

# Theoretical module: **Creativity techniques**

Authors: Rainer Pamminger | Florian Krautzer | Wolfgang Wimmer



# Introduction to this module

## Objectives of the module

- To explain the process of finding ideas to address a specific problem
- To present specific methods to generate, refine and select ideas to reach a specific objective
- To give practitioners and teachers useful tools to facilitate the creative process

## Introduction to the creativity techniques

A whole range of creativity techniques exists to help with each step from the problem definition, the idea generation, the refinement of ideas to the selection of suitable ideas to be implemented in a new concept or new product.

Once the problem has been clearly defined, the ideas can be generated. There are numerous creativity techniques designed to help you in this step of the creative process. Some of the most common and useful techniques are described in this module. It is important to generate as many ideas as possible in this stage of the creative process. This will generate a range of plausible and implausible ideas, some of which may be related and feasible while others can be used for other projects and others may be completely unfeasible.

These ideas then need to be refined, combined and thought out in a little more detail before they can be pursued further or discarded. While some creativity techniques in the 'idea generation' step incorporate this, there are specific creativity techniques to support this refinement, which have been set out in the 'refine ideas' step.

Once the ideas have been refined, similarities identified and combinations have been explored, it is necessary to select the most promising ideas for further development or implementation. In some cases, this may be obvious, while in others, it may require an extra step: 'select ideas'.

The moderator has the focus on the methodology and is not directly involved in solving the problem. He is responsible for ensuring that the group is goal-oriented and are working efficiently. The procedure should be transparent to all concerned to ensure that everyone can participate in the problem solving. The role of moderator is often carried out by external persons or neutral experts.

## Background material

For more in-depth information, consult the background material, available at [www.sinndesignproject.eu](http://www.sinndesignproject.eu).

Creativity techniques

 SinnDesign

# Creativity techniques

Slides

# Creativity techniques?

## **What?**

The techniques for thinking up solutions to problems are called ‘creativity techniques’ or ‘creativity methods’. Most of these methods are general - they are applicable to a wide variety of problems. Creativity techniques are very useful in the design process, generating large amounts of ideas in a short time.

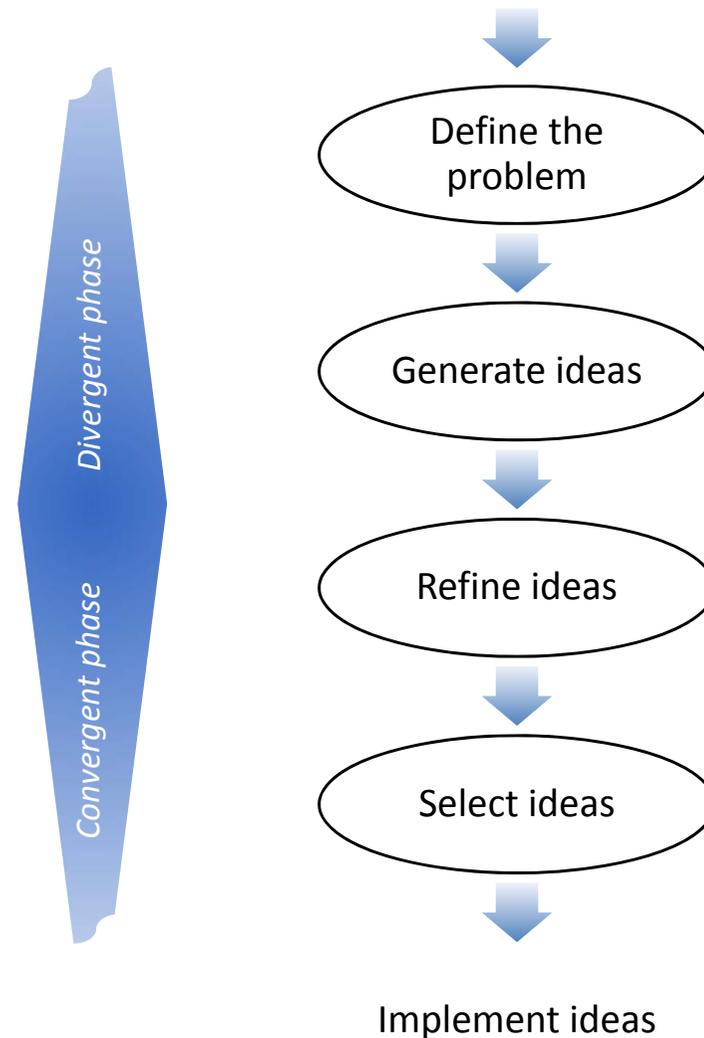
## **When?**

Creativity techniques are mostly used in a creative workshop, typically taking place at the beginning of the conceptual design phase, starting the phase of creating product ideas and concepts.

## **Why?**

The creative process is an ongoing exercise. Everything you do that is not habit is creative. Harnessing this creative power and directing it toward new ideas and solving problems is where most people need help.

# The problem solving pathway



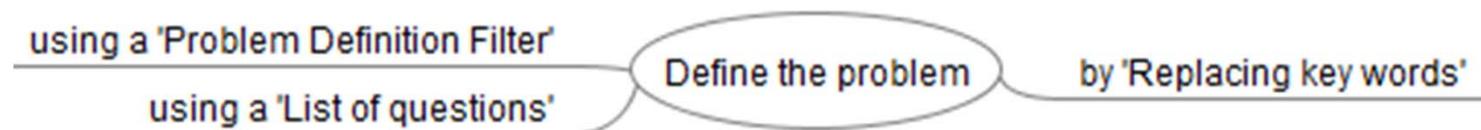
# STEP 1- Define the problem

To ensure a successful creativity session, the problem or question has to be clearly defined. Clearly identifying the problem is a huge step towards finding a solution.

## What is to do?

- define a clear, succinct statement that explains the problem
- if the problem consists of several sub-problems, it is recommended to tackle the sub-problems first
- boundaries need to be clear to ensure that the ideas address the problem at hand and contribute to a solution

## Specific Methods?



## Replacing key words

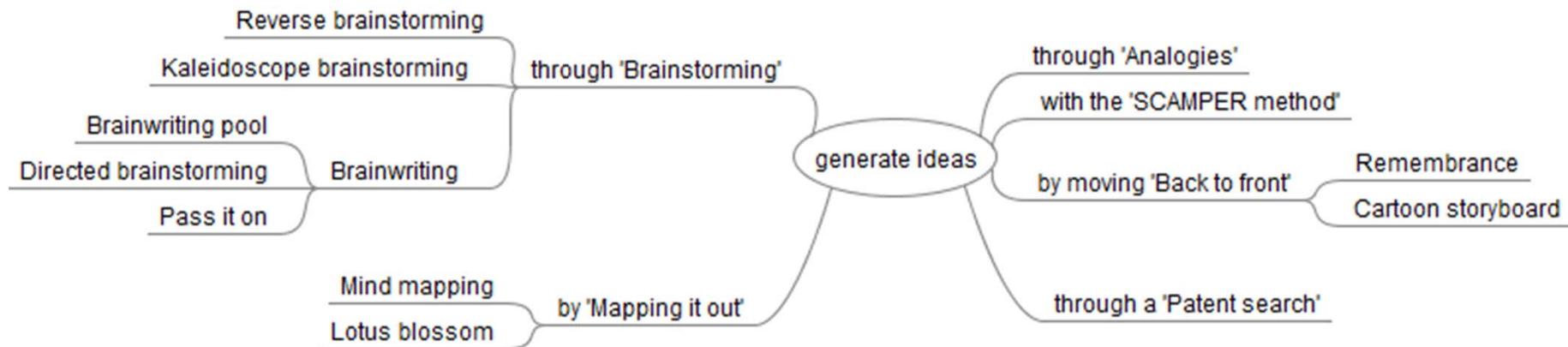
This method requires the identification of key words in the sentence, their substitution with other words that have the equivalent general meaning to create different emphases and a different rhetoric.

The amount of potential paraphrasing is very large and a simple problem statement can be reworded in many ways, which correspond to very different meanings. For example:

| The product    | consumes | too much      | resources, while | in use      |
|----------------|----------|---------------|------------------|-------------|
| <b>outcome</b> | uses     | excessive     | reserves         | occupied    |
| <b>result</b>  | wastes   | profligate    | material         | engaged     |
| <b>effect</b>  | depletes | extravagant   | supplies         | taken       |
| <b>item</b>    | exhausts | lavish        | incomes          | unavailable |
|                | expends  | wasteful      | assets           | operational |
|                | exploits | large amounts |                  | working     |

## STEP 2 - Generate ideas

Using the clear and concise definition of the problem, the idea generation can start. There are a huge number of different methods available, many of which are simply variations of a central technique:



# Brainstorming

- A group of participants with different backgrounds come together to generate ideas addressing a specified problem.
- The ideas, generated in the span of approximately half an hour, are written down by a moderator visible to all participants.
- The ideas should not be criticized or commented on by the participants during the idea generating phase, as criticism may freeze the idea generation process.

## Reverse brainstorming:

Similar to brainstorming: instead of asking "How do I solve or prevent this problem?" → "How could I possibly cause the problem?"



# Brainwriting

A variation of brainstorming where

- participants are asked to write down ideas on a form within a fixed time period.
- The ideas are then passed on to other participants, who can either write down new ideas or further develop the previous ideas.

For example:

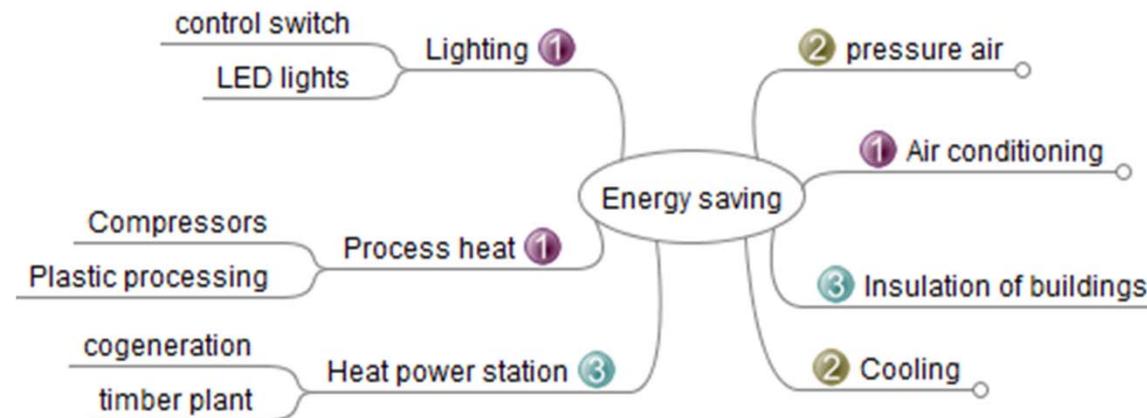
- 6 participants write down 3 ideas each within 5 minutes
- then pass them around and write down the next 3 ideas
- inspired by the ideas of the ideas already on the paper
- and the pass it on again till the round is completed.



# Mind mapping

...can be used by groups or individuals, to generate ideas around a central topic or to develop further potential solutions. Participants are encouraged to use free association to start the ideas flowing and “branch out” from the central topic, using single words or simple phrases to extend thoughts from one idea to the next. Very easy to apply and can also be applied from a single person.

For example:



## Cartoon storyboard

In this technique, the participants use a blank cartoon storyboard to find a pathway to achieving a goal or solving a problem:

- Storyboard of six numbered boxes: in box number 6 participants are asked to draw the goal.
- In box number 1, participants then draw the current situation or problem.
- Next participants fill the remaining four boxes, generating a sequence from the present to the future.
- Finally, the participants are asked to identify the potential obstacles when moving from one box to the next. Participants can then evaluate, discuss and find solutions and even combine different storyboards.

## STEP 3 – Refine ideas

In the next step ideas need to be refined, combined and thought out in a little more detail before they can be pursued further or discarded. While some creativity techniques in the 'idea generation' step incorporate this, there are specific creativity techniques to support this refinement, which have been set out in the 'refine ideas' step:



# Morphological box

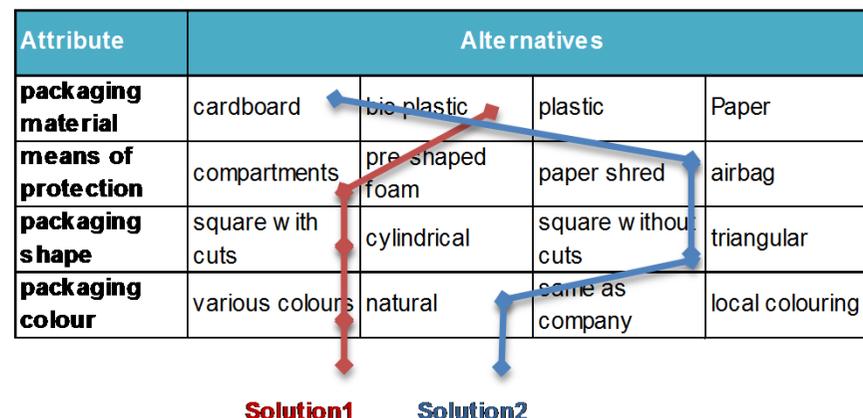
The product being considered for improvement is first analysed:

- A full product description is made using a list of attributes. The question then asked is: can (or have) alternatives be(en) found for the various attributes? If, for example, a certain part is made from aluminium, could it also be manufactured from a different material?
- Next, a table is drawn using these attributes as row headings. The identified variations of the attributes are written down within these rows.
- An entry from each row is then selected and linked which leads to different options.

Example: packaging solution

| Attribute                  | Alternatives     |                 |                     |                 |
|----------------------------|------------------|-----------------|---------------------|-----------------|
| <b>packaging material</b>  | cardboard        | bio plastic     | plastic             | Paper           |
| <b>means of protection</b> | compartments     | pre shaped foam | paper shred         | airbag          |
| <b>packaging shape</b>     | square with cuts | cylindrical     | square without cuts | triangular      |
| <b>packaging colour</b>    | various colours  | natural         | same as company     | local colouring |

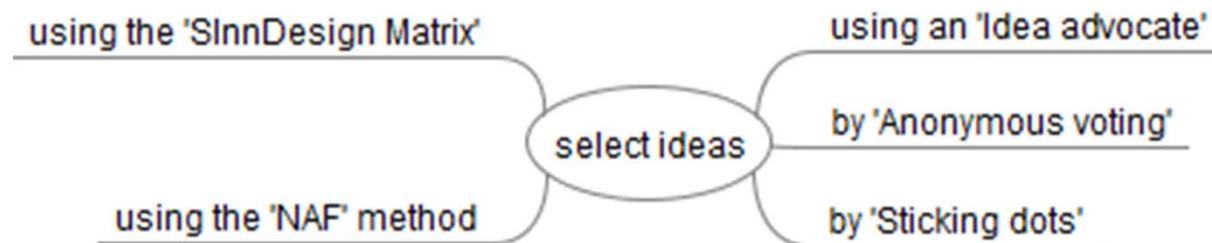
Solution1      Solution2



## STEP 4 – Select ideas

Once the ideas have been refined, similarities identified and combinations have been explored, it is necessary to select the most promising ideas for further development or implementation.

The selection of an appropriate technique should be made based on what seems most feasible to use and on what seems to be most appropriate to the problem under investigation. Some of the techniques are designed for group sessions while others can be applied by individuals:



# SinnDesign Matrix for the evaluation of DfS ideas

The purpose of this tool is to evaluate the product improvement from individual ideas or groups of ideas that were generated during the brainstorming session(s) regarding its technical, economic, environmental, social and market feasibility.

The application of this tool allows the design team and top management of the company to decide whether a given improvement option or a group of options is to be implemented in the short, medium or long term, or if it should be discarded. In some cases, additional research may be necessary to implement an idea.

| Feasibility |        | Impact        |        |          | Robustness of the analysis |
|-------------|--------|---------------|--------|----------|----------------------------|
| Technical   | Market | Environmental | Social | Economic |                            |
|             |        |               |        |          |                            |
|             |        |               |        |          |                            |
|             |        |               |        |          |                            |
|             |        |               |        |          |                            |

## NAF - New, Appeal, Feasibility

The NAF method is a simple way of scoring / assessing ideas and potential solutions. Subjective scores out of 10 are given in the three categories:

- New: (to the problem holder) How new is the idea to you? It may not be new to the world, you may just not have thought of it.
- Appeal: How much do you like it at a gut level? This has to be high.
- Feasibility: How feasible is it to put this into practice?

# NAF - New, Appeal, Feasibility

| The NAF matrix |        |             |   |
|----------------|--------|-------------|---|
| New            | Appeal | Feasibility | The idea / solution ...                                 |
| ↓              | ↓      | ↓           | <i>should not be pursued.</i>                           |
| ↓              | ↓      | ↑           | <i>will likely not be implemented.</i>                  |
| ↓              | ↑      | ↓           | <i>might be good but needs work.</i>                    |
| ↓              | ↑      | ↑           | <i>might already exist? if not, why?</i>                |
| ↑              | ↑      | ↑           | <i>should be pursued!</i>                               |
| ↑              | ↑      | ↓           | <i>is good, but needs work or further ideas.</i>        |
| ↑              | ↓      | ↑           | <i>might be a good part-solution or starting point.</i> |
| ↑              | ↓      | ↓           | <i>is not worth pursuing.</i>                           |

# Summery

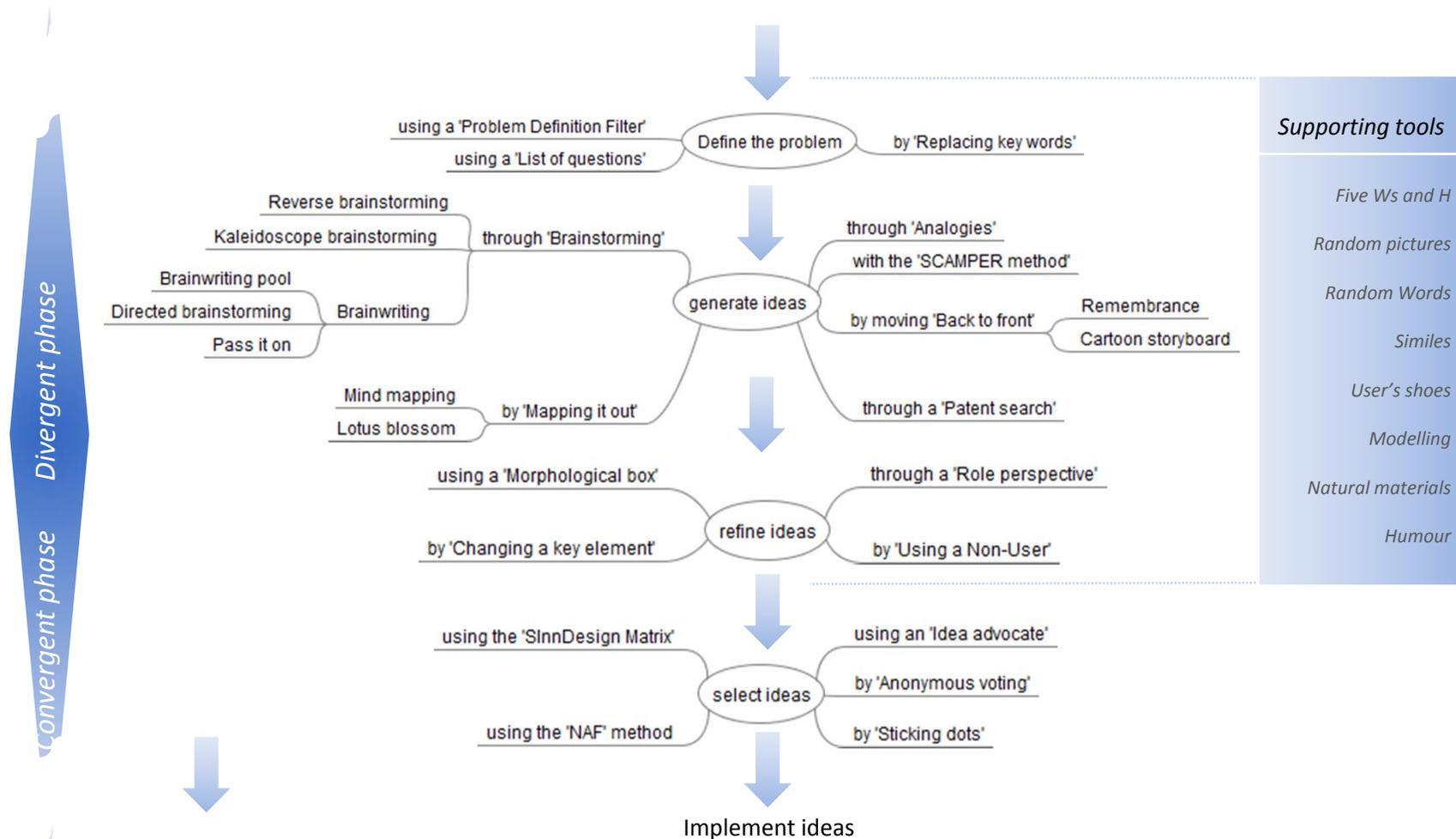


FIGURE 1 CREATIVITY TECHNIQUES ALONG THE ENTIRE PROBLEM SOLVING PATHWAY

## Summary

This module introduces different creativity techniques and methodologies to support the product development:

- These methods are to be used in the step 4 New product concept of the SInnDesign product development process.
- After finalizing the DfS strategy (step 03) the mentioned methods and tools can be used to define a problem, to generate ideas, to refine them and finally to select the relevant ones for defining the new product concept.
- Once problems are solved and ideas generated, the product concept can be defined and the embodiment design can start. Often this also needs further research to come up with a first design.

# **Creativity techniques**

References and further reading

## References and further reading

Cornett, C., *Tips for Structuring Better Brainstorming Sessions*. [online]. San Francisco: inspireUX. [Accessed: 2015-02-17]. <<http://www.inspireux.com/2013/07/18/tips-for-structuring-better-brainstorming-sessions>>

MindTools *Website on Brainstorming - Generating Many Radical*. [online]. Creative Ideas, 2015. [Accessed: 2015-02-17]. <<http://www.mindtools.com/brainstm.html>>

Crul, M.R.M. & Dieh, J.C. *Design for Sustainability a practical approach for Developing Economies*. [online]. 2014. [Accessed: 2015-02-17]. <<http://www.d4s-de.org/manual/d4stotalmanual.pdf>>

Wimmer, W. & Züst, R. & Lee, K.M. (2004). *ECODESIGN Implementation - A Systematic Guidance on Integrating Environmental Considerations into Product Development*. Springer Verlag. ISBN 1-4020-3070-3

Cooper, M. *Defining Problems: The Most Important Business Skill You've Never Been Taught*. [online]. 2014. [Accessed: 2015-08-15]. <<http://www.entrepreneur.com/article/237668>>

Infinite Innovations *Website on Creativity Techniques*. [online]. [Accessed: 2015-08-15]. <[http://www.mycoted.com/Do\\_Nothing](http://www.mycoted.com/Do_Nothing)>

Made by Makers *Website on Ideas for Ideas*. [online]. Aarhus, Denmark. [Accessed: 2015-08-21]. <<http://ideasforideas.com/index.php>>

Hinchliffe, K. *Creative Problem Solving, Prezi website*. [online]. San Francisco. [Accessed: 2015-08-21]. <<https://prezi.com/zac6kktkthc8c/creative-problem-solving/>>

WikiHow *Website on How to Make a Mind Map*. [online]. California. [Accessed: 2015-08-17]. <<http://www.wikihow.com/Make-a-Mind-Map>>

## References and further reading

Wimmer, W. & Ostad-Ahmad-Ghorabi, H. & Huber, M. & Pamminger, R. & Neagoe, M. (2007). *Ecodesign for sustainable development, Volume 4 Product development*. ISBN: 978-973-598-107-5

Infinite Innovations Ltd. *Website on How to use the SCAMPER technique*. [Accessed: 2015-08-17].  
<<http://www.brainstorming.co.uk/tutorials>>

EU project InEDIC – Innovation and Ecodesign in the ceramic industry (2011). *InEDIC Ecodesign Manual*.

Herb, R. & Herb, T. & Khonhauser, V. (2000). *TRIZ, Der systematische Weg zur Innovation*. Verlag moderne Industrie, Landsberg/Lech. ISBN: 3-478-91980-0

This resource is part of the training materials developed in the SinnDesign project.

The material may be used in whole or in parts for any educational purpose, with  
acknowledgement of the source, without special permission from the authors.  
SinnDesign authors would appreciate receiving a copy of any publication, presentation or  
course program that uses this material as a source.

More information about the project and training materials available at:

Kontakt:

Dr. DI Rainer Pamminer, Technische Universität Wien, [pamminer@ecodesign.at](mailto:pamminer@ecodesign.at)

DI Maria Kalleitner-Huber, Österreichisches Ökologie-Institut, [kalleitner-huber@ecology.at](mailto:kalleitner-huber@ecology.at)

[www.sinndesignproject.eu](http://www.sinndesignproject.eu)

