think of at least 16 different words or use the set from the Word brainstorm worksheet. Do not choose words that directly relate to the design problem, instead think of words from different domains. Include a variety of verbs, nouns, adjectives and prepositions.

2. Print the words in a large font, cut them into separate cards and put them in an envelope. Give an envelope to each design team.

3. Decide how you want the participants to work in advance. E.g. Do you let them brainstorm individually or in a group?

4. Introduce the Words brainstorm and explain how the associations can help them think of new ideas.

5. Once the participants have put their initial ideas down on paper, give them the words.

6. Ask the participants to pull one card from the envelope at a time, and come up with at least one new idea for each word. This will force them to think beyond their current ideas and get the imagination flowing.

Tips

- Use words that participants have used previously, for example words that came up in the Inverse brainstorm tool.
- Discuss a number of ideas in class and let the participants tell everyone how the words helped them get to their new idea. The value of the tool will then become clear.
- Vary the word brainstorm with the Picture brainstorm tool or make a combination of both tools. Words inspire language-oriented thinkers, images inspire visual thinkers.

Materials

- A set of 16 Word cards in an envelope

reward

everywhere

guessing

feeling

talking

stress

pawns

drawing

playing dice

breaking

buttons

trick

elephant

snake

Donald Duck

looking

dancing

friends

playing

hands

soccer goal

egg

screen

net

rope

gloves

protecting

floating

shoes

flexible

goal

questioning

stealing

time

fighting

hiding

walking

running

turning

Snowy white

martian

Big bad wolf

talking

touching

colours

angry

floating

sitting

hitting

corners

net

rope

paperclip

protecting

team

feet

screen

paddling

ripping

breaking

culprit

grabbing

shadow

together

high

ball

winning

looking

eating

own boss

city

meadow

running

magic

sword

happy

tapping

pipe

pain

sand

listening

direction

after eachother

sunny

quicker

sad

cheap

umbrella

heavy

wind

tree

elastic

fruit

ditch

fun-fair

navel

candle

wheel

paper

wing

wheel

reversed

tube

back

flower

circle

ridges

water

window

cat flap

penguin

pillows

view

cake

fishing rod

searching

magnet

mud

tongue

meatball

cell

queen

soldier

blocks

shop

cactus

shiny

picking

grandfather

glove

broom

under

karate

rope

lint

teacher

relishing

slowly

whispering

rainbow

golf

splash

telephone

lawnmower

YES/NO LIST

Make a quick, rough selection of ideas to continue with.

Participants
Group

Design skill
Define your direction

Prior design experience
None

Duration
10 – 15 minutes

Design step
Selecting ideas

Description

Participants choose which ideas they want to develop and the ideas they don't want to develop. They do this spontaneously, based on their first impression of an idea. The decision can be made purely by personal preference but deciding criteria in advance enhances the process. For example, 'Is the idea new and special?' is a widely used and strong criteria.

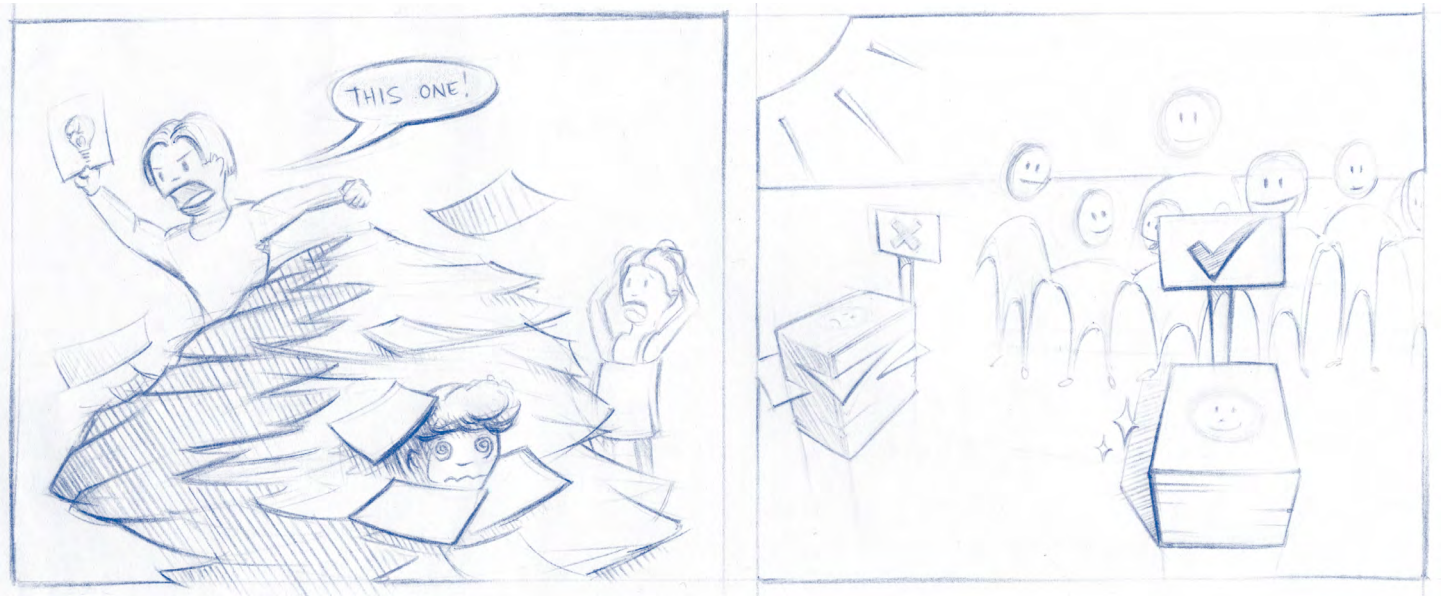
Every participant receives their own Yes/no worksheet. Each idea is numbered. Each participant individually lists the numbers of the ideas they find special in the Yes box and the ideas they don't find special in the No box. Initially participants do not see what the others decide. Once every participant has completed the worksheet the group collects the ideas rated 'Yes' by at least one person. Ideas with multiple 'Yes' votes are particularly interesting. Why did one participant choose an idea while the others did not? The participants' argumentation clarifies the differences in opinion.

Effect

Participants quickly make a (first) selection from all the different ideas. Because choices are not discussed immediately, every participant has a chance to develop their own preferences. This forms an equal group dynamic where every participant has a say.

Without the Yes/no list

With the Yes/no list



Example

Year 4 students from the Riverside primary school were asked to help think about a social problem, namely obesity among young people. One of the causes of being overweight is the fact that children are moving and exercising less.

The students came up with solutions for the design question: 'How can we ensure that children get more exercise?' The students came up with many different ideas and then removed identical ideas. Then the teacher asked her students to use the Yes/no list to make a selection. It was good that Mrs Miller did it! When removing the identical ideas, only a few students were speaking. However, when using the Yes/no list, the quieter children felt more comfortable and were happy to speak about their preferences as well during the selection.

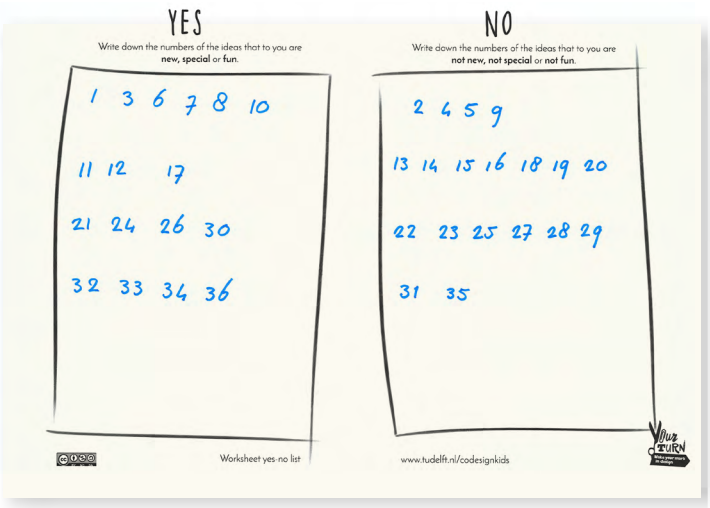
Step by step

1. Make sure the participants have come up with lots of different ideas, you could use a brainstorm technique.

2. Clearly display all the ideas and place repeated ideas in a stack with a paper clip. Demonstrate this if necessary.

3. Have the participants number all the different ideas. They will use these numbers later. An added bonus of counting is that the participants see how many ideas they have created!

4. Explain to the participants that they will use the Yes/no list to select ideas for development. Discuss the criteria for choosing an idea, for example, the idea has to be new and special or it has to look good and attractive.



5. Give participants a Yes/no worksheet and let them complete it individually. They will write the number of every idea in either the yes or no column on their own worksheet.

6. Have the participants make an overview of all the ideas from the Yes columns of their group by placing them on the table. Include the ideas with just one Yes vote.

7. Discuss the ideas on the table and select the most promising ideas with the group. This can also be done amongst the group without assistance.

Tips

- Ensure that participants do not secretly consult or influence each other when filling in the list.
- Use the Choice-box tool to help narrow down the selection in step 7.

Materials

- A Yes/no worksheet for each student
- Many design ideas that the participants have created themselves

YES

Write down the numbers of the ideas that are
new, **special** or **fun** to you.

NO

Write down the numbers of the ideas that to you are
not new, not special or **not fun** to you.

Your Turn
Make your mark in design

CHOICE-BOX

A visual aid to make a conscious selection of ideas together.

Participants
Group

Design skill
Define your direction

Prior design experience
Average

Duration
30 minutes

Design step
Selecting ideas

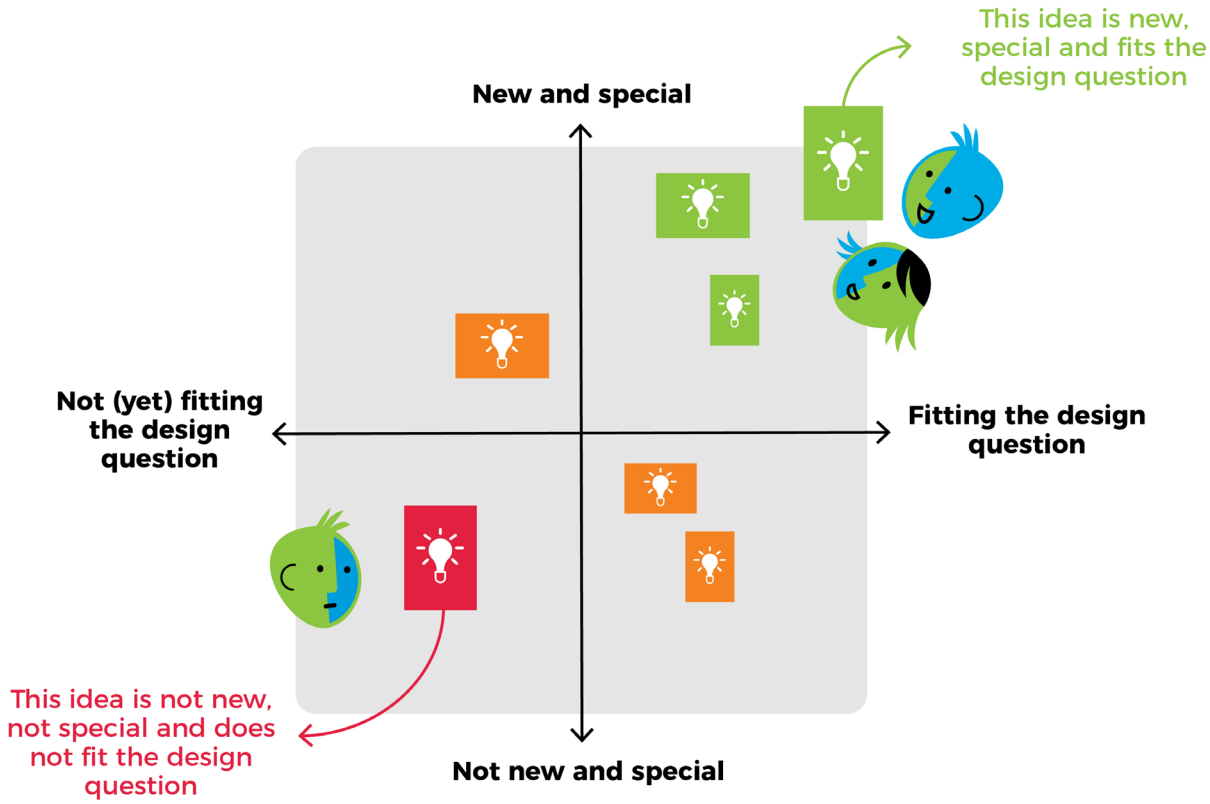
Description

When participants have come up with a lot of ideas, brainstorming is no longer useful. The Choice-box helps them to compare and select ideas. The Choice-box consists of a horizontal and a vertical axis. The horizontal axis indicates how well an idea is in line with the design question. The vertical axis indicates how new and innovative an idea is.

There are four quadrants in the Choice-box:

- Fitting the design question - new and special: **ideas to develop**
- NOT fitting the design question - new and special: for-the-future-ideas
- Fitting the design question - NOT new and NOT special: already-possible ideas
- NOT fitting the design question - NOT new and NOT special: trash can ideas

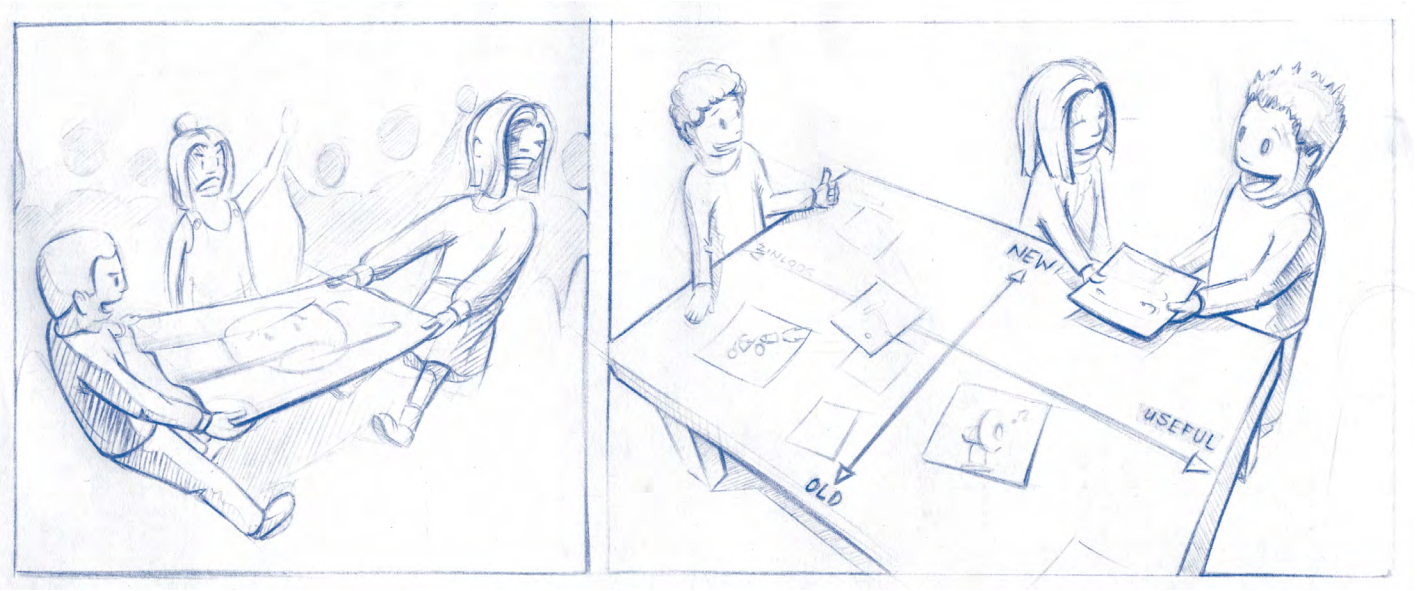
The participants discuss and place their ideas in the quadrant where they belong. When all the ideas have been placed, the participants will see which ideas are worth developing. These are the ideas in the box at the top right. From this area of ideas, the participants choose an idea to develop further!



Effect

Working with the Choice-box helps participants to consciously reflect on the strength of each idea. They share opinions with each other and gain insights about the value of their ideas in an effective and fast way.

Without the Choice-box *With the Choice-box*



Example

In the project 'The future of Physical education' child design teams thought of all sorts of ideas that can make PE classes fun for all types of children. The director of the HALO (The Hague Academy of Physical Education) would like a list of the most promising ideas. But how do you determine which ideas are best? The design teams succeeded in selecting the best ideas with the help of the Choice-box.

To start with the children didn't know which ideas were suitable. They always asked the facilitator. There were far fewer questions when they used the choice box. It helped the groups to independently think through their ideas.

Step by step

1. Make sure the design teams have a lot of different ideas on separate cards.

2. Show them the Choice-box and explain how it works. Discuss the two criteria (the axes) and what each quadrant means.

3. Tell them that the Choice-box is a tool used to gain insights into the value of ideas that have been made. Show them how to decide what quadrant to place an idea in.

4. Give each design team a large sheet with a Choice-box drawn on it. Lay the sheet down on a table or the floor so each group member can see all of the sheet and reach the four quadrants.

5. Let the team spread their ideas out over the sheet. Tell them to discuss where an idea should be put.

6. Ask them which box contains the ideas that are suitable for developing. Have the teams focus their attention to the ideas in the upper right box.

7. Let each design team choose an idea (or a few ideas) to develop. Everyone in the group must agree with the chosen idea(s).

Tips

- It is also possible to let participants place their own ideas individually then discuss them as a group, moving ideas if necessary.

- Indicate timings for placing ideas, viewing the 'ideas to develop' and selecting ideas. Help the teams to think of and voice arguments.

Materials

- All participants' ideas on separate cards
- Large sheet with Choice-box drawn on it per design team (A0 or flipchart format)

References

The Choice-box is a variation on the C-box, which was created by Marc Raison.

DOT VOTING TECHNIQUE

As a group select populair ideas to continue.

Participants
Group

Design skill
Define your direction

Prior design experience
None

Duration
10 – 15 minutes

Design step
Selecting ideas

Description

Each participant is given six dots (stickers). They then rank the 1st, 2nd and 3rd best ideas with 3, 2 and 1 stickers respectively. Participants are encouraged to rank the ideas based on their gut feeling or agreed criteria.

After pasting the stickers the interesting and loved ideas will be differentiated from the rest. It became immediately clear that the bulk of ideas is not interesting. These ideas are put to the side. It is also worth paying particular attention to the ideas that received three stickers from an individual.

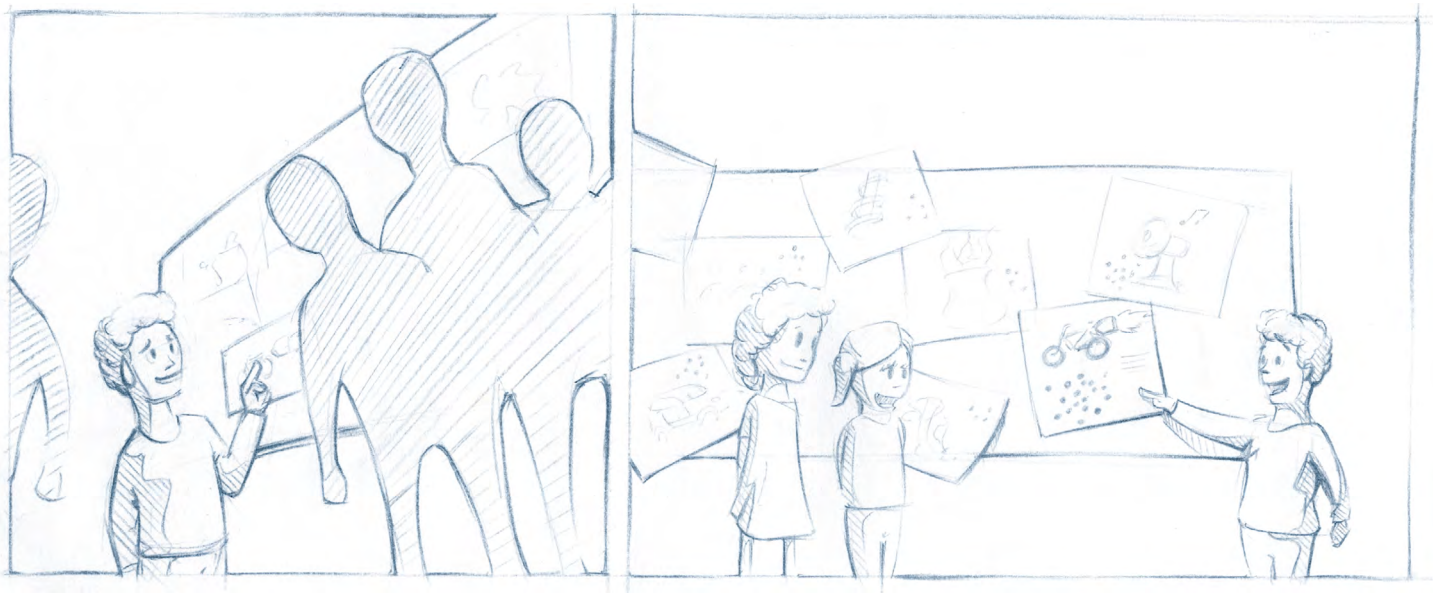
The participants are encouraged to discuss why a particular idea is interesting and any negative points it has. Through the discussion they all feel more connected with the ideas.

At the end of this processthey will make a final choice. Everyone must agree that the idea is relevant to the problem. Participants can also choose to combine elements of ideas into a new idea.

Effect

Participants select many and different ideas in a quick and practical way and jointly think about their favourite ideas. When sticking dots, the particpants are not hindered by peer pressure as much as with group discussion.

Without the Dot voting technique *With the Dot voting technique*



Example

Seagulls cause the director of a large company on the coast a lot of problems during the breeding season. Groups of students from year group 5 came up with lots of solutions for this design problem. The students used the Dot Method to decide what idea to develop further.

Lucas stuck three stickers on the idea ‘a flying scarecrow’. The idea ‘a large net across the entire factory’ received most of the stickers. The group asked who voted for the scarecrow idea. Lucas explains that a drone shaped as a bird of prey can be used to move the seagulls away from the factory. The group decides that this idea is promising and innovative, they choose to develop this instead.

Step by step

1. Ensure there is a sufficient number of ideas; each on a separate sheet.

2. Decide whether to use coloured dot stickers or felt-tip pens for placing the dots.

3. Explain conditions to the activity: can they choose their own ideas, how much time do they have, how many stickers can they use per idea (a total of 6; 3-2-1), how much time do they have for pasting, etc.

4. Spread out all ideas on a tabler or wall. Identical ideas are put in a stack with a paper clip to hold them together. Everyone in the group must be able to reach each idea. Participants can ask and/or explain what a drawing is. Avoid discussion about the quality of ideas.

5. Have the participants stick the dots. Emphasize that participants should choose their favourite idea by themselves, without consultation!

6. Have the participants evaluate how the dots are divided themselves. Each participant should have the opportunity to explain their favourite ideas. Encourage discussion in the group.

7. The participants then decide which idea to develop further as a concept. Combining elements of ideas into a new one is possible!

Tips

- Make sure the participants do not secretly discuss or influence each other while sticking the dots.
- To increase the chance of original and innovative ideas, you can agree on selection criteria with the participants such as original, promising or fun.
- Be careful that the group doesn't choose an idea just because it has the most dots. If the participants cannot agree on which idea to choose, offer help with this process – e.g. by adding criteria. Do not make the decision for them.

Materials

- Ideas on individual sheets
- Dot stickers or felt-tip pens

TRAFFIC LIGHT RATING

Rate ideas against criteria and quickly compare them with each other through the colour codes.

Participants
Group

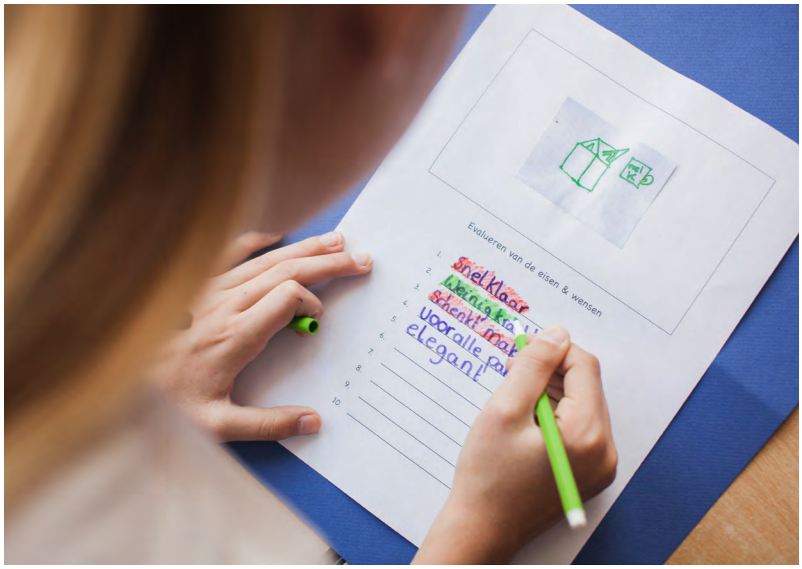
Design skill
Define your direction

Prior design experience
Average

Duration
15 minutes

Design step
Selecting ideas

Description



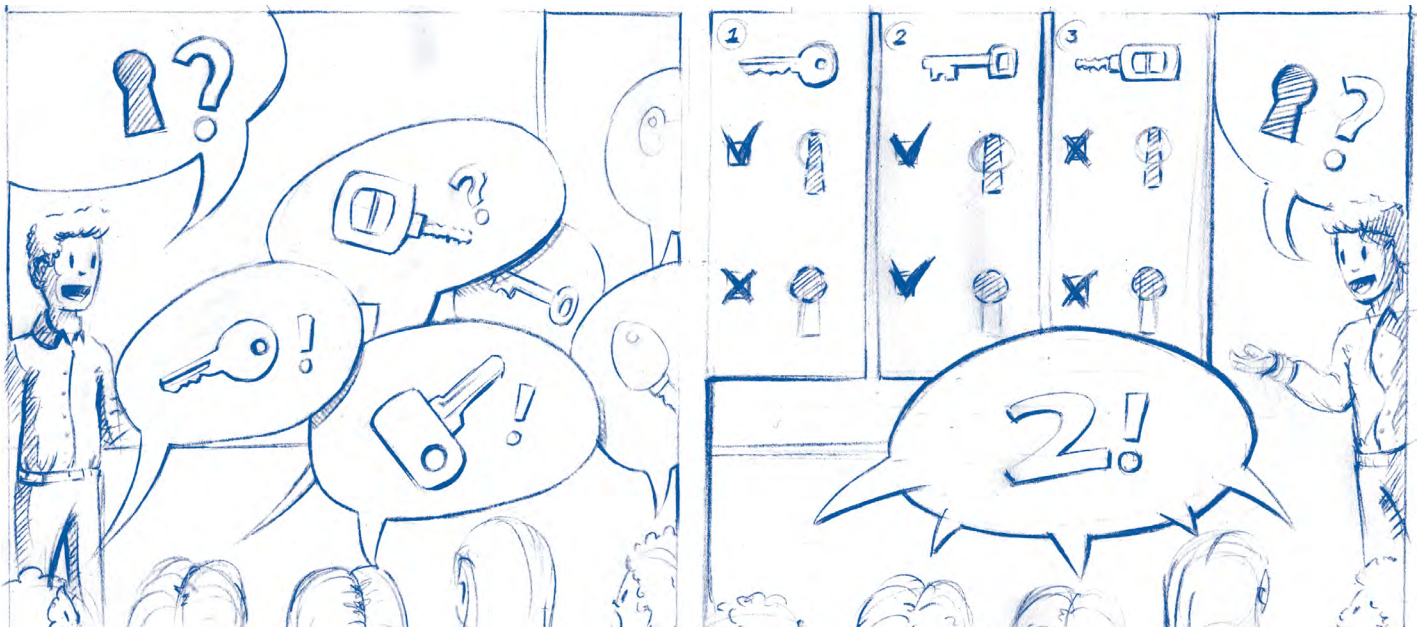
With this method, participants are able to evaluate and compare two to eight ideas and select a few ideas to develop in the design process. For each idea, participants indicate to what extent it meets their own criteria (requirements and wishes) with different colours. Green stands for 'this idea fully meets the criteria', orange for 'it partially meets the criterion' and red for 'does not meet the criteria at all'. Discussing arguments whilst rating and comparing is important.

The colours give an overview of how their ideas rate against the criteria. They can then choose an idea that scores high. They can also choose an idea that has potential even if it does not score high on all criteria yet. When developing this idea, the aim is to improve it so that it scores high on all criteria.

Effect

By using this tool, participants consciously search for a design idea that meets all their requirements. The participants learn how to assess and compare the quality of different ideas in relation to the design problem.

Without the Traffic light rating *With the Traffic light rating*



Example

How can children in a wheelchair participate in the game marbles? A design team has devised more than thirty ideas, with the help of the Choice-box tool they have discovered that three ideas are innovative. Because they only want to build one prototype, they indicate with green, orange and red how the three ideas score against a list of their criteria. Each idea scores a number of 'green' points but they also have some orange and red points. They decide to make a wheelchair with a marble tube, because this is the only solution that can be made cheaply and can be taken anywhere. The challenge for further development is to ensure that the child in the wheelchair can properly aim the marble.

Step by step

1. Have each design team make a numbered list of their previously established criteria from most important to least important.

2. Have the participants paste all ideas they want to choose from, onto individual Traffic light rating worksheets.

3. Have the design team rate each idea based on each requirement: green (fully satisfies), orange (partially meets) or red (does not meet the requirement).

4. Let the design team look at the resulting colour distributions and choose the idea or ideas they want to evelop further. An idea with a lot of green is good. An idea with orange and red can be chosen if the participants think they can improve it sufficiently.

Tips

- Pause the process if they cannot select a colour. Ask supportive questions such as: 'Can you explain your opinion? Why do you think so? Is that your own preference or the preference of the end user?'
- Use the 'Yes/no list' or 'Choice -box' tools to let participants make an initial selection if they want to evaluate more than eight ideas.

Materials

- Worksheet Traffic light rating: one for each idea per team
- Green, orange and red felt-tip pens or small stickers.

References

This tool is derived from the Harris Profile, as found in:
van Boeijen, A., Daalhuizen, J., van der Schoor, R., & Zijlstra, J. (2014). Delft Design Guide: Design Strategies and Methods. BIS Publishers, p139

Name: _____ Class: _____

Place the idea here!

EVALUATING CRITERIA

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____
9. _____
10. _____

Green: meets the criteria
Orange: does not fully meet the criteria
Red: does not meet the criteria

FORWARD WITH FEEDBACK

Formulating effective feedback through a standard routine.

Participants
Class

Design skill
Share ideas

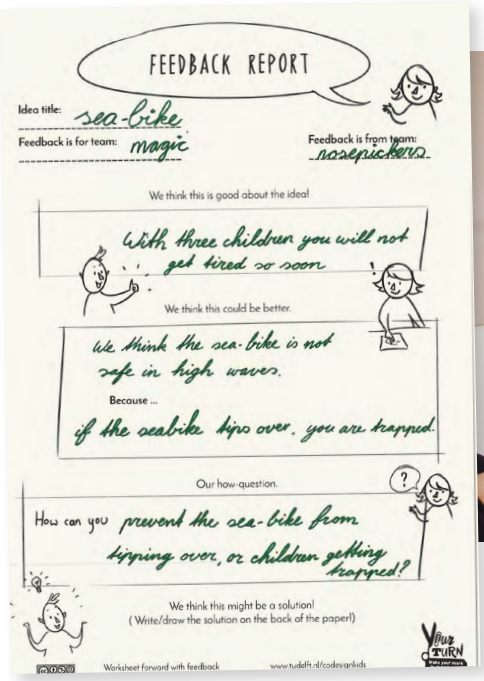
Prior design experience
Average

Duration
60 minutes

Design step
Generating concepts

Description

Participants provide each other with feedback through a standard routine. One design team presents their idea. Other participants can then ask questions for clarification. These questions are solely for information and should not contain compliments or criticism.
Once the design team have answered questions, the other groups write their feedback on the feedback report worksheet. They comment on specific qualities of the idea. They comment on what could be improved through a 'This could be better'- statement and a 'How can you'-question. The formulation of statements and questions is important.

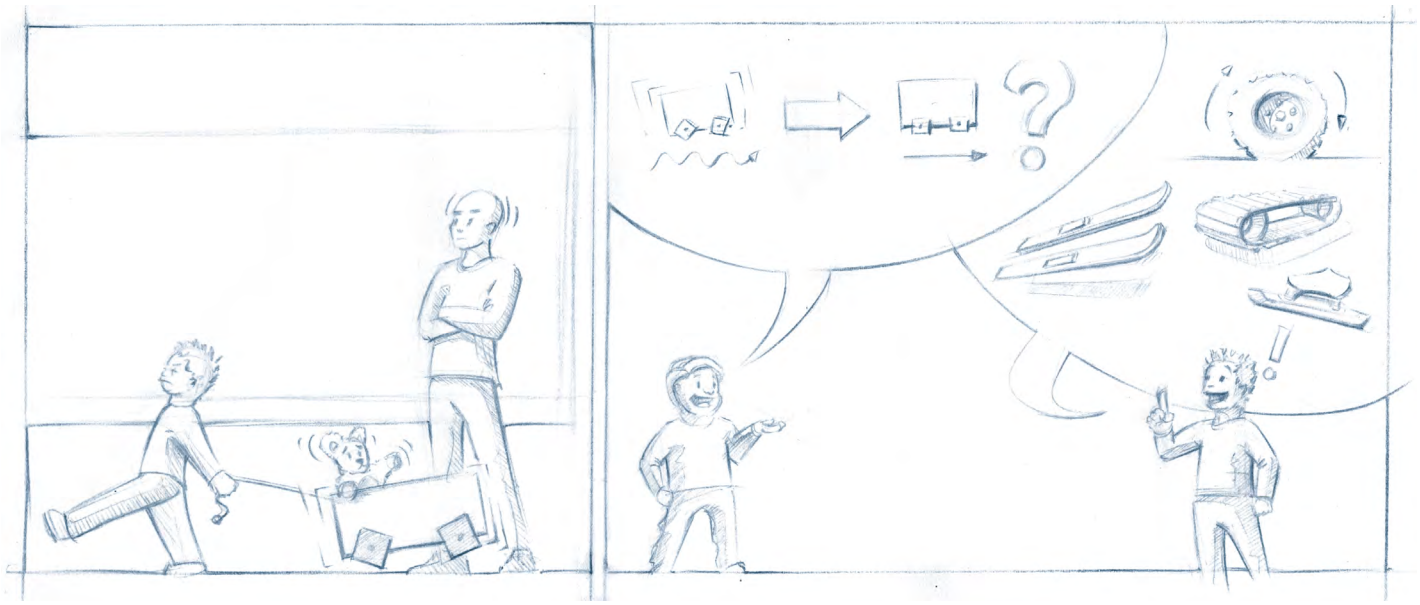


In the next session, each design team receives the completed feedback worksheets. Each team reads and discusses the feedback. The design team then selects two 'How can you'-questions for further development.

Effect

Giving and receiving good feedback during a design process is not always easy. Because participants are enthusiastic about their own design, they can easily feel criticized and respond defensively. Through the feedback routine, participants become open to the feedback and it helps them to come up with new solutions.

Without the Forward with feedback *With the Forward with feedback*



Example

Mila, Peter and Ezra are designing a milk carton opener for James, an arthritis patient. They presented their best idea to the class yesterday. Peter thought the presentation went well, because their classmates hadn't asked many questions. It appeared that their idea was clear. The teacher gives them the completed feedback forms and they read them to each other. They now have to choose two forms to continue with. There are potential areas for improvement from all of the forms. Ultimately, they choose the forms with suggestions that will benefit James the most. They start to come up with solutions for the 'How can you' questions and immediately start to improve the milk carton opener.

Step by step

1. Explain to the participants that giving and receiving feedback is important in a design process. Ask the participants about their own experiences, for example:
   - Do you give each other feedback on other subjects (e.g. Tips and Tops)?
   - What do you use feedback for?
   - When is feedback good feedback?
   - What do you need to know to give good feedback?
   - What are important skills for giving feedback?
   - What are important skills for receiving feedback?

2. Complete the feedback report with the whole group using a 'wrong' example, see below. Practice how to give a compliment first. Then practice using the 'This could be better, because …' statements. Then formulate a 'How can you' question with the whole group. Make sure that this question is an indication of a goal and offers room for a variety of solutions. Make sure everyone understands.

3. Have the teams take turns presenting an idea they want to receive feedback for.

4. Have the group (and the external client if present) ask clarification questions, such as 'What is the opener made of?', 'Can you explain again?'. Compliments, criticism and discussions are not permitted.

5. Have the participants (and the client) complete the Feedback report worksheet in pairs or as a design team. If necessary, give a participant or the client the opportunity to read out their feedback. The receiving team is then only asked 'Do you understand the feedback?'

6. In the next session, give the design teams the Feedback report worksheets that have been completed for their ideas. Have them read and discuss it with each other. Let each team select two Feedback worksheets for further development.

7. Later, in their final presentation of their design, ask the participants about the feedback and the improvements that were made because of it.

Wrong examples for practicing

Mila has made a milk carton opener for James, an arthritis patient. Jake sees the design and tells Lisa: 'This is not possible. It is too hard to use for James.' Jake thinks of a clear point for improvement but does not explain it properly. In addition, his feedback is not pleasant for Mila to hear.

Through the feedback routine, Jake's feedback is now phrased as follows:

(This could be better)	'James still can't use the opener easily,
(because)	because it is too hard for him to push the opener into the carton.
(How can you)	How can you make it easier for James to get the opener into the carton?'

Not: 'Doesn't the milk spoil very quickly? A milk carton should have a cap!'
But: 'It's good that the opener is lightweight. But it would be better if you could close the milk carton, because the milk spoils quickly. How can you ensure that the milk carton can be closed close again?'

Not: 'James still can't pour the milk himself; I think. You should make a type of crane that lifts the carton which can be controlled with a remote control! That is cool!'
But: 'It's good that the opener is lightweight. But James still can't pour his milk himself, because the carton is too heavy for him. How can you ensure that James can pour the milk by himself?'

Tips

- A team can either respond defensively to questions or quickly come up with solutions. Make them aware that it does not matter if participants do not know the answers to all questions. During the design process it is helpful to know what details are not clear and what can be improved. Participants will be able to help each other with this.

- Make sure the feedback is concrete and supported by an argument. This has added value for the recipient.

- Split larger groups so that there is sufficient time for presentations from each team.

Materials

- Presentation materials of the design idea
- Worksheet 'Feedback report'

References

The development of the 'how' question is based upon research by Alice Schut and on Eris' question-driven design model:

- Schut, A., Klapwijk, R. M., Gielen, M., & de Vries, M. (2019). Children's Responses to Divergent and Convergent Design Feedback. Design and Technology Education: an International Journal, 24(2), 67-89.

- Schut, A., Van Mechelen, M., Klapwijk, R. M., Gielen, M. & De Vries, M. J. (accepted), Towards Constructive Design Feedback Dialogues: Guiding Peer and Client Feedback to Stimulate Children's Creative Thinking, International Journal of Technology and Design Education.

FEEDBACK REPORT

Idea title:

_____

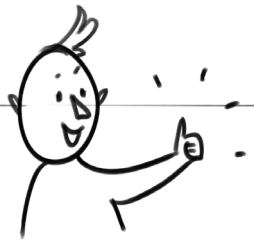
Feedback is for team:

_____

Feedback is from team:

_____

We think this is good about the idea!



We think this could be better.

Because ...

Our how-question.

How can you

We think this might be a solution!
(Write/draw the solution on the back of the paper!)

Your Turn
Make your mark in design

Piecing together a design pitch

Participants learn about the structure and important elements of design presentations.

Participants
Individual / group / class

Design skill
Share ideas

Prior design experience
None

Duration
20 minutes

Design step
Presenting

Description

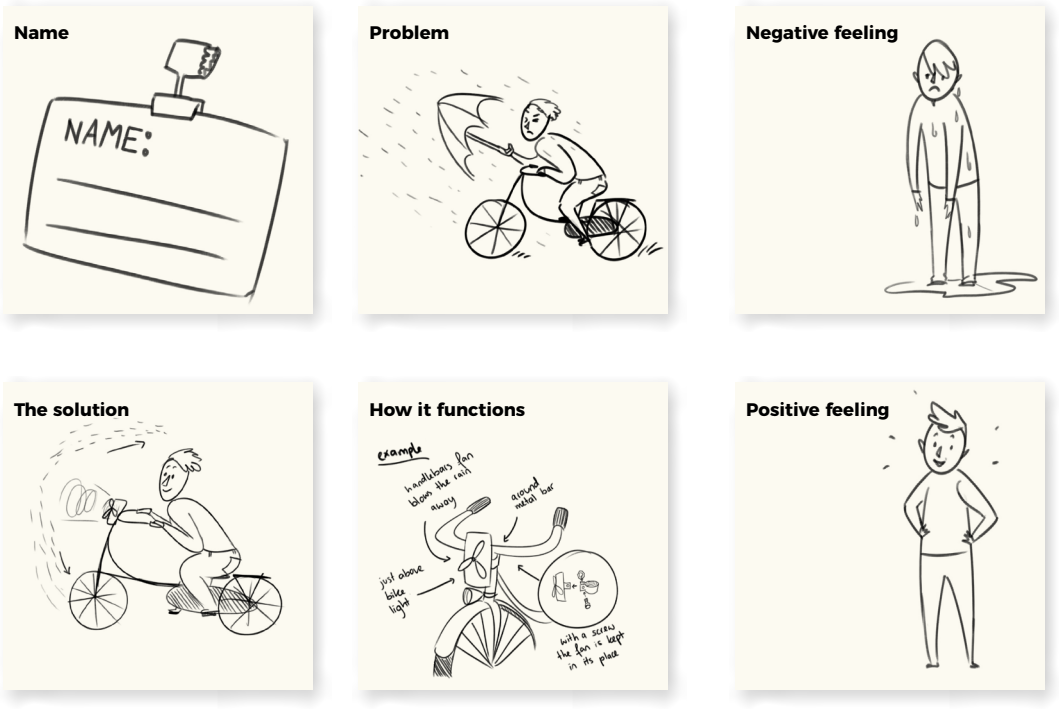
Design has a distinct language and it is about things that do not exist yet. It's not easy to present a design idea clearly. To learn how to present, participants first watch videos of design presentations from industry.

The participants will then receive a sheet with images from a design presentation video, placed in a random order. They will try to put them in a logical order. Once the puzzle pieces are placed in a sequence, the participants give each puzzle piece a 'label'. Each label describes the function of an element in a design presentation.

A good basic structure, that is used in this assignment, is:

- name of the design
- design problem
- feelings of the person with the problem
- what does the design solution look like
- how does the design function
- feelings of the person using the design solution.

The puzzle assignment gives the participants insight into the structure of a good design presentation. They also discover how each element fits together to form a story. They also learn that a user's emotions play an important role in the presentation. They use these insights to help work out a presentation about their own design ideas.

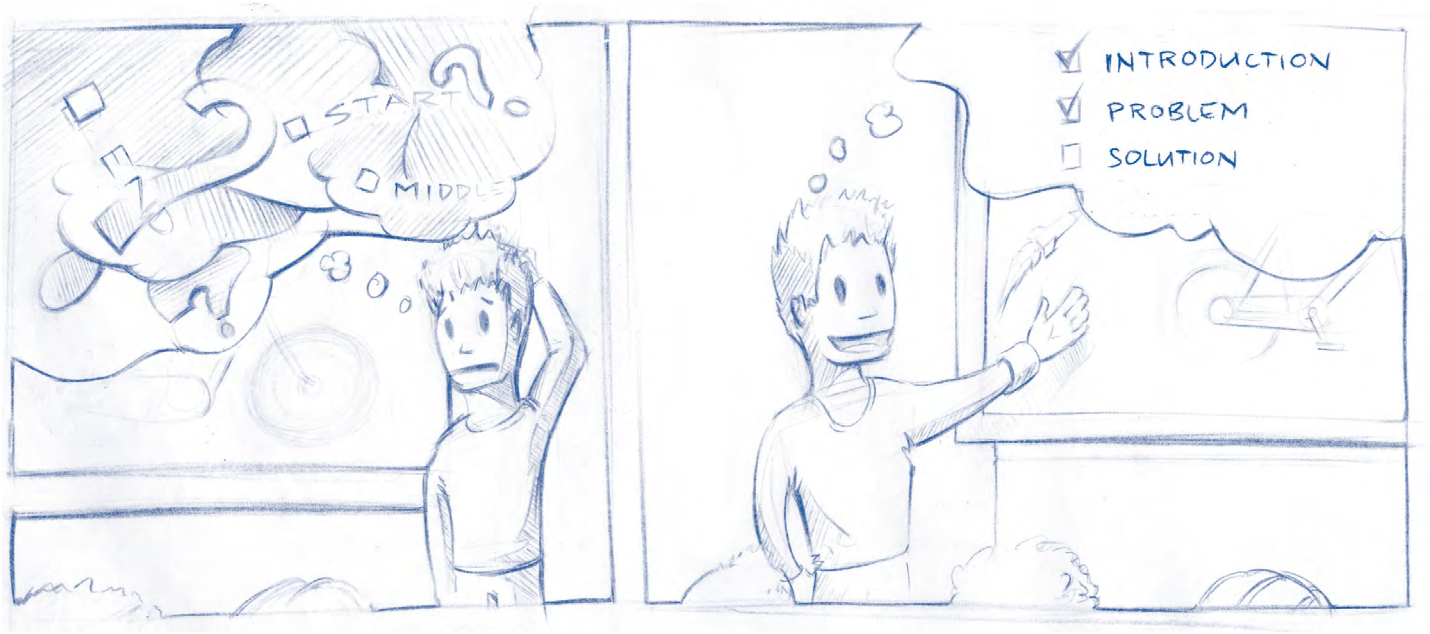


Effect

Analysing sample videos helps participants to discover and recognize the structure and important characteristics of a design presentation. Participants can then make their own presentation faster, better and more independently.

Without the Piecing together a design pitch

With the Piecing together a design pitch



Example

Bilal knew exactly what he wanted to tell the rest of the class with his talk about drones. But he was not so sure how to best explain his invention 'Rotating slide with water cannon.' Fortunately, Miss Brewer had planned to help with this using the 'Piecing together a design pitch' tool. Together with the entire class, they watched how real designers and other students present their ideas.

The example presentations introduced a problem and ended with a solution. The emotions of the users were expressed strongly. You could see that someone was sad because of a certain problem. The solution to the problem, the design, made that person happy! The participants took on board this structure for their own presentations. Bilal benefited greatly from the exercise!

Step by step

1. Find design pitch videos on internet – innovation competitions are a good source. Look for a video about a design idea with a clear story structure.

2. Print the 'Piecing together a design pitch' worksheet for each participant.

PIECING TOGETHER A DESIGN PITCH

Assignment 1
Look at the different scenes of the video "Drawings binder net". What do you think is the right order of the scenes?
Write the Scene number with the corresponding letter.

Scene A = ...

Scene B = ...

Scene C = ...

Scene D = ...

Scene E = ...

Scene F = ...

Assignment 2
A design presentation can be viewed as a story with separate chapters. These chapters signify the important elements to be able to present your design properly. In the video above, every scene is a different chapter. Look at the different scenes of the video again. Write the Scene number with the corresponding presentation element

- Name of the design = Scene ...
- The problem = Scene ...
- The person with the problem's feelings = Scene ...
- What does the design looks like = Scene ...
- How does the design functions = Scene ...
- The person using the design's feelings = Scene ...

worksheet piecing together a design pitch

www.tudelft.nl/codesignkids

3. Tell the participants that they will look at an example of a design presentation because they can learn from it. Emphasize that they have to pay attention because they will be given an assignment afterwards.

4. Watch a video with the group. Then hand out the work sheet. Have the participants arrange the puzzle pieces in order (assignment 1) and assign labels to each piece (assignment 2).

5. Discuss the results and what emotions the participants saw. Ask what else they noticed. Ask why something might be useful for a listener to know.
6. Finish with a conclusion about the problem-solving structure and the six elements that help to structure a design presentation.

7. Watch another video clip and discuss the six elements or do another puzzle. Tip: this is extra fun if an element is missing or not clear.

Tips

- View the videos in advance and try out the puzzle yourself.

- After watching the video, use the Solution Pitch tool where the six elements appear.

- The answers to the worksheet are:
  1 = name = scene D
  2 = problem = scene B
  3 = feelings of the person with the problem = scene A
  4 = what the design looks like = scene F
  5 = how the design functions = scene E
  6 = feelings of the person using the design = scene C

Materials

- Example design presentation video 'piecing together a design pitch' (written texts are in Dutch) and other comparable presentation videos with a clear story structure.

- Worksheet 'Piecing together a design pitch'

PIECING TOGETHER A DESIGN PITCH

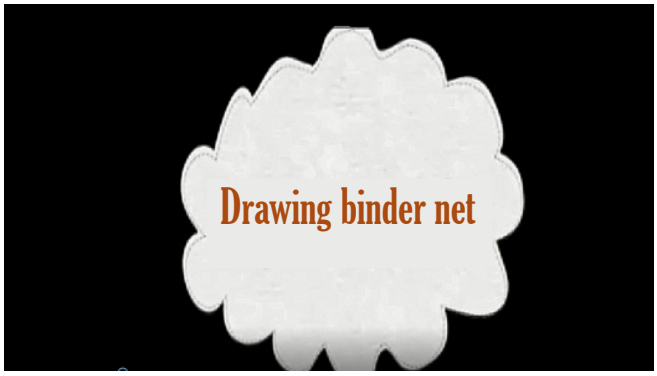
Assignment 1

Look at the different scenes of the video "Drawings binder net". What do you think is the right order of the scenes? Write the Scene number with the corresponding letter.

Scene A = ...

Scene B = ...

Scene C = ...



Scene D = ...

Scene E = ...

Scene F = ...

Assignment 2

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- How does the design functions = Scene ...
- The person using the design's feelings = Scene ...

SOLUTION PITCH

Using an appropriate story structure to communicate design ideas.

Participants
Individual/group

Design skill
Share ideas

Prior design experience
None or little

Duration
75 minutes

Design step
Presenting

Description

Participants prepare a presentation about their design idea for people who weren't directly involved in their design process, such as the client. Every participant receives their own Solution pitch workbook. The pages of the workbook contain the start of sentences about important design elements. Completing these sentences and making illustrations forms a storyline about the design.

Participants complete the sentences and make illustrations. The process helps them to explain how they solved the key issues in the design problem. They learn how to present an idea from the user's perspective.

This tool provides a natural structure for the participants' because they are able to give a comprehensive explanation of their thought processes. A natural structure for the presentation arises.

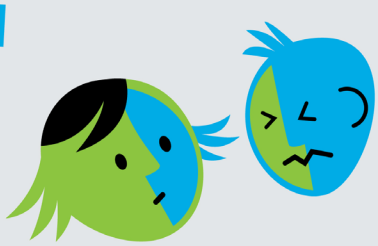
Presentation hopscotch track: six basic steps

Start

1 The name of the design idea

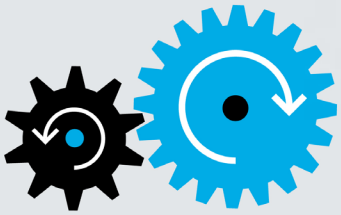
2 The problem and the context

3 Feelings of the person with the problem, the negative experience

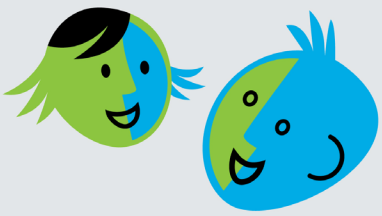


4 The design

5 How the design functions



6 Feelings of the person using the design, the positive experience

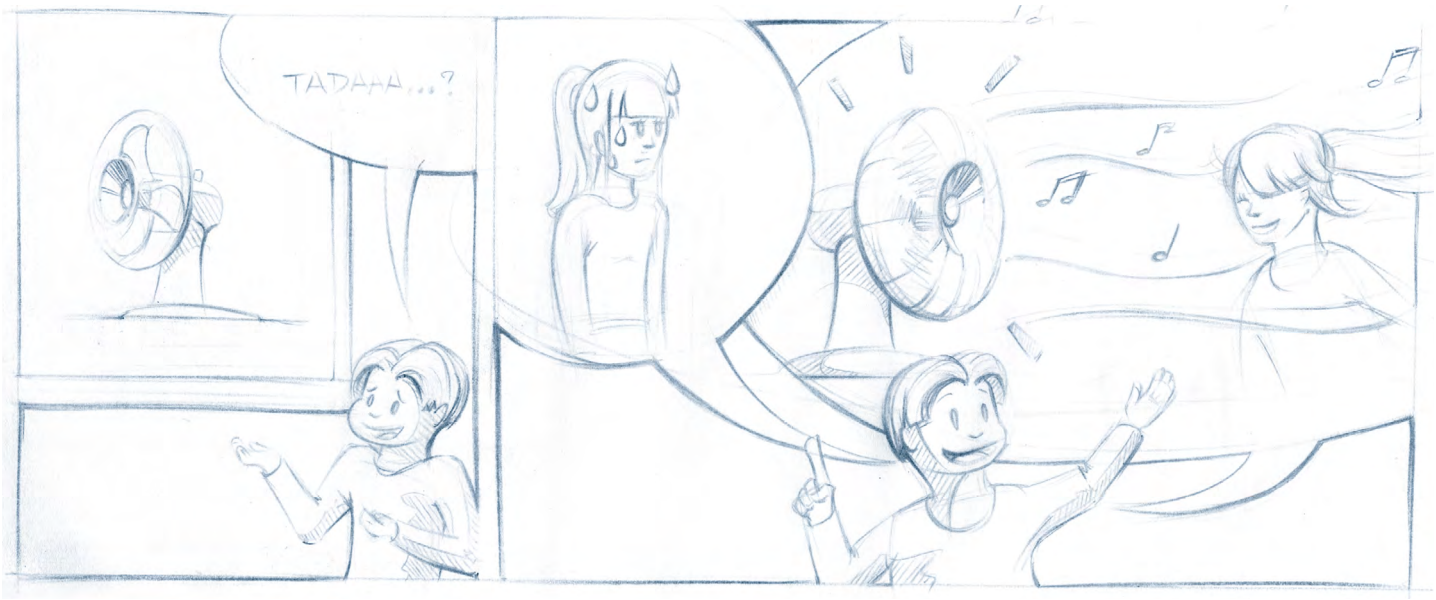


Applause!

Effect

Using a fixed story structure allows participants to independently work on a presentation of their design idea. The presentations are comprehensive and easy for an audience to follow. A benefit is that participants develop a conceptual framework for the design process. They learn to think from the users perspective.

Without the Solution pitch *With the Solution pitch*



Example

A seven year old boy uses the Solution pitch workbook to prepare his presentation. He came up with a solution to reduce the plastic pollution in the ocean.

The Solution Pitch workbook helps him to create a comprehensive view of his idea. All of the important aspects are included in his story. Thanks to his thorough preparation, the boy feels confident about his presentation. He has the confidence to share his ideas.

The waste catcher

Our design is called 'The waste catcher'. An astronaut in space saw that there was a lot of plastic in the world's waters. He was not happy with that. Back on earth, he wants to clean the environment with the 'waste catcher'. The waste catcher is a flying bottle that sucks up plastic and

water. There are sponges in the bottle that let the water out but the plastic stays in the bottle. He now feels reassured about the situation in the environment, because of the 'Waste Catcher'.

Step by step

1. Make sure the participants have a design idea ready.
2. Discuss what the participants already know about presenting. An example of a design presentation video can also be shown.
3. Explain to the participants that they will prepare a presentation about their design idea. By completing the Solution pitch workbook, they will cover all the elements of their design.
4. Have the participants complete the sentences and make drawings.
5. Let the participants practice their presentations and give them one point of feedback for improvement. Repeat just this part until you and the participants are satisfied. Celebrate the success.
6. Have the participants present their idea to the intended audience and allow time to communicate about their design (afterwards).

Tips

- Let the participants real-time perform their presentations. This will help them learn how to explain their design idea through words, gestures, drawings and even prototypes. This leads to a presentation that contains a more 'vibrant' feel for the client.
- Participants can make a video to present thier idea instead of presenting in person.
- Use the tool 'Puzzling a design pitch' as preparation for this activity.

Materials

- Solution pitch workbook

SOLUTION PITCH: PRESENTING YOUR DESIGN

Name: _____ **Class:** _____

Instruction: Describe your design and create a story about it. Use the sentences in this booklet to make the story. Make drawings to help explain your point.

We want to present a design to you. Our design is called:

With this design, we want to help ...

(space to draw)

Who is this story about?

or

Once upon a time, there was

Once upon a time, there were

Where does this story take place?

or

He/She was

They were

(space to draw)

1. What was the problem?

or

His/Her problem was

Their problem was

2. How did they feel?

or

He/She felt

They felt

(draw the emotion here)

(space to draw)

1. What has been made to solve the problem?

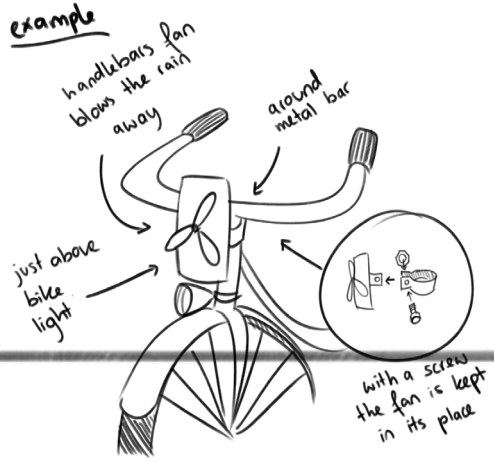
or

He/She has

They have

2. What does it look like?

3. How does it work?



(space to draw)

1. What is new and special about your design?

2. What is super useful about your design?

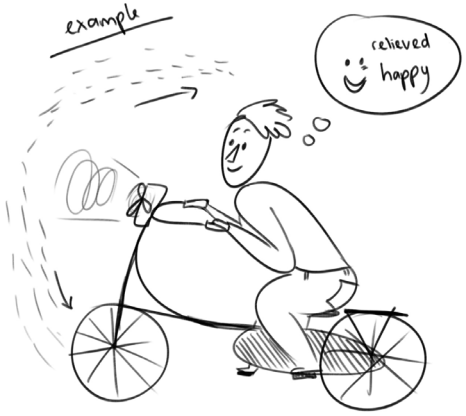
3. How do they feel after using your design?

or

He/She feels

They feel

(draw the emotion here)



(space to draw)

As you could see, our design helped to solve the problem of

_ _

With _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ *(name of the design)* **you will not have any issues with**

_ _

_ _

_ _

We are curious to hear what you think about our design!

(space to draw)

VIDEO ROLL

Making a clear video about the design idea to easily share with a client.

Participants
Group

Design skill
Share ideas

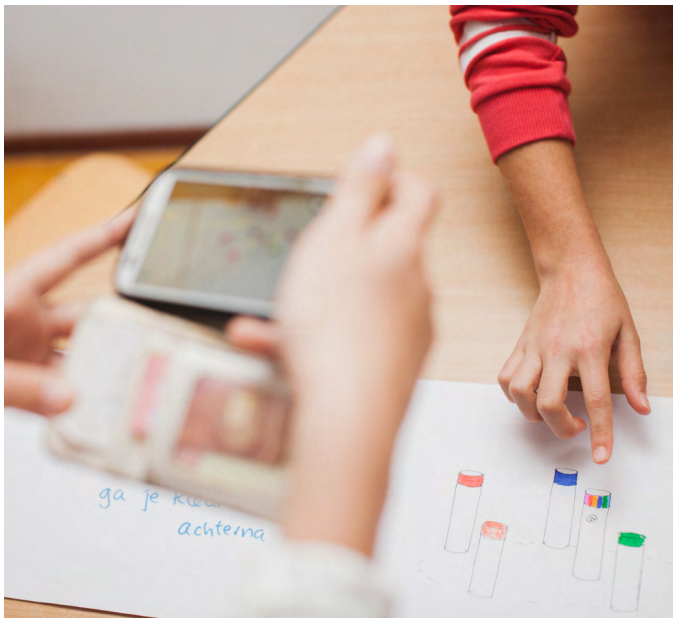
Prior experience
None

Time
20 minutes

Design phase
Presenting

Description

Participants make a video roll of their design process to present their idea and how they arrived at it. To start with, the participants collect the materials they have made during their design process such as photos, idea cards, sketches or prototypes. Then they use the 'Crib sheet' to check if they have everything to make the video roll. They supplement missing elements with drawings and text on separate sheets. They lay all their design materials side by side in a logical order on a table, from left to right, like a comic strip.



They then prepare an explanation. The presenter stands behind the drawings so that they are upside down. This person practices the design story once. Then the team films their material in one go and records the full explanation. One team member holds the camera above the drawings and only records the materials.

Only the narrator's hands will be in view of the camera as they point at details, the focus is on what they talk about. Minor mistakes are not a problem, they give the video a spontaneous feeling.

CRIB LETTER FOR VIDEO ROLL

- → name of the design
- → for who is it
- → what problem does it solve
- → how does it look
- → how does it work
- → pros

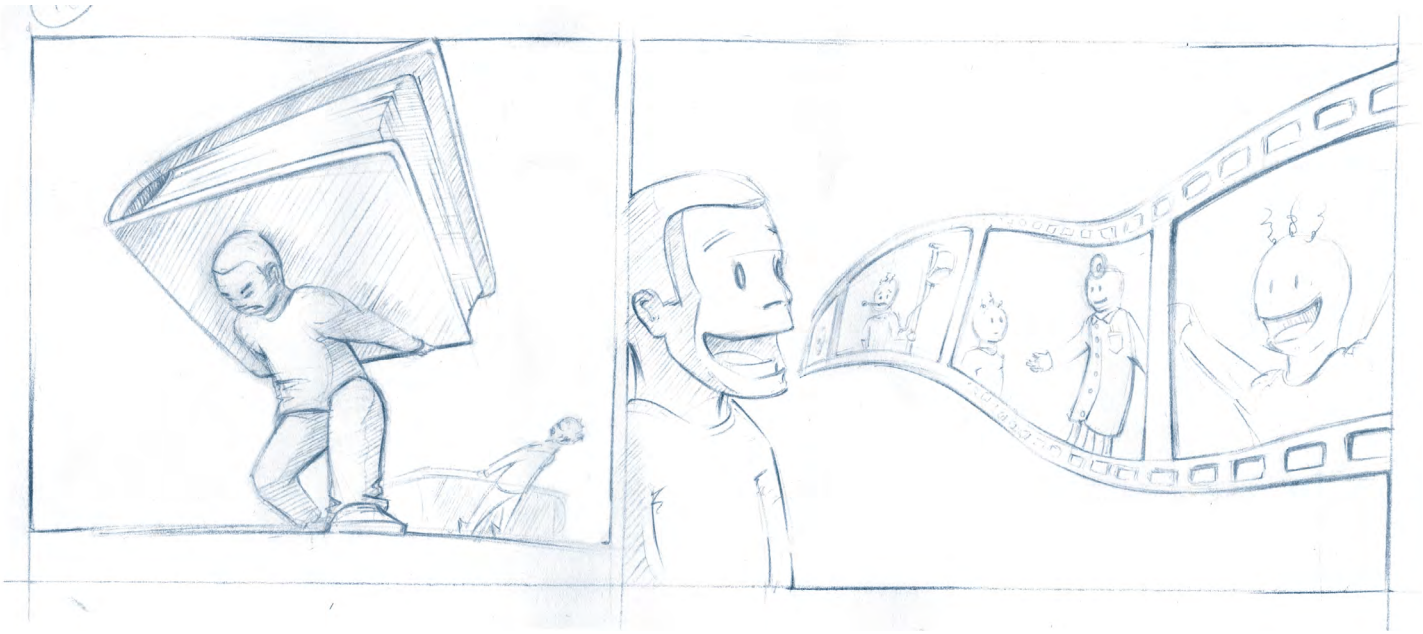
Effect

Participants often dislike presenting existing materials form their design idea. They can often feel like they are repeating themselves. With the video roll they enjoy working on a presentation about their design process.

The video contains both the visual materials and the spontaneous explanation of the design team. The client is able to see that the process is still ongoing. The video gives them insight into the thinking process of the design team, providing empathy towards them.

Without the Video roll

With the Video roll



Example

Charlotte and Emma have drawn ideas for an octagonal water trampoline. If you jump on it, a fountain sprays from every angle. They have come up with a fun game for their idea. They call their idea 'Splash bed'.

Before they present their idea, they look at the crib sheet. They already have a drawing of the water trampoline and a sketch of the technical system but they don't have visuals of the name and the rules yet. They write the name large on one sheet and the rules on another sheet. They put everything in the correct order and make the video in one go: Charlotte films the drawings whilst Emma explains them.

Step by step

1. Assign the design team a quiet place to film, without background noise, and make sure the preconditions are met (see Materials).

2. Explain the process to the team:
   1. Collect the available materials of an idea.
   2. Make extra drawings and texts if there are not enough to explain the idea well.
   3. Look through the crib sheet and check if anything is missing. Make the missing visuals if necessary.
   4. Place all the design materials next to each other in a logical order and think about how it will be filmed.

5 Determine who will present and film.
6 Practice the story once.
7 Record the story in one go.

3. Collect the video or tell the participants how to send the video to the client.

4. Have the participants send the film to the client without any editing and ask for a response.

5. Discuss the responses with the design teams.

Tips

- For the sake of privacy, participants should not be filmed. If they do appear in the video in a way that they can be recognised, permission from their parents is required before sharing the video with the client.

- Have the design team use the crib sheet in for preparation but put it away during filming. Let the material on the table be their guide. Keep crib letters small so that it can't be used as a form that has to be filled out.

Materials

- Worksheet crib sheet
- Sketches and other results of the design team
- A long narrow table
- A telephone with camera, or a photo camera with film mode or video camera
- Address to send the video to (e-mail, WhatsApp or other)

CRIB SHEET FOR VIDEO ROLL

- → name of the design
- → who is it for
- → what problem does it solve
- → what does it look like
- → how does it work
- → positive elements

CRIB SHEET FOR VIDEO ROLL

- → name of the design
- → who is it for
- → what problem does it solve
- → what does it look like
- → how does it work
- → positive elements

CRIB SHEET FOR VIDEO ROLL

- → name of the design
- → who is it for
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CRIB SHEET FOR VIDEO ROLL

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- → what does it look like
- → how does it work
- → positive elements

APPENDIX B: DESIGN SKILLS

Appendix B

Design skills

Think in all directions

Pupils generate many, diverse and original ideas. They combine, associate and imagine. They seek inspiration in unusual places and look at problems from different perspectives. And most important, they postpone their judgement.

- **Many**; come up with a lot of relevant possibilities, solutions and ideas;
- **Diverse**: think from different viewpoints and try out various directions;
- **New connections**: associate, combine and make new connections;

Develop empathy

Pupils empathise with and understand other users. They experience the problem themselves, investigate the users and context and actively seek input and feedback. They focus on the user's wishes.

- **Experience**; experience the problem yourself, identify yourself with the problem, users and stakeholders;
- **Target group**: research the user and context through field research and use the findings in their design process;
- **Active**: ivolve users and stakeholders in their design process and actively seek input and feedback (context mapping, co-creation, testing).

Bring ideas to life

Pupils express and elaborate their thoughts and ideas in appropriate, meaningful ways and use tools such as stories, drawings, models and prototypes. Making ideas tangible is not only essential for sharing them, it is how you think and learn.

- **Express**; depict ideas and insights for yourself and others;
- **Develop**: make ideas as concrete as necessary in order to share them and make decisions;
- **Model**: use media related skills, including drawing, visualisation, drama, storytelling, simulation, modelling, (prototypes) making and computer programming.

Share ideas

Pupils share their ideas and collaborate within their team. They involve users and other stakeholders in their design process and they look for collaboration with people outside the
process to improve, spread and implement their ideas. They design together.

- **Letting go**; share your own ideas: find the balance between letting go and staying true to an own idea;
- **Complement each other**: be open to each other's ideas, complement and help each other;
- **Outward**: involve people with various backgrounds (inside and outside the process) for feedback, support and guidance. Inspire others.

Deside on your direction

Pupils organize their ideas and develop an overview of their project. They form an opinion about the essence of the problem and the desired quality of the solutions. They decide on their design direction.

- **Validate**; form your own opinions, dare to make value judgments, aim for your ideals and take balanced decisions;
- **Overview**: order all the generated ideas and information collected to provide an overview and use this to make decisions on the design direction;
- **Focus**: determine your vision, focus on the core and draw conclusions.

Make productive mistakes

Pupils try out- at the earliest possible stage - their beliefs, ideas and solutions. They deliberately apply different approaches, techniques and resources. They iterate and use mistakes to learn from.

- **Try out**; try out as many things as fast as possible. Search deliberately search for mistakes and deficiencies;
- **Learn form mistakes**: recognize and acknowledge failures. Investigate, comprehend failures and use them to improve and learn;
- **Deal with frustration**: learn to deal with uncertainty, ambiguity and frustration.

Make use of the process

Pupils switch between different ways of thinking within the design process. They steer the process and switch between divergent and convergent thinking, nonconformity and cooperation, abstract and concrete thinking.

- **Process knowledge**; understand the processes of designing and different techniques. Use these in appropriate ways;
- **Reflection**: reflect on design processes and use feedback for improvement;
- **Self-knowledge**: discover and develop own skills, design approach, preferences and most suitable methods for you and your project.

The above described design skills are taken from the Make Design Learning Visible set from Science Education Hub TU Delft and Goldsmith University London. This set includes practical formative assessment tools for clarifying the learning goals and giving feedback during design-based learning.

Your Turn Guidebook for the teacher

Filled with practical tools for design-based learning, Your Turn for the Teacher is the guide for busy teacher education students and teachers who want to generate design lessons geared to pupils' real-world experiences.

The guide 'Your Turn' and enables teachers to develop authentic, real-life design projects for children aged 9-14 year. It sets out step by step how you can teach a design lesson or series of design lessons on your own theme, possibly with a professional client from the school environment.

The guide contains research-based guidelines and tools that help pupils to design and to develop creative thinking skills, empathy and improve their communication skills, both within classes as well as when they communicate with clients from design companies and other organizations.

The practical tips and new tools provide for authentic and fun design experiences, as pupils develop crucial skills such as creative thinking, critical thinking and empathy.

Your Turn will help your pupils to:

- Explore wishes and problems of users
- Learn how to empathize with people who differ from yourself
- Learn to think creatively using surprising tools
- Give constructive feedback to peers and to use feedback
- Een idee helder presenteren aan een echte opdrachtgever
- Present design ideas in a clear way to clients
- Learn outside the classroom and participate in local communities
- Make their mark in design

Teachers will find:

- Advice on generating a design project step by step
- Practical tips for working with professional clients
- Suggestions for connecting substantive learning goals with 21st-century design skills
- Examples for learning how to design in class and how to give feedback on both process and products