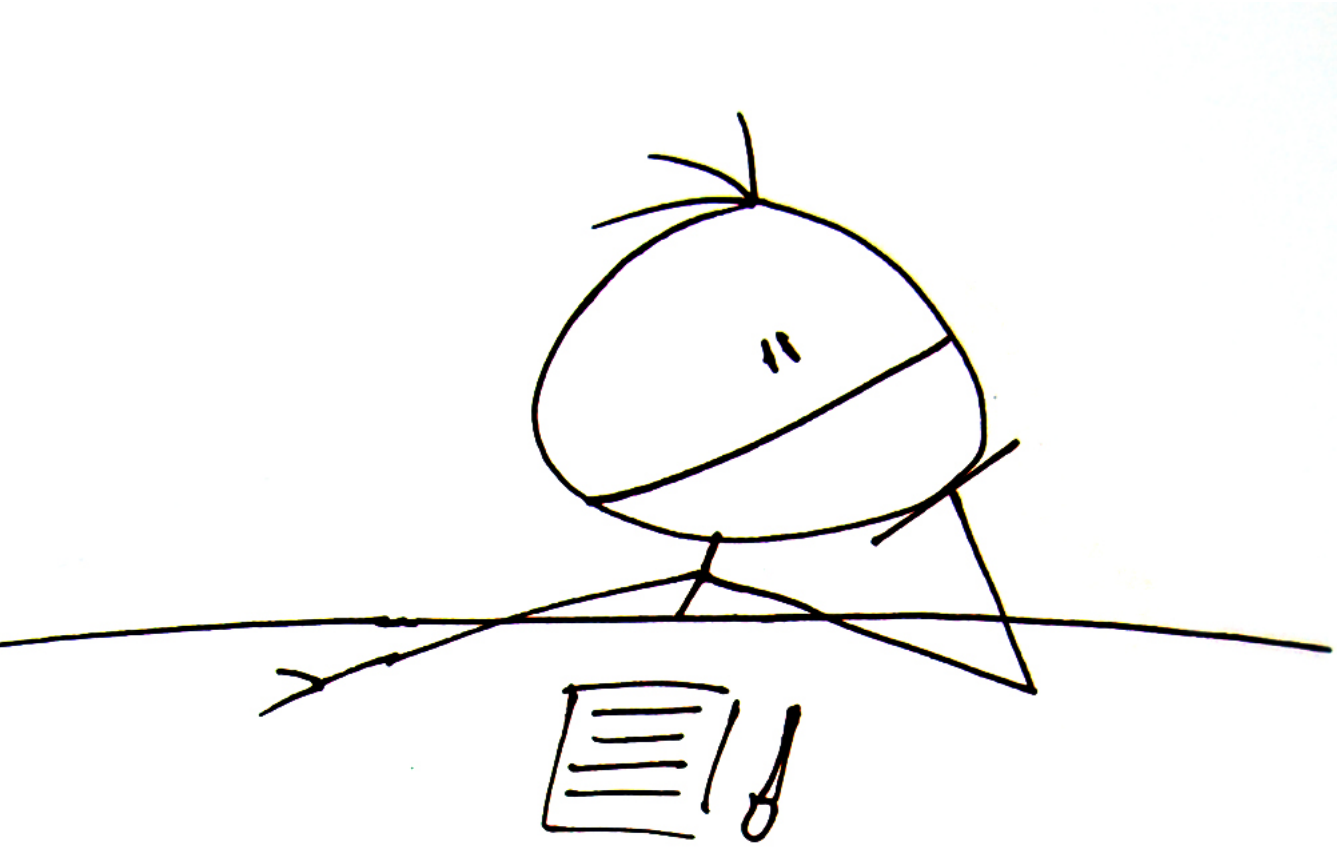
Management of Scenarios

Proposal for the design of an inspirational scenario development-supporting tool



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Bachelor thesis Industrial Design
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September 27, 2010

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Preface

This report is written within the scope of my Bachelors assignment in Industrial Engineering at the University of Twente.

When I started searching for an interesting subject I got in contact with Mascha van der Voort. She sent me a couple of potential assignments. One was called ‘Management of Scenarios’ and made me enthusiastic. This assignment is within the framework of Irene Anggreeni’s Ph D and was intended as Masters assignment. We rewrote it so it suits the Bachelors level and the time limit of three months of work.

Soon we decide that information from the design practice should be very useful. Frederik Hoolhorst helped me get in contact with Ingeborg Griffioen of Panton (Deventer). They were willing to cooperate in this assignment and together with Mario de Zeeuw, she gave me insight in how a real design team works.

Mieke van de Bijl-Brouwer assisted Irene Anggreeni in the supervision on the progress of my assignment.

I would like to thank all above-mentioned people who helped me making this assignment possible.

Summary

Scenarios are concrete descriptions of people using technology to discuss and analyze how this technology could fit into their lives. They have proved to help the designers during the development of successful products. Despite its benefits (inexpensive, getting a better idea of the user, good communication tool), designers do not make use of scenarios in an effective way; scenarios use is still very heuristic.

To help the designers during the use of scenarios we want to develop a tool that supports the development of scenarios. A literature study is done and the real design practice is analysed. Design agency Panton served as a starting point; the tool will be designed for their specific practice and is intended to be adapted later so other design teams can benefit from it too.

From the interview with two designers of Panton we concluded that they don't need a stimulating tool: they are already very experienced with the use of scenarios (and in particular with personas). Therefore we did not consider it useful to continue with development of a tool that helps them making better use of scenarios and decided to develop a tool that gives them inspiration during the design process concerning to scenarios development. This should make the use of scenarios more fun and useful.

To find out what requirements the tool format must fulfil, a study on existing tools (e.g. IDEO Cards, input-output chart) is done. These tools all differ from each other in format. Also three concept tools are developed with inspiration from the existing tools. The selection of different formats of the existing and concept tools is evaluated with Panton.

One of the concept tools is called the 'Wheel of Fortune' and turned out to suits Panton's practice best. It exists of several discs with eight entries. Some discs are kept blank, so the design team can fill in their own 'inspiration', for example funny statements of colleagues. The other discs are divided by phases of the design process; each phase has its own disc with techniques that could be useful during the development of scenarios. By giving the top disc a big swing, it will turn and finally stop at a technique. The technique will be showed by the gap in the top disc. Designers can choose for themselves whether they will use this technique or turn again.

The result of the interview (reactions to the different tool formats) are translated into a list of requirements for the tool format:

- tangible, for example cards or a game;
- all included options (techniques) should be visible or easy accessible;
- less input or even random;
- extra techniques can be added by the user;
- for all phases of the design process.

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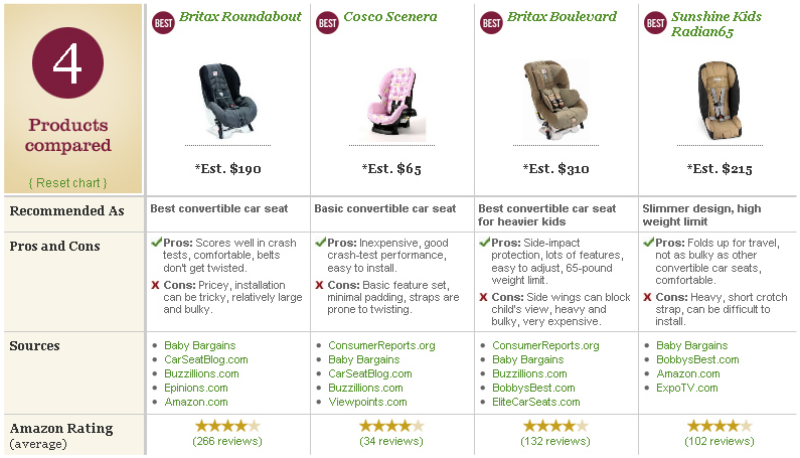
1 Introduction

The ability of products to excel is more important now than ever before. Users expect products to work, not only good but exceptional. Excitement about the product can only be achieved when they exceed expectations. In the past, companies could rely on the image of their brand. People tend to buy their products when they have confidence in the brand. Faults become known after some time, and brand image diminish only at a slow rate.



4 Products compared (Reset chart)	BEST Britax Roundabout	BEST Cosco Scenera	BEST Britax Boulevard	BEST Sunshine Kids Radian65
	*Est. $190	*Est. $65	*Est. $310	*Est. $215
Recommended As	Best convertible car seat	Basic convertible car seat	Best convertible car seat for heavier kids	Slimmer design, high weight limit
Pros and Cons	✓Pros: Scores well in crash tests, comfortable, belts don't get twisted. ✗Cons: Pricey, installation can be tricky, relatively large and bulky.	✓Pros: Inexpensive, good crash-test performance, easy to install. ✗Cons: Basic feature set, minimal padding, straps are prone to twisting.	✓Pros: Side-impact protection, lots of features, easy to adjust, 65-pound weight limit. ✗Cons: Side wings can block child's view, heavy and bulky, very expensive.	✓Pros: Folds up for travel, not as bulky as other convertible car seats, comfortable. ✗Cons: Heavy, short crotch strap, can be difficult to install.
Sources	• Baby Bargains • CarSeatBlog.com • Buzzillions.com • Epinions.com • Amazon.com	• ConsumerReports.org • Baby Bargains • CarSeatBlog.com • Buzzillions.com • Viewpoints.com	• ConsumerReports.org • Baby Bargains • Buzzillions.com • BobbysBest.com • EliteCarSeats.com	• Baby Bargains • BobbysBest.com • Amazon.com • ExpoTV.com
Amazon Rating (average)	★★★★☆ (266 reviews)	★★★★☆ (34 reviews)	★★★★☆ (132 reviews)	★★★★☆ (102 reviews)

Figure 1 *Example of a product review on internet: four convertible car seats compared on consumersearch.com*

Due to the growing availability of real-world information, like reviews on internet as well as communication though social-media, consumers easily change brands. They try new brands based on positive internet reviews. Therefore companies can no longer fall back on their brand and as a result every product must stand out. (Formosa, 2009)

The designers need to convince the consumer that their product is by far the best value for money. Products get more functions to distinguish their selves from others. As a result, products become more and more complex. Next to it, consumer products need to be increasingly multi-purpose for a big group of different users in dynamic contexts of use. The product design must meet the demands of the stakeholders and standards or regulations from relevant authorities. Together with all the aspects and demands of the user of the product and the desire to excel, this makes the designing good products very complicated. As a result, a design project often involves a multi disciplinary team. You must think of designers, engineers, marketeers, managers, end-users, and etcetera. Working in a team with members from different disciplines can bring up problems with communication. (Anggreeni & van der Voort, 2008a)

1.1 Problem definition

Using scenarios can answer these challenges. Scenarios are concrete descriptions of people using technology. They aim to discuss and analyze how this technology could fit in their daily lives and help to keep the focus on the user during the whole design process. They also serve well as communication tool between all members of a design team and are inexpensive. Despite of these benefits, scenario based design in its original form is not commonly used. The number of types of scenarios and approaches in scenario use in product design make it complicated for the designer to make good use of this technique.

Scenarios have their origin in the software domain, and therefore further research is needed to be applicable in product design. The 'Use Anticipation in Product Design' research group of the University of Twente is doing research in the topic of scenario based product design. (Anggreeni & van der Voort, 2008b)

The idea is to help designers in the use of scenarios by developing a tool that supports them in the development of scenarios. Such tool will stimulate them to make better use of scenarios by making it easier to develop them. The tool will provide suggestions for techniques that could be useful. When we mention tool, we mean some kind of support. You can think of a game, an online search engine or a prototype. A complete definition of tool can be found in chapter four.

1.2 The assignment

My assignment is to develop this tool for designers of all kinds of products which can be used during a design project. For example: the determined requirements and demands can be used to find out from what scenario type or technique they can benefit most.

Because of the time limit, the final result will be a proposal and not a fully worked out tool.

1.3 Stakeholders

Univeristy of Twente

The University of Twente is an entrepreneurial research university. It is the only campus University in the Netherlands and provides academic education and research in a wide variety of fields, from psychology to public administration to biomedical technology. The University of Twente focuses on education, research and valorisation. With valorisation is meant the transfer of knowledge commercially and also the transfer of innovations to society. They strive to excel in education, research and valorisation because "talent attracts talent". (University of Twente, 2010a)

The faculty of Engineering Technology (CTW) is one of the five University of Twente's faculties. It was established in 2001 and combines Mechanical Engineering, Civil Engineering and

Industrial Design Engineering. This faculty has approximately 1700 bachelor's and master's students, 300 staff and over 100 PhD candidates. The faculty is organized in a matrix: the departments cooperatively conduct the educational programmes and participate in interdisciplinary research projects and programmes. The faculty of Engineering Technology consists of ten research groups. This assignment will be carried out for the research group Design, Production and Management. (University of Twente, 2010b)

Points of interest for this subject of this research group are:

- organization of the design process;
- developing of computer systems to support design and production development;
- life cycle engineering;
- automate and methodize action preparations.

This assignment is carried out in the framework of the PhD research of Irene Anggreeni. Her research is called 'Supporting Scenario Generation in Scenario-Based Product Design'. (University of Twente, 2009) Irene Anggreeni will be representing the University of Twente as my supervisor.

Figure 2 *A series of suture forceps which protect the sharps in a soft disposable part, designed by Panton.*

Panton

Panton is a design agency located in Deventer (The Netherlands). Panton was founded by Ingeborg Griffioen in 2005. The core design team exists of seven designers/project managers and two part-time healthcare experts. The agency focus is on healthcare. They design new products, processes, communication and often a combination of these for this complex field with a lot of requirements (e.g. clarity, safety and acknowledgement of users). They aim to develop for and with healthcare and companies. (Panton, 2010)
Panton clients are:

- medical device companies;
- healthcare institutes and universities;
- start-ups from a university or healthcare instates.

By cooperating in this assignment, they can benefit from the results. I used their time and information in exchange for ideas how to inspire their designers to get to new ideas during the development of scenarios in their projects.

1.4 Objective

The original goal of this assignment was to help designers in the scenario development process using the tool so they are stimulated to make better use of scenarios.

I got in contact with design agency Panton (Deventer) to gather information from the practice to found out where problems could be solved. An extensive interview was held with two of their designers to find out how they work and whether they use scenarios already. It turned out that they are very skilled with the use of scenarios (and in particular personas).[1] We did not

[1] More about this interview and the conclusions can be found in chapter 3.

consider it useful to continue with this ‘problem-solving’ or ‘stimulating’ goal.

Therefore we changed the goal of the tool in providing inspiration. This will be achieved by developing a tool that makes inspires the selection of scenario-development techniques.

The tool will be designed specifically for Panton but is intended to be adapted later so other design teams can benefit from it too.

The following main research questions are used to get to the final result.

1. What are scenarios and how can they be classified?
2. Where do scenarios fit in the design activities of Panton?
3. How should the tool look like when it is intended to help the designers during scenario development?

1.5 Strategy

To answer the main research questions, I first needed to get more knowledge about the subject scenario based product design by doing a literature study. My next step was to learn from the current design practices and to investigate whether the theoretical knowledge I gathered meets the practice. The design agency Panton was willing to cooperate in my project and during developing my proposal for this tool I will use the company’s characteristics and strategy as a starting point.

Besides this I did research in (existing) formats of tools that support designers in choosing techniques. The next step was to generate concept ideas. The concept ideas are evaluated with designers from Panton. After this evaluation, I came up with guidelines for the tool. These guidelines are also used to adapt the most potential concept tool format.

Details about the approach of the interviews I held with the designers to gather information from the practice can be found in the Appendices.

1.6 Report

This report consists of five chapters. It is chronological with the steps I took during this project. I’ll briefly mention the contents of each chapter.

The first chapter introduces the reader to the assignment and the topic. The second chapter summarizes the relevant literature that is regarded as the foundation for this research. The third chapter gives an overview of the use of scenarios in practice, in this case at Panton. It is reflected with the theoretical knowledge of chapter two.

The second part of the assignment starts with chapter four. It describes what I mean with tools in the context of this

assignment and gives both example as concept tools. I evaluated the format of these tools with a designer from Panton in the final part of this chapter. Chapter five uses the results for the proposal of the format of the desired tool.

I will finish this report with the conclusions and recommendations for further research.

2 Scenarios

Scenarios find their origin in the human-computer and software engineering disciplines. A lot of research is done in this particular field, for example by Mary Beth Rosson and John M. Carrol (Rosson & Carroll, 2002). But the techniques and methods developed for the design of software is not completely applicable for product development. Product design differs from software design in the more varied context of use, characteristics of the users and more tangible solutions. Because scenario use in product design requires more aspects to be taken into account, the use of it is therefore more challenging. (Anggreeni & van der Voort, 2009)

The interest in scenario use in product design is growing. Now it has proven to have benefits, more research is done on this particular topic. These publications are used to get a good overview of the results of the research that is done.

2.1 Definition

In literature several definitions can be found. In short, scenarios can be seen as a 'sketch of use': they are explicit descriptions of hypothetical use of a product (van der Bijl, M., 2009). In the next paragraph definitions of scenarios are mentioned and after that the difference between scenarios and use cases and persona's are discussed.

2.1.1 Scenarios

According to Irene Anggreeni and Mascha C. van der Voort (2008) scenarios include concrete descriptions of people using technology to discuss and analyze how the technology could fit into their activities. They always describe a process or a sequence of activities, the unfolding is from the viewpoint of an actor, which corresponds to a stakeholder. The scope ranges from 'narrow' (describing what a product does) to 'rich' (describing a larger context of use). They introduced the term Scenario Based Product Design; the approach of applying scenarios in the design process of user-friendly consumer products.

Jakob Nielsen, a well-known usability expert, defines scenarios as encapsulated descriptions of a user (or users) using a specific set of facilities to achieve a specific outcome under specified circumstances. (Nielsen, 1990)

Klaus Weidenhaupt et al. add to this description that the main objective of scenarios is to present possible ways to use a system to accomplish some desired function. (Weidenhaupt, Pohl, Jarke, & Haumer, 1998)

Bonnie A. Nardi puts more emphasise on the real and fictive part of scenarios: it blends a carefully researched description of some set of real ongoing activities with an imaginative futuristic look at how technology could support those activities better. (Nardi, 1992)

2.1.2 Use cases

Uses cases have some of the features of scenarios but cannot be considered as the same. Use cases are enumerations of all possible interactions between the user and a system when a user gives input to this system. Two major differences can be distinguished:

- Use cases are more general. They included multiple possible responses where a scenario describes a specific execution thread.
- Uses cases are indented to cover all functionalities, where scenarios only do this in the context of use. Scenarios include possible side effects and are deliberately underspecified (in particular early in the design process). Use cases are developed as a functional specification of user-system/product exchanges and scenarios to raise and consider the usability implications of these exchanges. Scenarios can be seen as an instance of a use case. (Rosson & Carroll, 2002)

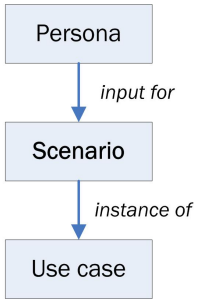


Figure 3

2.1.3 Personas

A persona represents a significant part of the user group with regard to their goals and personal characteristics. The persona describes one imaginary user that stands for this particular group. It includes a detailed and complete description of all relevant characteristics and interest of user. Often a name and a photo are added, to give the persona a more real look. (Bouma, 2009)

In contradiction with personas, scenarios do not only contain the user, but also the product and in particular the interactions with the product. The information about the user from the personas can serve as input for scenarios.

2.2 Characteristic elements of scenarios

Scenarios have characteristic elements. Rosson and Carroll (2002) claim that a scenario includes or presupposes a setting or starting state (the environment). Scenarios describe the behaviours and experiences of actors and include at least one actor and at least one task goal. When multiple actors or goals are involved, some are usually more prominent than others. The highest-level scenario goal answers the question “why did this story happen”. The answer to the question “who is this story about” leads to the actor with the principal role.

Scenario element	Definition	Examples
Setting / Starting point	Situational details that motivate or explain goals, actions and reactions of the actor(s)	Car on the highway, inside of a car, at start of narrative
Actor(s)	Human(s) interacting with the computer/product or other setting elements; personal characteristics relevant to scenario	Driver of a car, young, two years of drivers experience
Task goal	Effects on the situation that motivate actions carried out by actor(s), changes the actor wishes to achieve	Navigate by car from the drivers home to a party location using a TOMTOM
Plans	Mental activity directed at converting a goal into a behaviour	Using a navigation system will provide information about what direction to drive
Evaluation	Mental activity directed at interpreting features of the situation	Inserting the address while driving is complicated and dangerous
Actions	Observable behaviour	Insert the destinations address in the TOMTOM
Events	External actions or reactions produced by the features of the setting; some of these may be hidden to the actor(s) but important to the scenario	The TOMTOM shows which road has to be taken to arrive at the destination

Table 1

The table on illustrates the scenario elements, their definition and an example.

Scenarios have a plot: they include sequences of actions and events, things that actors do, things that happen to them, changes in the setting and so forth. These actions may aid, obstruct, or be irrelevant to achieve the goal.

2.3 Benefits and pitfalls of scenario use

Scenarios have proved valuable in several ways, summarized below (Suri & Marsh, 2000):

- Representation of user experience: the design team has the responsibility for issues relating to users' experiences of the product. They have to deal with variability's such as the product itself (behaviour, smell, sound, feel etc.), the reactions it evokes and aspects relating to the person (mood, goals, perceptions etc.). Using scenarios allows exploration and communication of qualitative aspects of the user experience at the earliest stages of the design.
- Evaluations of early design ideas: scenario use offers a rapid, inexpensive way of visualizing early design ideas and examining them in the context of use. Examples are 3D models or interaction design prototypes.

- Communicating issues: scenarios convey human factor issues in a way which is engaging and enables people to immediately see subtle en complex points.
- Individualisation of “the user”: scenarios bring to life imagined individuals. Personas cover names, abilities and lifestyles.
- Focus for interdisciplinary teams: scenario building cuts across traditional disciplinary boundaries. It integrates understanding of both human and technology issues.
- Consideration of systems and context: scenario use (by telling stories) is an accessible way to connect a systems approach with a user-centred perspective.

Despite the best intentions it is possible to fall into some traps in scenario building.

- The rosy story: scenarios can end up too simple. Remember to reflect the complexity of real world interactions. Build in the issues you need to deal with such as errors, noisy children, failing eyesight and so forth.
- The single scenario: the power of scenarios is to represent alternatives, explore boundary conditions and enable comparisons. Therefore designers need to create multiple scenarios and show, for example, how different people might use a product, or how one person might use different products.
- Losing focus: scenario building is a balancing between focus on the issues and dramatic license to maintain interest and texture.
- Confirming weak ideas: since scenarios are fiction, it is easy to alter characters and situations to make a bad idea work.

2.4 Scenario classification

In literature several authors formulated a classification for scenarios. They had different motivations to come up with a classification but they shared two objectives for classifying scenarios:

- to help in understanding and clarifying existing scenario-based approaches;
- to obtain a better view on the extent scenarios can be useful.

2.4.1 Nielsen’s Taxonomy

Jakob Nielsen starts with making a distinction between scenario types. Subsequently he classifieds the scenario types to three dimensions. I’ll first briefly mention the scenario types and then explain the three dimensions. (Nielsen, 1990)

The main types of scenarios according to Nielsen:

- *Archetypical interactions*: classic scenarios which describes typical previous observations of user behaviour.
- *Illustrative scenarios*: striking observations of usability problems that can be used to argue for the change of a specific design, they are intended to help the audience understand the issue.
- *Design scenarios*: are used to develop specifications by providing examples of possible goals users may have when using the new system or product.
- *Presentation scenarios*: are intended to communicate the proposed design better than can be done with a textual description. Examples are storyboards (series of screen shots on paper), videos, and a speaker showing slides. The audience can be managers or user representatives.
- *Mockup*: cheap kind of interface prototype which only implements a single scenario of an interaction with the proposed design.
- *Experimental setting*: used to provide subjects in a usability test with an artificial background for the tasks they are asked to perform.
- *Generic test suite*: describe a set of tasks that is reasonable to use for the testing of a given class of applications.
- *Documentation scenarios*: used to provide users with task-oriented instructions by giving them specific examples of what their new product is good for.

	Inspired by empirical observation			**Inspired by designer's ideas**		
	Text	*Storyboards*	*Running system*	*Text*	*Storyboards*	*Running system*
Communication	Illustrative scenarios	Extended illustrative scenarios		Documentation (manual)	Presentation scenarios, documentation (video)	Documentation (tutorial)
Structure thinking	Refined design scenarios			Design scenarios		
Testing	Archetypical interactions	Iterative tests of mockups (paper)	Iterative tests of mockups (running)	Experimental setting, generic test suites	Mockups (paper)	Mockups (computer)

Table 2 *Classification according to three dimensions: purpose, medium of expression and source of inspiration*

These types of scenarios can be classified according to the following three dimensions:

- *Medium of expression and implementation:* textual descriptions, storyboards or running systems.
- *Source of inspiration:* empirical observations or designer's own ideas and analysis.
- *Purpose:* communicate design issues to an audience of people with a different background (for example with managers, users and colleagues), structure thinking and providing background for refinements or testing of (in particular) interfaces and theories.

Table 2 on the previous page shows the classification of the scenario types according to the three dimensions.

2.4.2 CREWS Classification Framework

The CREWS[2] scenario framework (Rolland et al., 1998) suggests considering scenarios in four views. Each view captures particular relevant aspects of scenarios. A specific scenario can be characterized according to these four views:

- *Form view:* deals with the expression mode of a scenario. They answer the following example questions: is the scenario formally or informally described, in static, animated or interactive form?
- *Contents view:* concerns the kind of knowledge that is expressed in a scenario. Scenarios can for instance focus on the description of system functionality or they can describe a broader view in which the functionality is embedded into a larger business process with various stakeholders and resources bound to it.
- *Purpose view:* capture the role a scenario is aiming to play. Examples are describing the functionality of a system, exploring design alternatives or explaining drawbacks or inefficiencies of a system.
- *Life cycle:* considering scenarios as artefacts existing and evolving in time through the execution of operations.

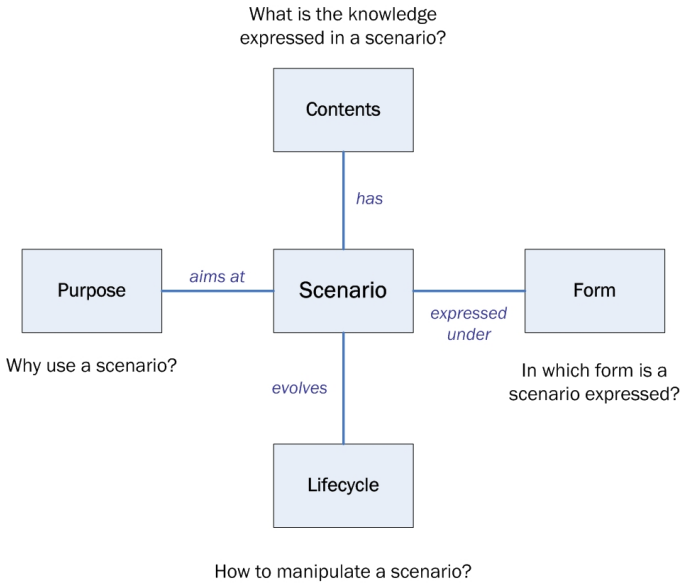


Figure 4 *CREWS Classification Framework*

[2] CREWS stands for Cooperative Requirements Engineering With Scenarios

2.4.3 Scenario use roadmap

The classifications and frameworks of CREWS and Nielsens taxonomy are based on scenario use in the development of computers systems. They are not sufficient and not applicable for scenario building including in product design. They do not cover the a full design process (Anggreeni & van der Voort, 2008a)

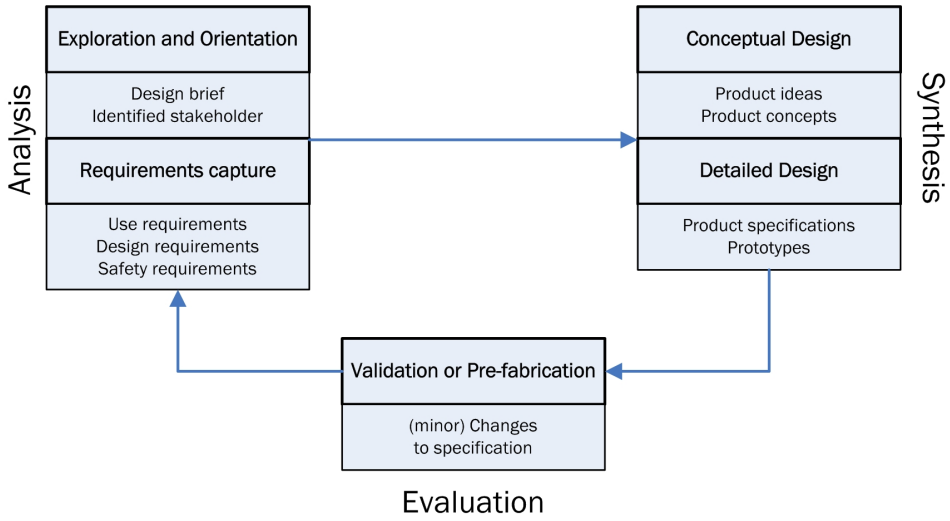


Figure 5 *Design process*

Scenarios including tangible products instead of computer systems need to comprise a larger scope of use situations as well as a smaller scope of interaction details. The complete account of designing is used as a source for this classification. Each scenario type is anchored to a design phase. The design phases can be represented within a loop of analysis, synthesis and evaluation. Figure 7 shows this simplified model of the design process. It aims to illustrate the roles of each design phase and becomes a foundation for the proposed classification framework.

Phase 1 Exploration and Orientation

In this phase of the design process, the problems are often ill defined. The design team members need to inform themselves on the subjects (that are relevant to the design problem), to make sound decisions. Not the designers, but managers or marketing department have an active role in creating these scenarios types. Often designers start a project with a "defined" design brief.

- *(Potential) stakeholder stories:* serve as an initial study into the domain where the product is going to be used. They reveal important aspects of their professional or personal lives, parts of which will affect the design. Techniques that can be used as input are: interviews, surveys and ethnography.

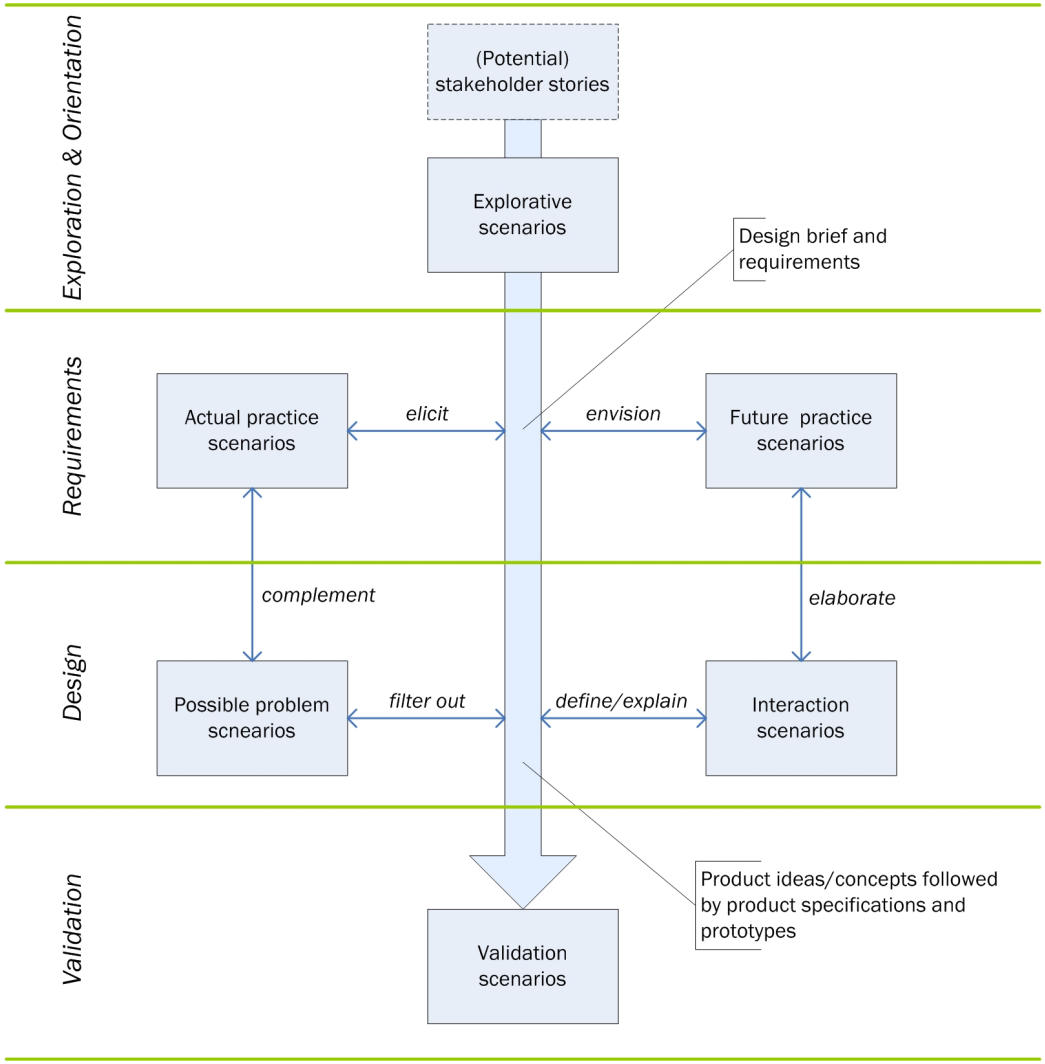


Figure 6 *Roadmap of scenario use*

- *Explorative scenarios:* the knowledge from stakeholders and other sources could be synthesized in descriptions of the plausible future, aiming to help the designers reflect on their design strategy and in creating awareness of the threats and opportunities along their decisions. Next to the input from stakeholders, information can be obtained from literature studies, survey results and interviews with experts

Phase 2 Requirements Capture

Requirements are an elaboration of problem and solution definitions. By developing actual and future practice scenarios, the design team gets a more detailed set of requirements.

- *Actual practice scenarios:* capture users' problems, dissatisfactions, needs and wishes in their current practice. Concreteness is achieved by using only relevant information, so that there is no room for misinterpretation. Interviews, ethnography and contextual inquiries with users (or stakeholders) support the creation of these scenarios.
- *Future practice scenarios:* describe imagined futures including solution ideas. Relevant are the project early product ideas that could change the use practice. These ideas could be accompanied with mock-ups or demonstrators.

Phase 3 Design (conceptual and detailed)

Designing requires both creativity and criticism. In this phase designers produce many sketches depicting their ideas to bring on solutions.

- *Possible problem scenarios:* expose weaknesses of the product concept, especially in extreme and critical situations. They could also describe unanticipated problems that may rise due to the proposed solutions. A brainstorm session and the use of probing technique will help identifying critical, extreme or dangerous events or situations that could happen during the product usage.
- *Interaction scenarios:* describe the interactions between the users and the product concept to actualize the futures as claimed in the future practice scenarios. They can be abstract to detailed, and eventually function as rationales to the resulting design specification. Opinions of users are very valuable in this phase.

Phase 4 Validation or Pre-fabrication

This phase must detect any remaining deficiency before the product design is manufactured and marketed.

- *Validation scenarios:* these scenarios, especially the ones intended for testing, must be complete, i.e. comprise a complete set of scenario elements (actors, goals and context). They must avoid overlooking any requirement. Inspiration comes from all other scenarios.

Example scenarios

To illustrate these types of scenarios, example scenarios are written:

A design team is given the assignment to "*develop a hands free navigation systems for cars"*. The examples below give an illustration of the scenario classification roadmap:

- *Explorative scenario:* Since the introduction of navigation systems in cars, young people who just received their drivers' license depend on these systems. Jim, a 22-year old student, has his license for two years now and he doesn't know the way without using his TOMTOM. He is only capable to drive a car when the navigation system is switched on, like other young people who received their drivers' license in the last couple of years. Safety in traffic is in danger because they tend to tune the system during driving and looses sight of the road for a couple of seconds…
- *Actual practice scenario:* Jim takes his car to visit his grandparents for their golden marriage anniversary in a city nearby his house. He knows in which direction he has to drive: first take the highway in south direction. But after taking the right exit, he can't remember how to get to the right street where the party centre is located. While waiting for a traffic light, he switched on

his TOMTOM and is using a pen to type the address he wants to find.

- *Possible problem scenario:* Jim is on his way to his grandparents' golden marriage anniversary. While driving he can't remember exactly how to get there and switched on his TOMTOM. Because he is in a hurry and doesn't want to park the car, he decides to type the address while driving. He is approaching a busy crossing when he has to take his attention from the road to the screen to read the small characters…
- *Future practice scenario:* Jim is almost at the party centre where his grandparents celebrate their golden wedding anniversary, but to find the exact location, he needs his TOMTOM. While driving his car, he switches on the system and is able to insert the address without taking sight of the road ahead.
- *Interaction scenario:* On his way to his grandparents' golden wedding anniversary, Jim can't remember the last part of the route description and needs assistance from his TOMTOM. He switched on the system by pushing the "on" button on top of the screen. By scrolling through a menu with buttons on his steering wheel, he can easily choose the street and place he is searching for. Jim did not take his sight of the road and keeps both hands on the steering wheel during this process, which took only a few seconds.
- *Validation scenario:* While Jim is using his new TOMTOM navigation system, by scrolling through the menu using the buttons on his steering wheel, it starts to rain heavily. He needs to switch on the windscreen-wipers immediately to keep good sight on the road ahead. The wipers can be controlled by pushing a button on the right side of the steering wheel.

Figure 7 *Using a TOMTOM navigation system while driving a car*

2.5 Conclusion

Scenarios can be defined as descriptions of a user using a specific technology, to achieve a specific outcome under specified circumstances. They differ from use cases: scenarios focus on a specific part of the use, where use cases cover all functionalities. Scenarios also get confused with personas: a detailed and complete description about one user representing a user group is called persona. A scenario includes not only the user (like personas), but also a starting point, a task goal, the plans, an evaluation, actions and events.

Scenarios can be classified according to Nielsen's Taxonomy, the CREWS Classification Framework and the Scenario Use Roadmap by I. Anggreeni and M.C. van der Voort. I will continue with the Scenario Use Roadmap because it is best applicable for scenario use in product development. Each scenario type is anchored to a phase in the design process. For the analysis of scenario use in practice this roadmap turns out to be very useful. Therefore I will use the classification of I. Anggreeni and M.C. van der Voort to get a good overview of the way the design agency Panton works and how they use scenarios.

3 Scenario use at Panton

The assignment is to develop a tool that that helps a design team to benefit more from the use of scenarios. Due to the time limit of this project, I will focus on one specific design practice and use their way of designing as starting point for my tool. Panton, a design agency in Deventer, was willing to cooperate in this project.

As short description of Pantons practice can be found in the introduction of this report. In this chapter their approach in designing user-friendly products will be discussed.

The information is obtained by doing an extensive interview with two industrial designers. Only designers with an education in industrial design work at Panton. This way every employee (except for the administration lady and the two health care experts) has similar background. Therefore it was not of high importance to know in advance with who the interview was executed. Considering the fact that the interview was held with two experienced designers, namely ir. Ingeborg Griffioen and ir. Mario de Zeeuw, this was probably an optimal situation to get the best information from their practice.

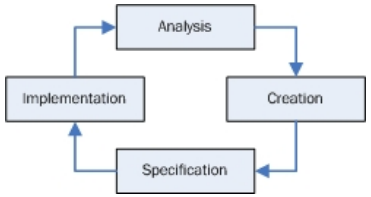


Figure 8 *Phases of the design process*

3.1 Approach

The information is gathered in two phases. After the literature study I had a phone interview. In this interview I asked some general questions about their practice, like with how many employees do you work on a project? All questions and answers to these questions can be found in Appendix A.

Now I had a better idea of Panton, I started the preparation of my visit and extensive interview. My main objectives for this interview are:

- To get insight on designers practice and their (potential) way of applying scenarios.
- To discuss where a tool potentially (can be applied to) help and inspire designers in using scenarios.

To achieve these goals, the following research questions are formulated:

1. When and how do designers use stories/scenarios in their practice?
2. What is the purpose of the scenarios?
3. What kinds of techniques are used to provide information/input for the scenarios?
4. Who are the audience and how are the scenarios communicated to them?

5. Which types of scenarios are natural choices for the designers? Why do they prefer these types of scenarios?
6. How is decided when scenarios are developed and what technique is used? Who makes this decision?
7. What are the benefits/difficulties of using scenarios this way?

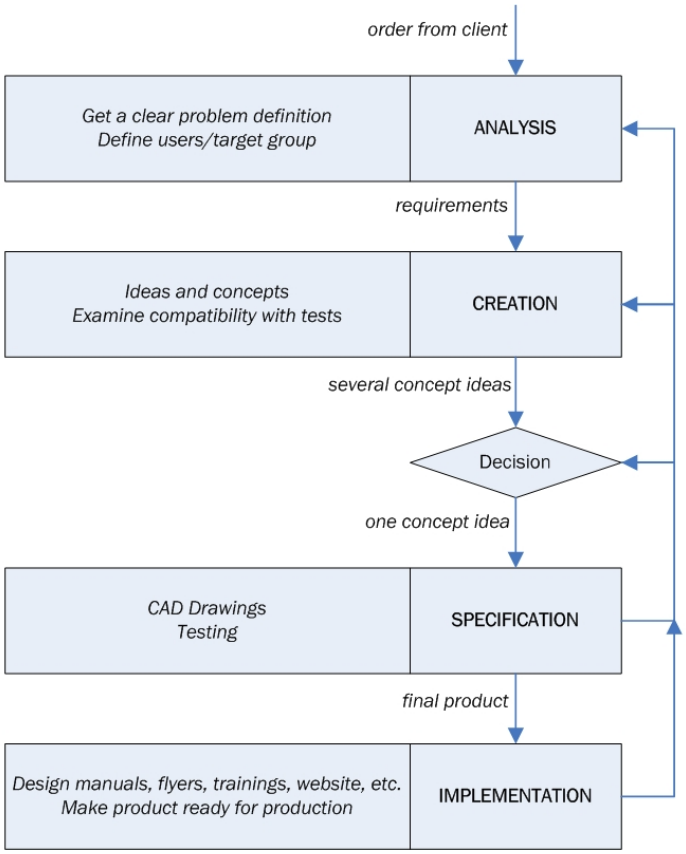


Figure 9

The complete plan and programme for this interview can be found in Appendix B. The results are summarized in this chapter.

3.2 Design Phases

It depends on the project Panton is working on how the design process looks like. Sometimes the clients just want a re-design, sometimes an application of new technology or just a concept idea. Because of the context of this assignment, the focus is on the kind of projects that ask for a complete new product; from problem definition to implementation to the market. These projects cover all design phases.

When we compare the design phases that the designers at Panton distinguish with the phases described by I. Anggreeni and M.C. van der Voort (2008), we can concluded that the exploration & orientation phase and the requirements phase are combined at Panton. They call it together ‘analysis’. The design phase is called ‘creation’ and validation is ‘implementation’. The validation/implementation scenarios are a part of creation. They exist of loops: after designing a concept idea, they validate it, adapt it (again designing), followed by validation and so forth.

The type of scenarios does not change every phase, but they change the techniques. In particular when the designers go to the next levels; for example the prototypes get more detailed or 3D simulations are developed. The way they want to test their

assumptions and ideas changes while the scenarios remain the same.

Next to it, scenarios are extended and improved during the process because designers gather more relevant information. This goes for actual practice as well as for the future practice scenarios. At the end of the process, the scenarios are complete. It depends on the complexity of a project how long these phases all together take. In the first place, this has to do with how innovative the product is, how big the project is, how detailed it must be, and so on. For the success of a complex product, much research is required. Especially in health care because it is of high importance that the safety is guaranteed. In these cases, designing can take more then one year. The risks for the patients are life-threatening when the product fails. Next to it the users (e.g. doctors) are very well trained on their equipment and therefore a new, innovative product can also endanger the safety when the user (doctor) doesn't precisely know how to handle the product. A study on this can take years.

Figure 10 *Example persona card → CONFIDENTIAL*

Secondly, the amount of loops tells something about how long the project takes.

> **Ingeborg:** "It is possible that the process pass several loops […] We strive for the less loops as possible: the length of a loop and the amount of loops. There is an optimum in this. When you go too fast, you know for sure that you have to go back to in a later stage."

3.2.1 Analysis

Problem definition

At the start of a new project, the client comes up with a problem. It turned out that often they don't know exactly what the real problem is. The client thinks he knows the problem, but after doing some research, it results in a different definition of the problem. It is important to get this clear before designing solutions.

Some clients don't see what implications a new innovation has for people who are involved. The designers need to do all kinds of research, because they don't want a final product that helps only a (small) part of the target group and has a negative effect on others.

Panton calls this phase *analysis.* In this phase the focus is not only on the problem definition, but also on who we are designing for. Who are the users/target group is a central question here. All preconditions need to be captured, so an overview the requirements can be obtained.

Personas

In the analysis phase the design team aims to get a clear definition about the problem. Defining the target group is a part of this. The use of scenarios is helpful here; this is the point where they start with the development of personas. To determine the personas, the designers need to do research. The developed personas show the users and people involved with the new product: this is the target group. Prior conditions (like the business case) also need to be taken into account while writing personas.

The personas described characteristics like age, job, if applies diseases, a short story about what he/she likes in personal life and so forth. Next to this, a suitable photo of a person that matches with the persona is added. This is printed on a *card* (figure 10 and 11). These cards are used during brainstorm sessions. It is easy to use; you can put the cards on the table and refer to them during discussions. With a quick look on the card, you will remember the persona that stands (for a part of the)- target group. This way, the designers will never loose the focus on the users. These cards with descriptions of the users are also used during meetings with stakeholders. They stimulate them to think about the users. The chosen photo for each persona can start an interesting discussion about what they think the users are.

> **Ingeborg:** "We search for pictures for each persona, so you get a better idea of this particular person. Discussion can arise about these pictures. Often it turns out that the client says 'that is not a Bram'. This way a lot of information comes up to the mind of the stakeholder. Information that we did not knew about yet and didn't know it was relevant because the stakeholder did not tell us before. This stimulates the discussions about users"

Several personas are created. They need to cover the whole group of people that is involved with this innovation. The designers start to search for small groups of the same users in this big group of people that can be considered as the same. For each 'kind of users' a persona is written. For example residents of a home for elderly and the nurses who work there. It is also possible to make another version of a persona, for example an obesited version of a resident.

These personas serve as input for all kinds of scenarios.

Scenarios

The scenarios in the analysis describe both the *future and actual practice*.

> **Ingeborg:** "In particular when we make a big step with a new innovation, you want both kinds of scenarios: how do things happen now and how in the future? This to prevent that we create an innovation that is so renovating for all users involved that they get confused. [...] As a result we try to develop both types of scenarios. For some projects it isn't necessary to look at the actual practice and you immediately take a look at the future"

3D animations and videos are useful when showing the future. They show the stakeholders how the innovation will be implemented. As a result, discussions start about this implementation, what serves as input for the requirements capture and later for further designing.

> **Ingeborg:** "For example: when we wanted to discuss with managers of health care institutions about what was going to change in the health care sector. Do they realize that the whole system will undergo a change? […] We made a movie which tells the story of a family (inspired by personas) that over come something. As a result they end up in several future health care institutions. […] The animated cartoon was shown to all the managers in the room. We did not design anything yet. I was aimed to help them think about what implications these innovation could have to their institution."

Figure 11 *Example of an elaborate persona card → CONFIDENTIAL*

Next to future and actual practice scenarios, the designers use *interaction scenarios and possible problem scenarios* in the first phase of the design process. For example, these interaction scenarios describe how they want the situation to be, without having a clue about how the product is going to look like. Later, in the creation phase, they will figure out whether it is possible or not. Using interaction scenarios in the first phase is also useful for communication with the stakeholders. This helps them to get an idea of the outcome of the project. Of course it is not possible to describe the product in detail but a description of the perception of the user is good example of what is an option.

> **Ingeborg:** "We worked on a project for an at-home-test. During the analysis phase it was clear what was wrong with current tests. We could describe: the test is taken and at that moment the user can see whether the test was successful. That is interaction. […] I had no idea how we could achieve it, but we already described what the product is able to do. "

3.2.2 Requirements

Scenario writing is the step between the start of the project and the requirements capture. These requirements are very important for the agreements between the design practice and the client. It is the contract that tells what will be delivered at the end of the project. When both stakeholders and designers agree with this document, they agree what is expected from the project.

The scenario describes what the product should do (in what context). From this scenario, demands can be made clear and serve as input for the requirements. When you skip the scenario-step in capturing the requirements, the designers and stakeholder will probably have discussions about the demands and wishes. A scenario makes the situation clear, prevents arguments and therefore saves time. Next to it, when they haven't made a good agreement about this, it is possible that both parties are disappointed about the result: designers, because they worked hard for nothing, and stakeholders, because they did not get their desired solution.

After this step, the design team and the stakeholders have a more clear idea about the project.

3.2.3 Creation

Concept ideas and testing

Next step is *creation*. Designers start thinking about possible solutions and reflect them with the outcomes of the analysis; the requirements. Ideas and concepts are generated. Tests with users, for example with a mock-up of a concept product, are implemented as soon as possible. By doing this in an early stage you will see things you did not thought about yet. These results will be taken in account for further designing.

> **Ingeborg**: "We aim to test the critical use of the product, with the simplest tools in the shortest time as possible. This can be done with a small line-drawing or animation or sometimes a piece of foam or what ever technique we choose, as long as we are able to test as soon as possible that specific aspect of use."

The scenarios and personas from the previous phase give input for these tests. The scenarios describe the users and the environment where the product will be used. This information can be translated into real users and a test environment.

Scenarios also serve as input for decision making between product concepts. When reflecting the concepts with the scenarios, the design team will get insight in which concept will be most feasible.

Ingeborg: "...this concept is going to be successful with this target group, with these personas, in their way of using it. They are going to accept the *use-scenarios* the way we defined them."

Scenarios for communication

Scenarios are used for *communication* between the design team and the stakeholders. The client is most of the time one person who initiates the project, but several stakeholders/parties are involved. They altogether make a new product a success. For example, when designing for a hospital, several departments within this hospital need to be consulted. All departments need to identify and find themselves comfortable in the described scenarios. The design team tries to plan meetings with all parties involved and check with them whether the developed scenarios are correct. In these meetings the designers tell them what implications the changes has and how the users think about that. Next to this, the meetings aim to check with the client whether they did not forget an involved party concerning the new product.

Mario: "Scenarios are very much a communication tool. The design team develops them, thinking: this is the way users will act. When you reflect these scenarios with real users, it turns out they don't work like that. [...] Therefore the scenarios are good tool for your self to get a clear picture and also to show the involved parties what is going to change."

Between design team members, scenarios also serve as a communication tool. Not all designers are equally involved in the project, but everyone reads the written personas and scenarios. Ever designer can easily empathize with the target group and the context. It helps them think from the user's situation.

All personas get a name. The designers together then use these names during the design process. This method makes communication go faster and easier. It also saves time; for example in health care, users often deal with hard to pronounce illnesses. Now they only need the name of the persona and everyone knows what the designer means.

Decision making

The concept ideas are adapted and redesigned until the design team is satisfied with a concept and believes it is feasible. The personas are used during decision making between concepts. Every concept can be tested with the personas. When there are a lot of concepts and personas involved, it is an option to give every combination a score (with a note). These scores point in a direction the designers must look for the most suitable and feasible concept.

Then the design team together with the stakeholders can make a *decision* which concept they like most. In this direction they will continue.

3.2.4 Specification and implementation

The concept needs to be specified, all details will be defined. It is possible to go back to a previous phase to gather information that is missing or for testing/reflection. Testing is a major part of this *specification* phase. With these tests you find out if things are overlooked and need to be reconsidered.

When the product reaches it final stage, the design team in cooperation with suppliers needs to think about how they are going to produce it. This *implementation* phase includes also the creation of manuals, trainings for users, websites, flyers and so forth.

3.3 Source of inspiration and development

It depends on the size of the project how many designers are involved. When the projects it carried by one person, he or she will develop scenarios. Within a bigger project, the designer that has most expertise in this particular subject will start working on it. He or she will then develop scenarios. Because all designers at Panton are schooled in industrial design, they had education in the use of scenarios. As a result everyone is capable of working with scenarios.

The design team creates the scenarios and reflect them with the stakeholders. The *stakeholder*s have a lot of information that could be useful as input.

> **Ingeborg:** "A technique we used once was with man-sized paper and printed silhouettes on it and we hanged in our office. Every silhouette was given a name and short description like this is grandfather and this is his grandchild. Every designer had post-its, on which they could write what they thought were characteristic for these persons. Not specific about the person, but what interest they could have in the innovation, what they expect of it. These post-its were sticked on the silhouettes. This was followed by discussions about what was written for each person, a very interactive way of developing personas with the whole design team. [...] It is also useful when we have heard a lot of information during interviews that has to be brought down to one persona."

This is one technique that is used to collect inspiration and information for the scenarios. Other used techniques are summarized below.

First of all, a *brainstorm session* with the designers involved in the project is executed. The aim of doing this is to inventory the ideas everyone has with the subject. It can be done before and after research.

Information from the practice that serves as input is gathered by designers being *around in the organisation* of the stakeholder for a few weeks. This way they really get to know the users and the setting they have to deal with the innovation. The designers are objective, and have another look on the situation then they stakeholders have. *Interview*s will also be held with users they encounter during these periods at the organisation.

Doing *literature studie*s is an essential and logic step to gather information for scenarios. The design team reads (medical) *book*s. Also *internet* is great databank of information and inspiration. A lot of research is already been done, and could also be useful for other projects.

*Survey*s are also applied, especially when other techniques are not an option. For example: in a project about pair of tweezers they needed input from South Africa. There were not enough budgets to go there, so they developed a web survey. The users filled in what they like and what they think was important.

Probing techniques are used to gather information about what users expect of the innovation. An example is given by Ingeborg:

> **Ingeborg:** "…We have no idea what the product is going to look like, we don't know what the product is capable of, but we just take a cube. I've painted these wooden cubes with black paint and called them 'black boxes', they will do anything for you. So carry out your daily job as you do normally and tell me how your life will be easier by the things the black box does for you. Now you have created a scenario with a probe […] Of course this cube is not going to do everything, but it gives input for the direction in which we need to design, where most irritations can be found."

As mentioned before, *previous scenarios* serve as input for new scenarios. The written personas, created at the start, are used as inspiration for evaluation scenarios and so forth.

3.4 Benefits and difficulties

3.4.1 Benefits

Scenarios create clarity, for the design team as well as for the stakeholder. Using scenarios, they get a better idea of what is expected from the project.

Communication between the designers and the designer and the stakeholder improves when using scenarios. During the whole design process it is clear for all involved parties for who and what you are designing. When you need to test, you always know with who you need to test and what you want to test. It helps keeping focus on what is important.

Scenarios help to emphasize better with the users. It is a more powerful and additional tool then the list of specifications, the requirements. It gives an image/picture to the user. For

example, the photos attached to the persona-cards tell a lot more. They evoke discussions with stakeholders and come up with more information. The written stories next to these photos tell so much more then a short telegram style way of telling what the user looks like.

3.4.2 Difficulties

It is almost impossible to create a scenario in which the user(s) stand for the whole target group. There will always be people who are important but not included.

The described people in the scenarios are fictive. You want them to sit next to you at the table to tell if you doing something wrong; that is not possible.

> **Ingeborg:** "You want them to [...] say: "good job, but this here, you did not understand". This will never happen, because the people are fictive. That means that at a certain point, we have to stop working with the scenarios and start searching for people who look like the people from the scenarios. But they really exist. You can ask them for feedback. We try to use scenarios as well as real people parallel. [...] Scenarios are limited and there the technique fails."

3.5 Conclusion

From this interview we can conclude that the designers at Panton are very experienced with the use of scenarios and in particular with personas. They make use of this method for a long period and in much projects to get to know the user they are designing for.

The research questions will be used to summarize the results and conclusions.

1. When and how do designers use stories/scenarios in their practice?

Panton starts with the development of scenarios at the beginning of a project. They first analyse the involved people and write a persona for each significant part of the group of users. These personas are used as input for all following scenarios.

2. What is the purpose of the scenarios?

Scenarios serve as communication tool (see question 4), for documentation, during testing, decision-making, discussions and analysis.

3. What kinds of techniques are used to provide information/input for the scenarios?

It is hard to say what technique is used when. It depends on the project what the source of inspiration for the scenarios is. You can think of stories from stakeholders, discussions with all

involved parties, brainstorm sessions, being around in the context of use, literature studies, surveys, probing techniques and previous written scenarios and personas.

4. Who are the audience and how are the scenarios communicated to them?

The scenarios are used for communication between the design team and the stakeholders. It is important for a good result to keep good contact with all involved stakeholders. This prevents disappointments about at the end of the project from both sides. The scenarios are presented during meetings and discussions. The scenarios also help making communication between the members of a design team effective. With a quick glance on the scenario, every member is immediately informed about the project. Between team members small cards are used to present the personas, for stakeholders also 3D animations and videos are used as medium.

5. Which types of scenarios are natural choices for the designers? Why do they prefer these types of scenarios?

During analysis Panton develops scenarios of all kinds: actual and future practice, possible problem and interaction scenarios. These scenarios are used in later stages of the design process. New information from research serves as input to adapt these scenarios over and over, so it keeps valuable and up to date during the whole process.

6. How is decided when scenarios are developed and what technique is used? Who makes this decision?

Most projects are carried out by one designer. Often with cooperation of colleagues. The designer who is in charge of the specific project initiates the development of the scenarios.

7. What are the benefits/difficulties of using scenarios this way?

The scenarios and personas create clarity and improve communication with all involved parties. They make it easier to emphasize with the users and evokes discussions. This way the designers will have a better understanding of the user, which results in improved usability of the products. Despite these benefits, Panton encounters problems with defining the personas for a big group of different users. It is hard to include all involved people and their characteristics. Next to it the designers find it difficult to check whether the fictive users they developed correspond with the reality because they cannot talk to you when you doing something wrong.

It can be concluded that Panton is very skilled and experienced with scenarios and in particular personas. The original goal of the to be designed tool was to stimulate the use of scenarios. In the case of Panton this is not useful because they already benefit a lot from scenario use. Therefore we decide to change it into an inspirational tool. The tool should inspire the design team during the development of scenarios to come up with fresh ideas and new insights.

4 Supporting tools

Before I start thinking about what to develop to help designers work in an optimal way, we must define what we understand to mean with methodology, method, tool and technique. There are various definitions used in literature. Therefore the explanation below gives a description of what these terms mean in the context of this project (Hoolhorst, 2008).

It turned out to be hard to come up with a complete new tool for Pantons practice that stimulates the use of scenarios so we decided to come up with a tool that inspires them during the development of scenarios (see conclusions chapter 3). The first step is to look for current, existing tools that help designers during the design process and in particular the ones concerning scenarios. I will discuss the IDEO Cards, UsabilityNet Method Table, Input-Output chart, Design and Emotion Society Search Engine and the Generic Work Process Toolkit. The criteria of selection are the format (e.g. online, on paper), the amount of input and the result. The tools are compared on these criteria.

After this I developed three concept tools myself and evaluated them with ir. Mario de Zeeuw (designer at Panton) to find out what kind of tool suits their practice best.

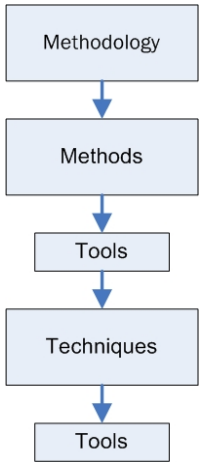


Figure 12

4.1 Definitions

Methodology

Methodology is defined as a set of methods, rules, theories and starting points which are used in a certain discipline (in this case product design). It focuses on the analysis and development of both methods and techniques which are aimed to create an effective and efficient arrangement of the design process. A methodology is also philosophy. It describes a certain approach that is considered as being optimal/best.

Well known examples of design methodologies are top-down design, bottom-up, concurrent engineering and next to it, scenario based product design is regarded as a methodology.

Method

A method is a way of doing something. Methods are indented to lead the designer into new areas of discovery, and as a result obtain information relevant to the project. They describe a specific procedure. The elements of this procedure are time-related. Methods are general; they can be applied to several kinds of problems and in more then one discipline. Furthermore they can be used at multiple levels/phases of the design process.

Regarding to the design process, many different methods are available. Examples are: models of Pahl and Beitz, Ullrich and Epinger, Ullman

Technique

Techniques focus on specific aspects of the design process. This is in contradiction with methods. They describe ways how information can be obtained. A technique can come together with a tool; the technique supports the tool. Ethnography, role playing, brainstorm sessions and interviews are example techniques that can be used to gather elements of a chosen method.

Tool

Tools assist techniques. We can divide tools in two kinds. The first kind of tool is used by the designer during the execution of the chosen technique. An example is a prototype of a concept idea for evaluation. Without this tool, it isn't possible to perform the technique in a successful way.

The second kind of tool is applied as a source of inspiration. They aim to help the design team choose a direction or technique. In particular when designers start working with a new methodology or method. Because they are not trained in working this way, problems with proper execution can occur. A tool can help them getting used to the techniques that support their (new) way of working. It is also likely that a design team gets stuck in the design process. The tool can give fresh insights or directions so they can continue their work with new energy.

4.2 Existing tools

As mentioned before, we divide two kinds of 'tools'. We will focus on the kind of tools that support designers in choosing techniques that support their research in design projects. Underneath several examples are described. They illustrate several formats that can be useful for the project.

Each tool will be introduced shortly and compared by the three criteria: format, input and output. With input we mean the amount and content of the prior knowledge that is needed to use the tool. The output is the result after using the tool.

More elaborated descriptions of each tool can be found in Appendix C.

4.2.1 IDEO Method cards

The IDEO Method Cards is a collection of 51 cards, representing diverse ways design teams can understand the users they are designing for. A number of different methods are made accessible for all members of the design team. The cards explain how and why the methods are applied best. Each approach is illustrated by a real-life example of how the method was applied to a specific project. As new methods are developed all the time, the deck will grow and evolve over time. (IDEO, 2009)

The cards are classified as four categories that represent ways to empathize with people:

- Learn: analyze the information collected.
- Look: observe people to discover what they do rather than what they say they do.
- Ask: enlist people's participation to elicit information relevant to the project.
- Try: create simulations to help empathize with people and to evaluate proposed designs. (IDEO, 2003)

This tool can be very useful in the development of scenarios. The outcomes of the methods described on the cards, give information about the user and how they handle the products.

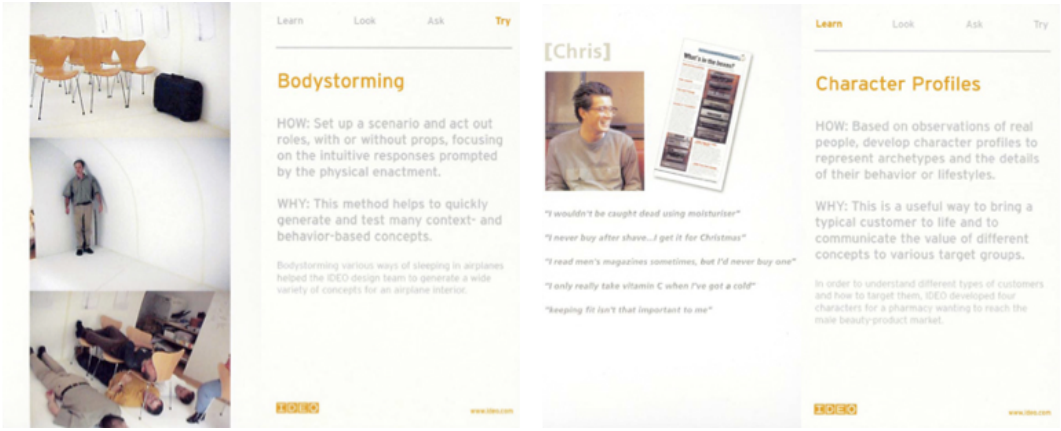


Figure13 *Two example IDEO Method Cards*

Using a card from the collection will give the design team a fresh look on the situation and inspires them to think of new ways to gather information. The methods are in particular useful because they focus on the user. This suits the scenario based product design approach very well, because it also aimed at usability.

4.2.2 UsabilityNet Methods Table

The website of UsabilityNet includes an online wizard which can help designers choosing techniques that suit their design project. These techniques are aimed to help the design team in developing a user-friendly product and support the usability design approach. (UsabilityNet, 2003)

The Methods Table includes several methods divided in six types, arranged in chronological order:

- Planning and Feasibility Overview
- Requirements
- Design
- Implementation
- Test and Measure
- Post-release

A selection of appropriate methods can be made by (de)selecting one or more conditions:

- Limited time/resources
- No direct access to users
- Limited skills/expertise

After you decided in what phase of the design process you are and which of the three conditions applies to your project, techniques will appear to be suitable. By clicking on the box of the technique you prefer, you will receive extra information about how to use this technique.

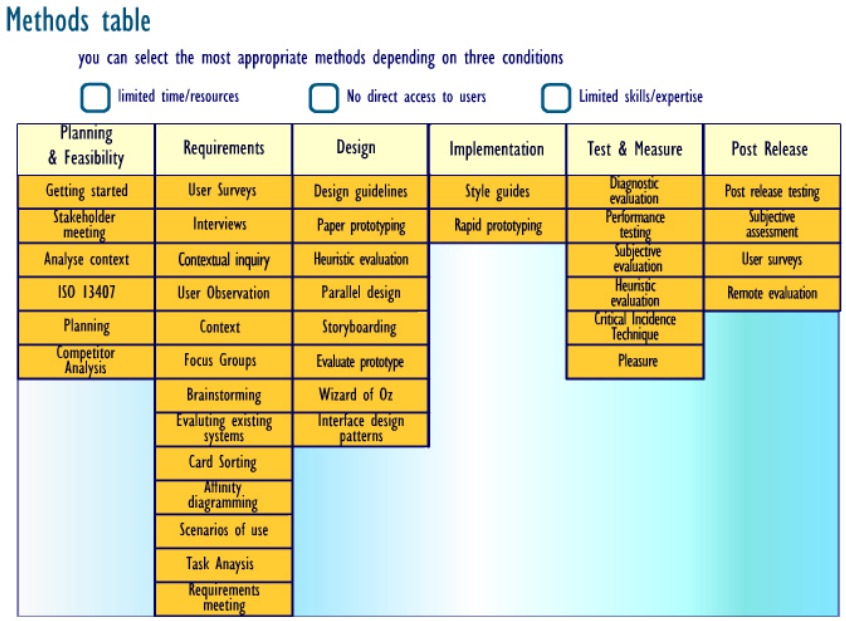


Figure 14 *UsabilityNet Methods table*

4.2.3 Input-output chart

The input-output chart is based on the assumption that the suitability of a method can be judged by comparing its input (what the designer already knows) and its output (what they want to find out). The left column shows inputs: information that is available before a method can be used. The first row shows outputs: the kind of information the methods produce. The two scales are placed in order of decreasing generality and increasing certainty. Methods at the top left are useful in early stages (when a lot is uncertain), the methods in the bottom right fit the final stages of design. It is possible to jump several stages forward: that are the methods with distance from the diagonal. Those just above the diagonal are step-by-step methods. Repeated methods can be seen as methods for back-tracking. (Jones, 1992)

Figure 15 on the next page shows the complete chart.

OUTPUTS INPUTS	2 Design situation explored	3 Problem structure serceived or transformed	4 Boundaries located, sub-solutions described and conflicts identified	5 Sub-solutions combined into alternative designs	6 Alternative designs evaluated and final design selected
	3.1 Stating objectives	3.2 Literature searching			
1 Brief issued	3.2 Literature searching 3.3 Visual inconsistency 3.4 Interviewing users 4.1 Brainstorming	3.3 Visual inconsistency 3.4 Interviewing users 4.1 Brainstorming 4.2 Synectics	3.3 Visual inconsistency 4.1 Brainstorming 4.4 Morphological charts	3.3 Visual inconsistency 4.1 Brainstorming 4.2 Synectics	2.1 Strategy switching 2.2 Matchett's FDM
2 Design situation explored		3.1 Stating objectives 3.9 Data reduction 5.1 Interaction matrix 5.2 Interaction net 5.8 Classification 6.4 Specification writing		5.4 System transformation 5.6 Functional innovation 5.7 Alexander's method	
3 Problem structure perceived or transformed	3.2 Literature searching 3.5 Questionaries 3.6 Investigating user behaviour 3.7 Systemic testing 3.8 Selecting measurement scales 3.9 Data logging		1.5 Boundary searching 3.7 Systemic testing 4.1 Brainstroming 4.4 Morphological charts 6.2 Selecting criteria 6.3 Ranking and weighting 6.4 Specification writing	4.1 Brainstroming 4.2 Synectics 5.4 System transformation 5.5 Boundary shifting	1.1 Systematic search 1.2 Value analysis 1.3 Systems engineering 1.4 Man-machine system designing 1.5 Boundary searching 1.6 Page's strategy 1.7 CASA
4 Boudaries located sub-solutions described and conflicts identified		4.3 Synectics 4.3 Removing mental blocks 5.3 AIDA 5.4 System transformation 5.5 Boundary shifting 5.6 Functional innovation 5.7 Alexander's method		4.1 Brainstroming 4.2 Synectics 4.3 Removing mental blocks 5.3 AIDA	5.3 AIDA
5 Sub-solutions combined into alternative designs					1.2 Value analysis 3.5 Questionaries 3.6 Investigating 3.7 Systemic testing 3.8 Selecting measurement scales 3.9 Data logging and reduction 6.1 Checklists 6.2 Selecting criteria 6.3 Ranking and weigthing 6.4 Specification writing 6.5 Quirk's reliability index
6 Alternative designs evaluated and final design selected					

Figure 15 *Input-output chart*

4.2.4 Design & Emotion Society Search Engine

Description: The Design & Emotion society is established in 1999 as an international network of researchers, designers and companies sharing an interest in experience driven design. The network is used to exchange insights, research, tools and methods that support the involvement of emotional experience in product design. The daily board is based in The Netherlands and includes professionals from design companies as well as professors from the Delft University of Technology. They organize conferences and next to it their website provides information for anyone interested in the design and emotion research field. (Design & Emotion Society, 2006)

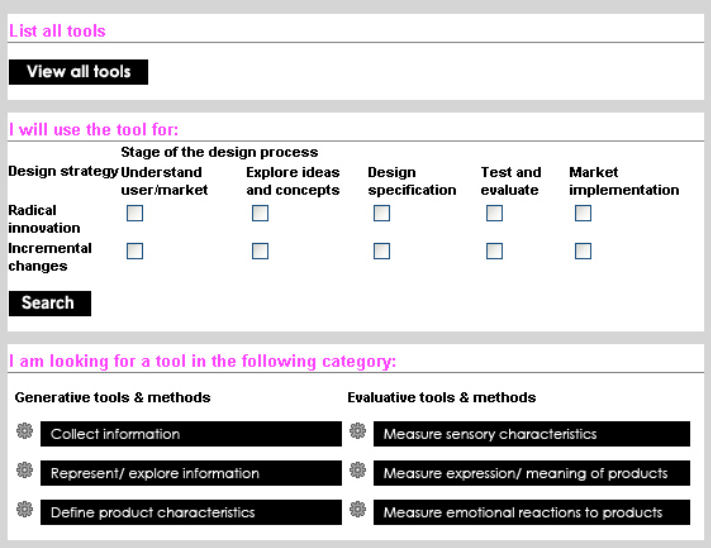


Figure 16 *The three options of the search engine*

A database including all kinds of methods and tools on this subject can be found on this website. Members can add their own tools/method. By filling in a template, they are put on the site. When you want to find a tool from this database, the search engine can be used to find the one that serves the purpose of your project. The search engine is based on the specifications that need to be filled in when you upload a tool.

The picture below shows the start point of the search engine. The user can choose from three search options:

1. List of all tools: by clicking on the button you find an alphabetic sorted list of all tools in the database.
2. 'I will use the tool for': when you know your design strategy and the stage of the design process, you can fill them in by clicking the empty boxes and then push the search button. The search results will give you a list of suitable tools and methods.
3. 'I am looking for a tool in the following category': all tools and methods are categorized. By clicking on a category that matches the intentions you have with the tool, a list of tools will disappear. When you are not satisfied with it, you can refine your search. Therefore you have to choose from a list of characteristics and practical issues.

4.2.5 Generic Work Process Toolkit

The online toolkit is developed by Bas Leurs from the Rotterdam University of Applied Science. It is still under construction and shows version 1.0.

The website shows an overview of five phases in the design process: Research&Analysis, Concept, Design, Develop and Implement. Underneath each phase a list of tools is enumerated. From this list, the designer can look for suitable tools that fit his project. (Leurs, Conradie, Lauman, & Verboom, n.d.)

Designers who are working on a user-centered project, can benefit from the toolkit. They can browse through the list and select the ones that get your attention. A short description is given and more information can be found in the references.

The table on the right shows all discussed tools and summarizes the format, input and output (amount and content).

Figure 17 *The five phases of the Generic Work Process Toolkit*

	Format	Input	Output
IDEO Method Cards	51 cards	none	one random technique
UsabilityNet Methods Table	online wizard	phase of the design process and three conditions	no, one or more techniques
Input-output chart	chart on paper	allready obtained knowledge and what he wants to achieve	no, one or more techniques
D&E Search Engine	online search engine	depends on search option	no, one or more techniques
Generic Work Process Toolkit	website	phase of the design process	list of techniques

Table 3 *Characteristics of each tool*

4.3 Concept formats for the tool

The above-mentioned example tools are used as illustration for the kinds of formats that exist. All tools have in common that they help designers in choosing techniques that supports their research in design projects. We are looking for a tool that support designers during scenario based projects. Therefore three concept tools are developed for the particular case of scenario development. It must be noted that these concepts focus on the format; the content is not defined yet.

Every concept is illustrated with a potential use scenario.

4.3.1 Technique indicator

Description: the answers to ten questions point in a direction where suitable techniques can be found. The questions are asked using a (online) wizard. The designer can choose between “yes”, “no” or “skip this question”. The last option is included so questions that are not relevant to the project can be taken out from the final result.

Input: answers to the ten questions

Result: The answers to the questions are compared to answers that meet a specific technique. The technique that has is has most similarity with the answers of the designers, suits the project best. This is presented by a coordinate system. The yellow area points out what techniques are best.

Scenario: Janet just started working on a project for TOMTOM after she graduated from university. Her supervisor asked her to find out what problems the user encounters using the current TOMTOM navigation system. With the use of scenarios, she want show the result of her research to her stakeholders. As input for these scenarios she made online questionnaires and asked people on forums if they want to fill them in. Although she got a lot of response, the result was not satisfying: Janet still has the feeling that the users have problems they did not fill in because they are not aware of it.

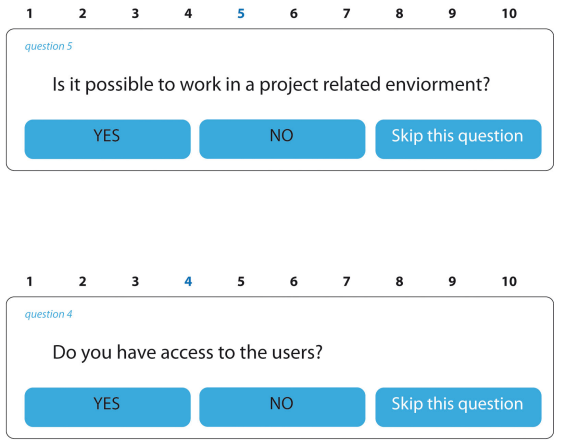


Figure 18 *Two example questions of the technique indicator*

Extra research is needed, but because she lost a lot of valuable time with the questionnaires, she wants to be sure about her next approach. Then she decide to use the online “toolkit indicator”. It helps her finding a technique that suits her demands and facilities. Now she can start making up the lost time and hopefully finish her research in time.

Examples: the ‘screen shots’ show two example questions. They give an impression in how the tool could look like. After answering these questions a result shows up. As mentioned before this will be done using a coordinate system. The figure on the right side of this page gives an example result. The yellow area presents the most potential techniques; in this case, according to the answers given by the designer, ‘Fly on the wall’ fits the project best.

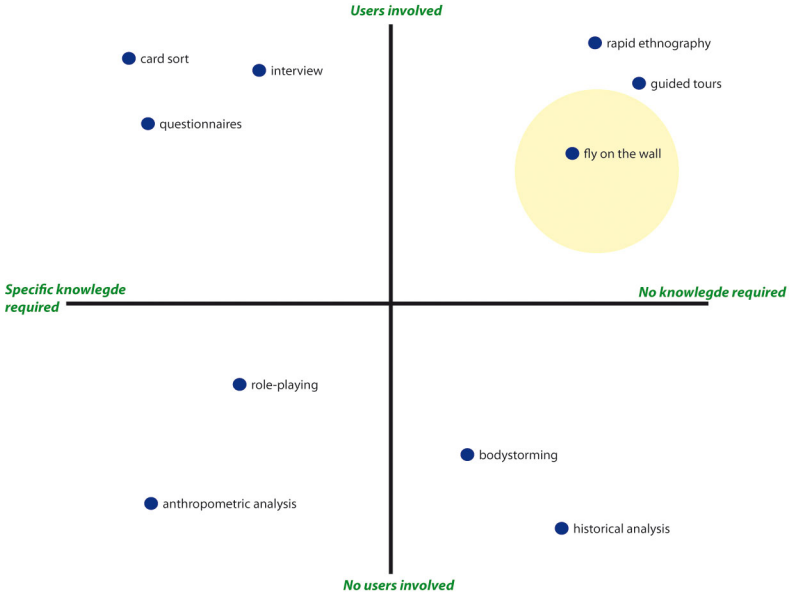


Figure 19 *The coordinate system of the technique indicator shows the final result*

4.3.2 Flowchart

Description: the flowchart brings you step-by-step to a technique that suits your project best. By answering questions or propositions, you will be directed to a next question and so on. Finally this ends with a technique description that meets your demands.

Input: answers to the questions in the flowchart

Result: all answers bring you to a next question. The final answer brings you to a technique description.

Scenario: Jack is new at the design company X. Before he took this job, he worked at other design agencies. The first project he will be working on with two colleagues is to redesign the interface of the TOMTOM navigation systems. Before they start designing, the problem definition must be clear. Information about the user needs to be gathered and will be used to develop so called 'current problem scenarios'. Because Jack is new in the company, he is not sure about the facilities company X has. His colleagues advise him to use the flowchart the company developed. This flowchart brings you to techniques that are possible to use within the boundaries of the company. By answering questions about their specific project, he gets to "shadowing". Because his colleagues used this technique before, he gets a lot of useful help with the preparations. It saves him a lot time, which is very valuable because of the deadline they have!

Example: the figure shows an example route and outcome.

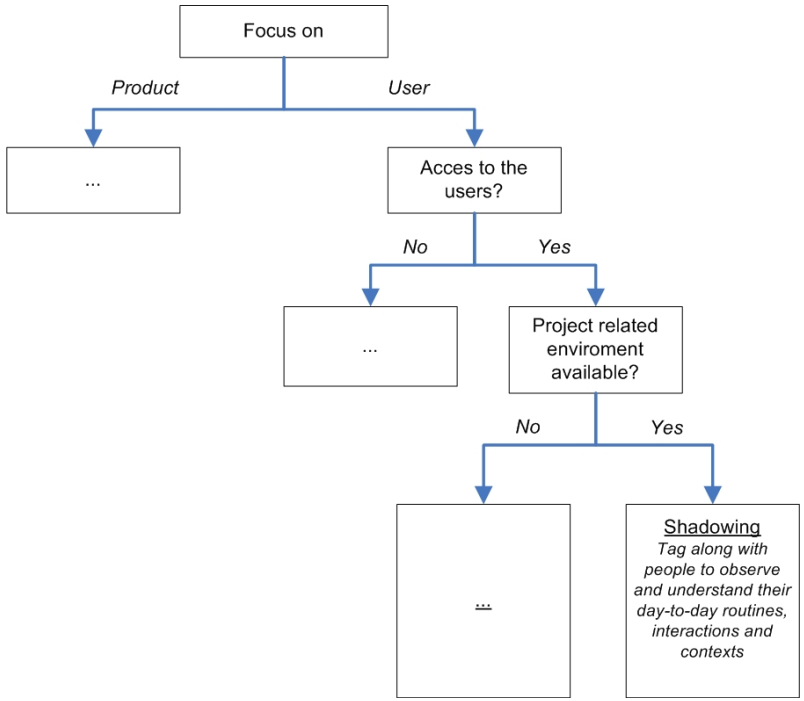


Figure 20 *Example flowchart*

4.3.3 Wheel of Fortune

Description: the tool is inspired on a wheel of fortune. By giving the wheel a swing, it will turn around and were the pointer shows at when it stops, this will be your outcome. This means that the result is completely random: the result (in this case a technique) has no relation with the knowledge about the project or facilities of the designer. It is not guaranteed that the resulting technique is applicable for your problem. It possible to make the tool less random by choosing a card matching to the phase you are currently working in.

Input: no foreknowledge required.

Result: a random technique. It possible to make the tool less random by choosing a circle card matching to the phase you are currently working in.

Scenario: Louis is still at work although most of his colleagues are on holiday. It is a warm day and unfortunately the air-conditioner got broken. These facts don't help him now he got stuck in his project: find out what problems occur during the use of the newest TOMTOM navigation system. His approach is to write scenarios, but therefore he needs input. Time is running out and his creativity is decreasing. He decides to get some refreshing water from the kitchen. Then he sees the 'wheel of fortune'. While drinking his water, he gives a swing to the wheel and the technique 'Camera Journal' shows up. This is actually a good an idea for his project and when he finishes his drink, he gets back to his computer with new energy and ideas to start the preparations of his research.

Example: the figure below shows an example disc for the phase Analysis. It includes ten potential tools for this specific phase. Next to this figure the complete wheel is illustrated (figure 22, 23 and 24).

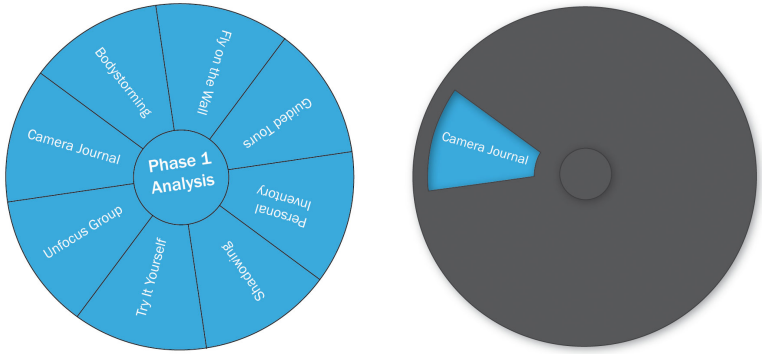


Figure 21 *Example disc (left) and topdisc (right)*

On the next page detailed illustrations can be found. All phases of the design process have its own disc with its own colour. The discs stay on the right place with small holes on the top and projections at the bottom. The first disc (grey, with the gap), which you turn, has rollers at the bottom, so it can move.

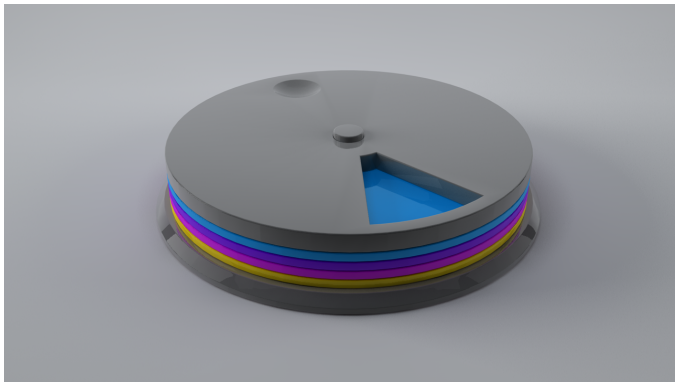


Figure 22

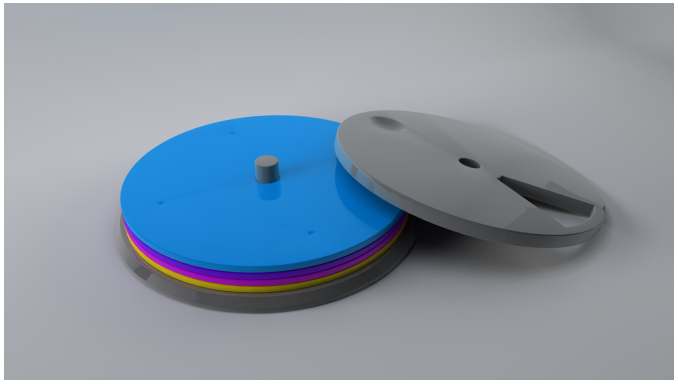


Figure 23

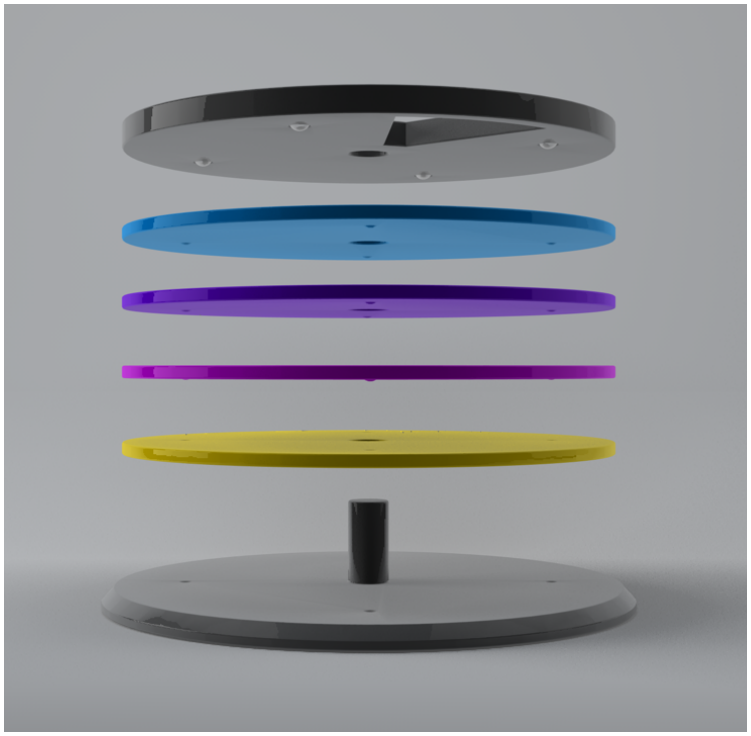


Figure 24

4.4 Evaluation tool format

4.4.1 Approach

To find out what format is most likely to be useful in practice, and in this case at Panton, I had an interview with ir. Mario de Zeeuw. He is a designer at Panton, we met before during my first visit (see Chapter 3).

My main objectives for this interview are:

1. Evaluate the example and concept tools from a practical point of view.
2. Discuss the weaknesses and strengths of each format.

To meet these goals I formulated research questions:

1. Is a tangible or digital tool more favoured?
2. Is it preferred to see only the result or all available techniques?
3. Does Panton prefer one or several suggestions for techniques that could be useful?
4. How much required input is best in practice (none to a lot of details)?
5. Is it valuable to have the option to add more techniques in time?
6. What goal must the tool meet (e.g. inspiration, decide complete strategy)?
7. Is the tool desired in a specific phase of the design process or in all phases?

I got the answers to these questions, by first showing the existing tools that are mentioned before in this chapter (the IDEO Cards, UsabilityNet Method Table, Input-Output chart, Design and Emotion Society Search Engine and the Generic Work Process Toolkit). It was possible to show the real IDEO Cards and also the original input-output chart was available. I illustrated the others with printed pictures. While I presented these tools, Mario de Zeeuw already came up with his ideas about the tools. After I finished the evaluation of the last tool, I asked some extra questions to get more extensive information about his reasons why he, for example, disliked a tool.

Next I showed my three concept tools and asked him what he liked or not about them.

All information I gathered is used for the final proposal for a tool format (see next chapter).

The complete plan and programme for this interview can be found in Appendix C.

4.4.2 Evaluation existing tools

Panton is not familiar with any of the existing tools. A short presentation helped Mario to get to know the tools. Not all tools evoked reactions that are related to the purpose of the interview; therefore I only include the ones that are relevant to the research questions.

Input-output chart

The input-output chart can help a design team defining a strategy for a project. Panton does not decide conscious their strategy at the start of a project.

> **Mario:** "What we do is when we get an request is, we write an offer, including what we are going to do and what the result will be. Finally a planning and an outline of the costs will be attached. When we finish this report we try to stick to it and not to depart from it. It does not happen that we are so aware of all the steps that we make. For example, when we think we need a brainstorm somewhere in the process, we just gather some people and perform the brainstorm"

It is very hard or maybe impossible for Panton do define their complete strategy before they start the project. They are used to the way they always work and it turned out that this works best for them. We agreed that this tool, which helps defining a complete strategy, could be useful for a very unstructured design team or designers who just graduated and do not have much experience yet. At Panton the steps they take come automatic and subconscious, because of experience in other, often similar, projects.

It is not likely that they will use a tool that defines their strategy in detail, like the input-output chart suggests. This reaction corresponds with my idea I had about Panton after my interview (Chapter 3) and the decision to change the goal of my tool: not to stimulate the development but to inspire during the development of scenarios.

Design and Emotion Search Engine

The impression was that it could be hard to find a suitable tool when you use the 'refine search' option. Because every technique has its own 'path' (characteristics), it is almost impossible to find a technique that has the same path and matches to all your wishes. The 'ignore' option helps to get better results.

Generic Work Process Toolkit

This tool shows all possible techniques. Mario really liked the fact that you could see all techniques a phase includes, in contradiction: the search engine only shows the result. You can't see what other techniques are included in this tool.

> **Mario:** "This tool includes lists which can scroll through [...] when you are reading and you think, 'he maybe this technique could be interesting', you can look it up what is meant exactly with the title."

IDEO Cards

The IDEO Cards is a hardcopy tool; they can be used during sessions or brainstorms with other designers. The online tools are more likely to be used when you start defining your strategy at the beginning of and not during a project. They serve other goals. Because we are looking for an inspirational tool, hardcopy, like the cards, is more favoured.

> **Mario:** "You are not going to search in the IDEO Cards when you really need something, like 'oh, this is not useful, and this is not useful either' because it not convenient arranged. The other example tools have a better overview of the techniques"

The tools which ask for much input is required give a better overview. With input I mean characteristics of the project you are searching supporting techniques for. The relations between the techniques of the tool and the aspects of the particular project are clear. In contradiction, the IDEO Cards for example are completely random and therefore it is hard to get an overview of the techniques they include and when whether they are useful for your case.

It turns out that tools that ask for input are more suitable when you define a strategy or when you encounter problems for which you need a solution in terms of new and fresh insights for next steps. Random tools serve well in sessions and brainstorms with other colleague designers to look at the project from another viewpoint or come up with new, fresh and fun ideas. In particular when the team gets stuck in the design process or for inspiration.

> **Mario:** "It depends on what goal you have in mind."

After we evaluated the existing tools, we continued the interview with a presentation of the concept tools I came up with.

4.4.3 Concept tools

Technique indicator

A big advantage of this tool is that in the final result (the coordinate system) all techniques are showed and not only the technique that suits best. Therefore the designer still has a choice what technique to use. He has the freedom to choose the 'second best' tool when he prefers this.

The result is not a list but very visual because of the coordinate system. This way you get immediately an overview.

Flowchart

The flowchart gives you less freedom to look at other techniques compared to the technique indicator. The result at the end of the flowchart is only one technique. This could be a disadvantage because it is not very broad. Mario suggested that when you quit halfway, all techniques underneath this 'tree' has potential to be useful.

Wheel of Fortune

> **Mario:** "It is fun thing to have at your table [...] because it is a physical thing, it makes it easily accessible. Much more approachable compared to a tool through which have to scroll on the computer."

Another advantage is that the whole design team can use the tool together.

The tool in this format doesn't give information about how the technique works; only the title is included. Mario suggested that there is space to include an extra line of text with more detailed information. In spite of this, it is not possible to put all information on it. A small booklet or cards will be needed to write down the explanations of each technique.

The content could be anything; in this example each disc stands for design phase but it doesn't necessarily has to be that way.

> **Mario:** "When you would like to have a disc with funny statements because it inspires you during a brainstorm, then you can put it on the top."

Another option is that you can develop your own disc. For example with small cards on which you write down whatever you like and then put them in or on the disc to use them. This way you can add your own useful techniques. We discussed that there must be a basis set of filled-in discs and in addition a disc to fill in yourself.

> **Mario:** "Between ourselves (at Panton) we have our own things we say to help each other to come up with fresh insights. You could bring this together and put it into a disc. That can be sometimes a technique and sometimes a way of thinking.

Mario also suggested that it would be more fun when it is possible to give the top-disc a big swing instead of a small, innocent swing. The way this concept is designed now, this is not possible. Therefore an adaption in construction has to be made.

When the goal of the tool is to inspire, like in this case, it is of high importance that the tool is always available.

> **Mario:** "A checklist on the computer is not always there. And when it is available, it is only for you because you are working with it. Therefore it (a checklist on the computer) is very personal/private tool."

A less personal tool that is always available for everyone is most useful to inspire a design team.

> **Mario:** "That is way this tool (concept tool: the Wheel) had much appeal to me. [...] It is a supplement, something of which you can say 'hé!'"

I found out that is was desirable that the user of the tool could see all options (like the concept Technique Indicator). The Wheel concept doesn't show all techniques. This is not a disadvantage because the user will be curious about other results. So this means he will probably turn the wheel again to look what other options could be suggested. The IDEO Cards has a similar effect: after you pick one card, you also try the second and so on. Just because you are curious about what is behind the picture.

Panton currently doesn't make use of similar tools. This doesn't mean they never get stuck in the process. For example:

when you solve the first problem, the next one is already showing up. A problem related to the development of scenarios or persona's is to find out if you covered the whole user group. Next to this you need to be sure that you have written the right description for this group with the right information. Getting this information can be the bottleneck. It always comes from extern sources and therefore the right technique to gather this information can be essential.

4.4.4 Conclusions evaluation tools

The research questions for the evaluation of the existing and concept tools will be used to summarize the result of this interview. It is important to keep in mind that we focus on *the format of inspirational tool.*

1. Is a hardcopy or digital tool more favoured?

Hardcopy tools are more likely to be used in practice. They are more accessible then for instance online computer tools. You can easily use them during sessions with other designers. Hardcopy tools can be put on the table so everyone can join the use of the tool and see the result.

2. Is it preferred to see only the result or all available techniques?

When it is possible to see all options, you can also choose for other techniques then the one that turns out to be the best. They may not suit your project in the same degree according to the test, but that doesn't mean it isn't useful. Because the tool needs to inspire you, it needs to arouse your curiosity. The freedom to still have a choice is therefore desired. When the tool only shows one result, you cannot choose for other options.

3. Does Panton prefer one or several suggestions for techniques that could be useful?

This is related with previous question. Choosing between more then one option is best, in particular when it turns out that more then one option suits the project.

4. How much required input is best in practice (none to a lot of details)?

Much input makes the use of the tool less accessible; you do not want to fill in too much information when you just need inspiration. Random results could end up being useless but are easy to use. For inspiration you do not need to have an exact result, a suggestion or a fresh insight is enough. In contradiction, when you want to use the tool to define your strategy, much input is desired to get a good result.

5. Is it valuable to have the option to add more techniques in time?

Different designers with all kinds of backgrounds have developed their own ideas of the design process. They share these insights among each other. It adds value to the tool when they could implement these ideas to the tool themselves.

6. What goal must the tool meet (e.g. inspiration, decide complete strategy)?

My idea that an inspirational tool is most useful at Panton corresponds with Mario's opinion. Tools that help defining compete strategies are not likely to be used because the design team has much experience with their own way of working. There are no reasons to change this strategy. It happens that they get stuck during the design process; an inspirational tool could help to get on with fresh ideas.

7. Is the tool desired in a specific phase of the design process or in all phases?

There is no preference given to a specific phase. It is important that is always accessible, therefore it is most likely that the designers wish to use it during the whole process.

4.5 Conclusions

Several tools are explained to illustrate the differences in format, amount of input and kind of output. For example, the IDEO Method Cards are completely random and hardcopy where the Search Engine of the Design and Emotion Society is an online tool which requires input from the designer about his project.

Next to these example tools, I came up with three concept tools. Like the existing tools, they also differ from each other in format.

All tools (both example as concept) are use to evoke a discussion with Panton's designer ir. Mario de Zeeuw about what kind of format they prefer in their practice. He got really enthusiastic about the Wheel of Fortune concept tool. It is a random tool, which you can put on the table and use with the complete design team. It is easy accessible, what he finds very important.

The findings from the evaluation will be used to come up with a list of requirements for an inspirational tool format for Panton in the next chapter.

5 Proposal tool format

The information gathered in the interview with Mario serve as basis for the proposal for the tool format. The conclusions of this evaluation can be found in chapter 4.4.4.

I will continue with the list of requirements for the format of the scenario-development supporting tool with an inspirational goal.

The concept tool Wheel of Fortune turned out to meet these requirements. In the evaluation with Mario we came up with some ideas about how this tool could be adapted so it meets almost all requirements. The final concept is included in the last part of this chapter and serves as illustration for the list of requirements.

5.2 Requirements tool format

From the conclusions of the interview a set of requirements can be conducted.

The format of a tool that inspires designers during the development of scenarios must meet the following requirements.

- The tool must be tangible, for example cards or a game. An online tool, to be used on a computer, is not easy accessible. A tangible tool, put on the table, encourages the design to make use of it because it is within reach and ready to use. Next to it, it makes it easier to use with the whole design team.
- All included options (techniques) should be visible or easy accessible. Because the tool serves an inspirational goal, the user must decide which proposed options he wants to use. This doesn't have to be the option that is marked as best.
- Less input or no input is required from the user. This means that the result can be random and therefore surprising, which can result in fresh and unexpected ideas. Next to this, it makes it easy accessible because the user doesn't have to fill in anything and can use it directly.
- Extra techniques can be added by the user so the tool can evolve over time and stays interesting to use.
- Applicable during all phases of the design process. Because scenarios are used during the whole design process, inspiration is needed anytime. It doesn't have to make a difference in what phase the design team is working.

The figure on the next page gives a visual overview of the above-mentioned requirements.

Figure 25

5.3 Example tool format: Wheel of Fortune

The concept tool 'Wheel of Fortune' turned out to suit Panton best. Some adaptations are made, so it meets all above-mentioned demands.

The tool consists of several discs. A basis set of three discs includes techniques suitable for each phase of the design process: analysis, creation, specification & implementation. In this case we use three phases, because the design process at Panton can be divided in three phases. When the tool is designed for other (design) teams, it is possible that we include less or more basis discs because the have a different amount of phases.

The remaining discs are blank; the design team can fill them in their selves. For example with techniques they developed themselves or statements of familiar designers they think give inspiration.

Each disc has space for eight entries (in the basis disc: techniques). The user can write or draw his or her inspiration on the blank discs using pen with erasable ink. When they don't use a specific entry anymore, they can erase it and write something else on the disc.

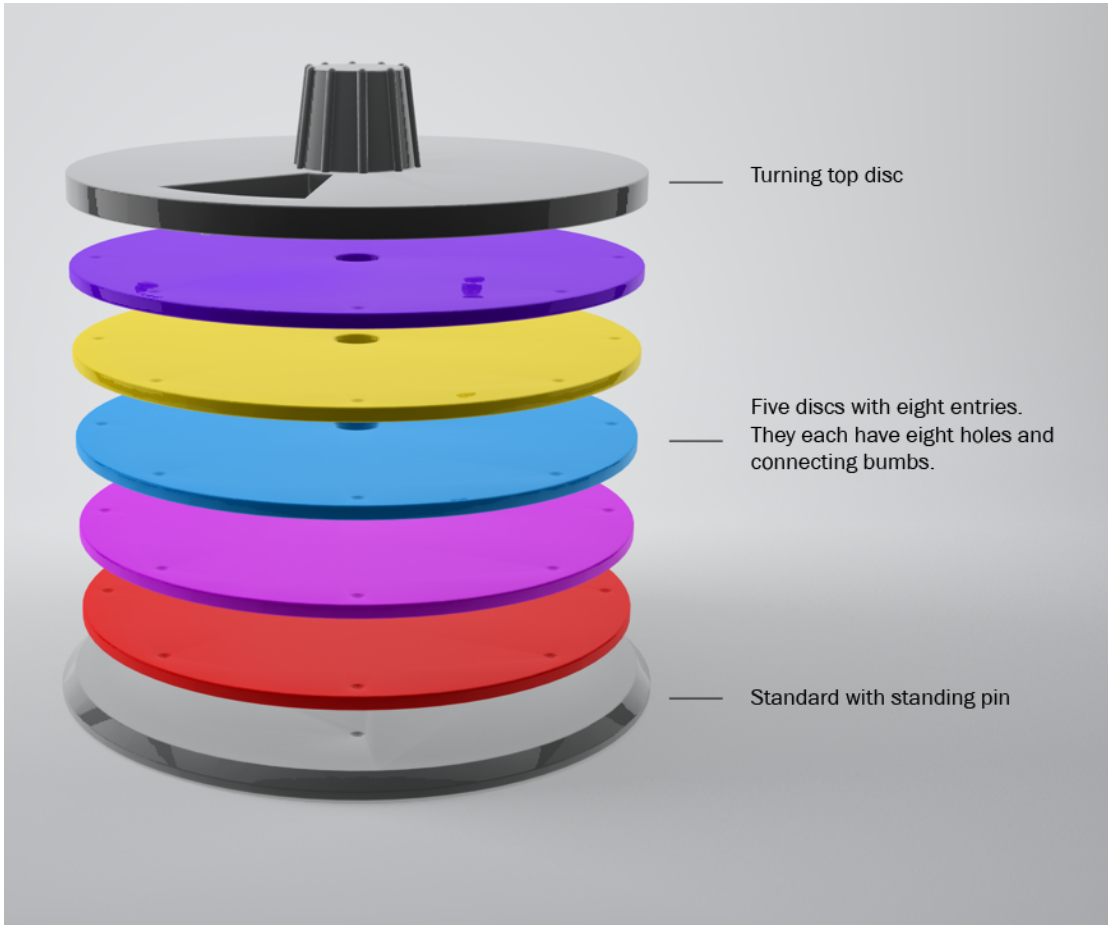


Figure 24

The standard with the standing pin includes a small additional booklet with the instructions of use for each technique of the basis disc. This can be used when they need more information about how to perform the specific technique.

The top ‘disc’ is turns when you give it big swing. The gap shows the result when it finishes turning.

Each disc has eight small holes on the top. The turning top disc has four balls and stops when it turns slow enough so the balls fall in the holes. This way, the top disc always stops when it shows a complete entry; it is impossible that you see the half of two entries. The discs stay on their place because each disc has eight bumbs at the bottom. These bumbs connect with the holes and prevent the disc from turning.

The concept tool that is developed (Wheel of Fortune) is reflected with these requirements:

- Hardcopy, for example cards or a game:
  the tool is hard copy. It is a tangible; you can put it on the table. An electronic device (with internet) is not required.
- All included options (techniques) should be visible or easy accessible:
  not all options are visible. The gap only shows one entry of the underlying disc. Despite this, the other entries are easy accessible; you only have to turn the top disc to see other options.

- Less input or even random:
  the only input that you need is to decide in what phase the design process is, so you can choose a disc. The resulting technique on the disc is random; each of the eight options has equal chances.
- The user can add extra techniques:
  the blank discs give the design the possibility to add their own techniques (or other sources of inspiration).
- For all phases of the design process:
  each phase of the design process has its own disc. The tool can therefore be used during the whole design process.

Figure 25

5.3 Conclusions

From the results of the interview with ir. Mario de Zeeuw, a list of requirements for the design of the inspirational tool can be made. They include that the tool should be tangible (not digital). All options should to be visible, not only the one that is marked as being the best option. The format should make it possible that the user can add his new techniques or other kinds of inspiration. For the use of the tool no or less input should be asked from the user, this results in a random outcome. Finally the tool should be applicable during all phases of the design process.

The concept tool, Wheel of Format, is adapted so it meets the all requirements. This concept tool must be seen as an illustration of the list requirements.

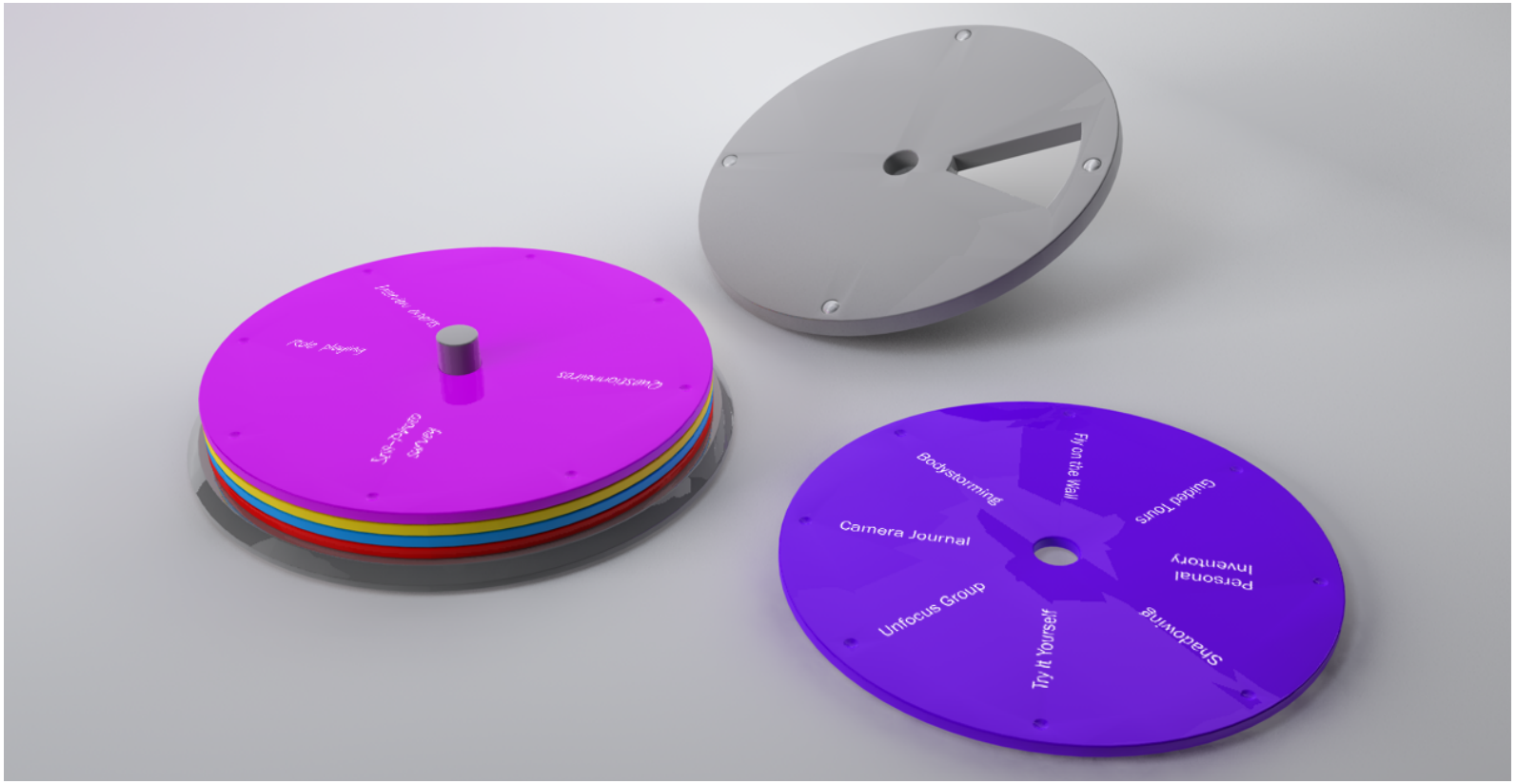

Bodystorming
Fly on the Wall
Guided Tours
Camera Journal
Personal Inventory
Unfocus Group
Try It Yourself
Shadowing

Figure 26

6 Conclusions and recommendations

6.1 Conclusions

The literature study showed that scenarios are most adopted in software engineering. A lot of research is done in this particular field; this can be seen in the amount of publications. Less research is done in the use of scenarios in product design. Despite the benefits this methodology, scenarios are not integrated in the design process of products.

In contradiction with this fact, the design agency Panton is very skilled in scenario based product design. Therefore the original assignment (develop an tool that stimulates scenario-use) was not applicable for Panton. The objective of the tool is changed into a tool that gives inspiration. The development of scenarios doesn't always go without problems; fresh insights and new inspiration can help them get on with the development of scenarios.

Because of the time limit the focus is on the format of the tool, not the content. From the evaluation with Panton conclusions can be made regarding to the demands the format must meet. Translated in requirements these are:

- hardcopy, for example cards or a game;
- all included options (techniques) should be visible or easy accessible;
- less input or even random;
- extra techniques can be added by the user;
- for all phases of the design process.

6.2 Recommendations

With regard to the whole assignment I would recommend to get in contact with other design agencies. In particular when you want to continue with the original objective, an agency with less experience with scenario based product development is desired. You need to find out why they don't use scenarios and where improvements can be made.

Next to it, a study on the content of the tool is needed. In this assignment I focussed on the format. It was too complex to do both. When you focus on the content, you need to know what techniques support the development of scenarios, what relationships they have with the phases of the design process and so on. I expect this to be a quite big and complicated research that requires quite some time to complete.

When we look at the concept tool Wheel of Fortune, tests must be done. A very practical issue is to test the system with the balls, bumbs and holes in the discs that prevent to the discs from turning and make it possible to stop the top discs right above an entry. Questions like 'does it really work and with

what sizes' and 'what material is best' need to be answered. A prototype will be needed and evaluations with users (designers) need to be carried out.

I also want to note that doing an interview was probably the best option for me to gather information from the practice within the boundaries of my assignment. But I think more intensive research is needed to get to know them. I tried to find out if what they say they do is actually what they really do by asking questions about example projects they did. You can't check it. A short internship or observation of several days would give better insight in how they really work.

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Appendices

Appendix A

By doing an interview by phone with Ingebord Griffioen (Panton) I will get a more detailed picture of the way a design team at their practice works. With this information, I prepared my extensive interview during my visit.

Objectives:

1. Getting a better idea of Pantons practice.
2. Liaise with Ingeborg my visit to Panton for the extensive interview.

Questions:

1. Do you use a specific approach or method to tackle a design challenge in projects?
2. Do your use scenarios in the design process?
3. How big is a design team?
4. How is the composition of a design team?
5. What is backgrounds/disciplines/experience of the members?
6. Do you work on different projects next to each order?
7. When do you have time for my visit?
8. How long can the extensive interview take at most?

Approach and planning:

1. Find out when it is convenient to call by sending an e-mail with a request.
2. I will execute this interview of Mach 3rd, 9:00 AM.

Findings (answers to the questions):

1. Do you use a specific approach or method to tackle a design challenge in projects?
   Yes, this method has no specific name or author but they use their approach for (almost) all their projects. At the start they are around in a company for a specific time. The goal of this is to get better insight on the definition of the problem. This sometimes results in another definition because the designers have another, objective view on the problem then the stakeholders have. After defining the definitive definition of the problem, a plan is written. This plan includes among others the description of the target group and requirements of the product design. Next step is writing personas. Personas describe imaginary users of the future product. Every persona has a name. During the design process they use these names as a reference to specific users. The use of fictive persons is a way to get a good picture of the users, an important component in usability - the quality of a product with respect to ease of learning, use and user satisfaction. In an early stage of the design process, concept sketches are presented to potential users. The outcome of this technique is used

for further specifying the ideas. Later they also do tests with the prototypes. Pantons opinion is that it is of high importance to understand "why" some things happen during the use of a product. They achieve this by focusing on how to enter their self into the role of the user.

2. Do your use scenarios in the design process?
   The personas in the previous questions are a kind of scenarios.
3. How big is a design team?
   Depends on the project. Sometimes they work alone on a project and ask for help from colleagues when needed. Bigger projects are carried out in a team.
4. How is the composition of a design team?
   All employees of Panton are Industrial Designers. Two experts from the healthcare practice give advice. The experts have experience from the field and give useful insights.
5. What is the backgrounds/disciplines/experience of the members?
   See previous question. The designers studied Industrial (Product) Design on the University of Twente or Delft, Design Academy Eindhoven or Higher Education. The designers worked at other companies before, except for one. Although they all have similar background, every designer has developed their own specialty in Industrial Design. For example in engineering, ergonomics or sketching and drawing. The two experts work at Panton as a second job. When they are not at Panton, they work in the hospital as a specialist.
6. Do you work on different projects next to each order?
   Yes, ten to twenty projects at the same time. Each designer works an average of three projects at the same time.
7. When do you have time for my visit?
   March 22 (Monday), 14:30 PM
8. How long can the extensive interview take at most?
   Indication: one to one-and-a-half hour

Appendix B

By going on a visit to Panton, I hope to get information from the real practice and reflect this with the information I got from my theoretical literature study. This will help me in developing my tool because I get better insight in how designers work.

I prepared this interview by making a plan and programme. This can be found below. The results of this interview can be found in chapter3.

Objectives:

1. Getting insight on designers practice and their (potential) way of applying scenarios.
2. Discuss where a tool potentially (can be applied to) help and inspire designers in using scenarios.

Questions:

1. When and how do designers use stories/scenarios in their practice?
2. What is the purpose of the scenarios?
3. What kinds of techniques are used to provide information/input for the scenarios?
4. Who are the audience and how are the scenarios communicated to them?
5. Which types of scenarios are natural choices for the designers? Why do they prefer these types of scenarios?
6. How is decided when scenarios are developed and what technique is used? Who makes this decision?
7. What are the benefits/difficulties of using scenarios this way?

Approach and planning:

1. This interview will be carried out on March 22.
2. This session will be voice recorded for documentation.
3. The participants are asked to bring example scenarios (and personas) from a current or earlier project. These examples serve as illustration during the whole interview.

Programme:

1. *Presentation (10 minutes):*
   A presentation about the project and subject will familiarize the designer(s) with the context of the research. This will take approximately 10 minutes.
   Contents of the PowerPoint-presentation:
   - my background and introduction to my Bachelors assignment,
   - scenarios (definition and elements).
2. *Interview: design phases (10 minutes)*
   The interview will give information about the way they work in a design project. I will ask the designers about the design phases they distinguish in the design process. For documentation I will bring paper and pencils to let them write down/draw and so illustrate the phases.

3. *Interview: scenario types (15 minutes)*
   After we get an overview of the design phases, I will ask for the way scenarios are implemented. When they don't come up with defined scenarios will ask them how they achieve usability and where they get their information from. A possibility is that they use scenarios, but don't actually call it scenarios. The information in the presentation at the start will help the designers with defining them. The defined scenarios can be filled in at the blank boxes on top of a matrix (appendix A). The matrix gives suggestions for characteristics and serves as a tool for documentation. Using this matrix I aim to get a good idea of their scenario use. In addition I will ask who makes the decision which scenario type and technique is used when and next to it what scenario types they come up with of their own accord.
4. *Optional: interview: scenario classification (10 minutes)*
   As soon as scenario types are defined, they can be reflected with the scenario use roadmap of I. Anggreeni and M.C. van der Voort. First I will explain this classification, and then the designers will try to see where their scenarios types fit best or if they are a combination. This step does not answer any question but could be useful for understanding. When I think I already get a good and clear idea about their scenario use, I can decide to jump over this part of the interview.
5. *Interview: difficulties/benefits and prospects for the tool (15 minutes)*
   In this stage of the interview I will discuss the difficulties and benefits the designers experience using scenarios. This will give insight on where assistance is needed. We will discuss if and when a tool could be useful for Panton. If possible, think of the way the tool should look like.

Appendix C

IDEO Method cards

The IDEO Method Cards is a collection of 51 cards, representing diverse ways design teams can understand the users they are designing for. A number of different methods are made accessible for all members of the design team. The cards explain how and why the methods are applied best. Next to it, the card includes a description of an application of these methods in real design projects.

The cards are developed by IDEO. IDEO is founded in 1991 and is an innovation and design firm with over 500 employees all over the world, among others in New York, Shanghai and London. They use a human-centered design-based approach to help organizations with strategies for innovation and new product design in the business, government, education and social sectors. (IDEO, 2009)

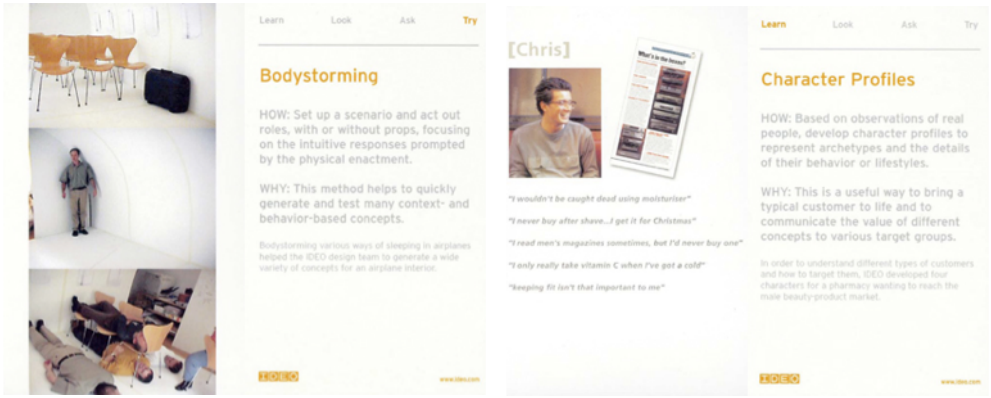

Figure I

The cards are classified as four categories that represent ways to empathize with people:

- Learn: analyze the information collected.
- Look: observe people to discover what they do rather than what they say they do.
- Ask: enlist people's participation to elicit information relevant to the project.
- Try: create simulations to help empathize with people and to evaluate proposed designs. (IDEO, 2003)

These categories make it easy to reference, browse, sort and share the cards. Each approach is illustrated by a real-life example of how the method was applied to a specific project. As new methods are developed all the time, the deck will grow and evolve over time. (IDEO, 2002)

This tool can be very useful in the development of scenarios. The outcomes of the methods described on the cards, give information about the user and how they handle the products. Using a card from the collection will give the design team a fresh look on the situation and inspires them to think of new ways to gather information. The methods are in particular useful because they focus on the user. This suits the scenario based product design approach very well, because it also aimed at usability.

Format: 51 cards with a picture of an example on the front and explanation at the back

Aim: It is indented as both information and inspiration to human-centered design teams and individuals at various stages to support planning and execution of design programs.

Application: This tool was initially compiled by IDEO's human factors specialists for its own staff. In response to requests from clients, colleagues, students and teaches, they decided to share their methods using cards. The tool can to be used by researchers, designers, and engineers to evaluate and select the empathic research methods that best inform specific design initiatives. The tool can be used in various ways; sorted, browsed, searched, spread out, pinned up.

Input: There is nothing you have to know before the designer uses the tool. No input is required.

Result: The result is not linked to information the design team has obtained before using the cards. The method that is suggested on the card you pick is random.

UsabilityNet Methods Table

Description: UsabilityNet was a project funded by the European Union to provide resources and networking for usability practitioners, managers and EU projects. The project started in February 2001 and finished in July 2003. Since then Nigel Bevan, the project manager, took responsibility for maintaining the web site. (UsabilityNet, 2003)
The Methods Table includes several methods divided in six types, arranged in chronological order:

- Planning and Feasibility Overview
- Requirements
- Design
- Implementation
- Test and Measure
- Post-release

A selection of appropriate methods can be made by (de)selecting one or more conditions:

- Limited time/resources
- No direct access to users
- Limited skills/expertise

Format: online wizard, assessable for everyone (for free) on http://www.usabilitynet.org/tools/methods.htm
Aim: support by suggesting appropriate methods based on three conditions. These methods are aimed to help the design team in developing a user-friendly product and support the usability design approach.

Application: UsabilityNet its self is supports usability practitioners, managers, members of EU projects and professional organisations. Because the wizard is an application on their website, the target group is considered as the same.

- Usability practitioners: supported by providing a comprehensive set of authoritative information and resources.
- Managers: supported by providing information and resources about usability to support the needs of managers and procurers
- EU projects: supported by providing material specifically tailored for use by EU projects.

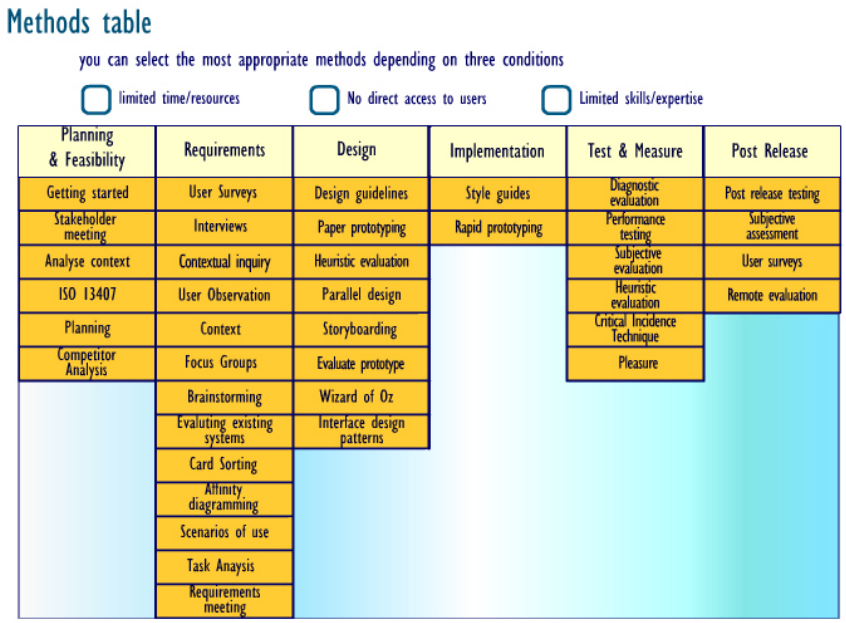

Figure II

Professional organisations: supported by providing a forum for communication between professional bodies and other organisations concerned about usability.

Input: Before using the wizard, the designer needs to know in what phase the design process is and whether the project meets the three conditions.

Result: No, one or more methods are suggested when the input is decided. When more then one method is shows up, the designer can choose one that has most appeal to him.

Input-output chart

Description: The input-output chart is based on the assumption that the suitability of a method can be judged by comparing its input (what the designer already knows) and its output (what they want to find out). The left column shows inputs: information that is available before a method can be used. The first row shows outputs: the kind of information the methods produce. The two scales are placed in order of decreasing generality and increasing certainty. Methods at the top left are useful in early stages (when a lot is uncertain), the methods in the bottom right fit the final stages of design. It is possible to jump several stages forward: that are the methods with distance from the diagonal. Those just above the diagonal

are step-by-step methods. Repeated methods can be seen as methods for back-tracking. (Jones, 1992)

Format: Chart

Aim: To prevent the selection of methods and strategies that are incapable of generating the information that is sought or which depend upon the prior existence of information that is not available.

Application: The use of this chart is illustrated by an example from Design Methods by John Chris Jones (second edition, 1992). The design brief of this example is to design a car that is very easy to park. The figure shows the strategy that this design team chooses after using the chart.

Input: The designer needs to have knowledge about in what phase the process is and what information is already obtained. Next he needs to decide what he wants to achieve.

Result: Combining both aspects from the input, you will find one or more methods that can help the designer to achieve the goal he has in mind. When more then one method is suggested, the designer can choose one or more he thinks suits his project best. When this procedure is repeated, the design team can develop a strategy for the whole design process.

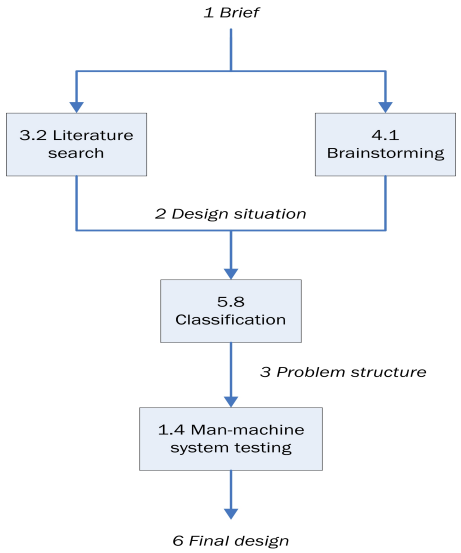

Figure III

OUTPUTS INPUTS	2 Design situation explored	3 Problem structure serceived or transformed	4 Boundaries located, sub-solutions described and conflicts identified	5 Sub-solutions combined into alternative designs	6 Alternative designs evaluated and final design selected
	3.1 Stating objectives	3.2 Literature searching			
1	3.2 Literature searching	3.3 Visual inconsistency	3.3 Visual inconsistency	3.3 Visual inconsistency	2.1 Strategy switching
Brief issued	3.3 Visual inconsistency	3.4 Interviewing users	4.1 Brainstorming	4.1 Brainstorming	2.2 Matchett's FDM
	3.4 Interviewing users	4.1 Brainstorming	4.4 Morphological charts	4.2 Synectics	
	4.1 Brainstorming	4.2 Synectics			
		3.1 Stating objectives			
		3.9 Data reduction		5.4 System transformation	
2		5.1 Interaction matrix		5.6 Functional innovation	
Design situation		5.2 Interaction net		5.7 Alexander's method	
explored		5.8 Classification			
		6.4 Specification writing			
	3.2 Literature searching		1.5 Boundary searching		1.1 Systematic search
3	3.5 Questionaries		3.7 Systemic testing	4.1 Brainstroming	1.2 Value analysis
Problem structure	3.6 Investigating user behaviour		4.1 Brainstroming	4.2 Synectics	1.3 Systems engineering
perceived or	3.7 Systemic testing		4.4 Morphological charts	5.4 System transformation	1.4 Man-machine system designing
transformed	3.8 Selecting measurement scales		6.2 Selecting criteria	5.5 Boundary shifting	1.5 Boundary searching
	3.9 Data logging		6.3 Ranking and weighting		1.6 Page's strategy
			6.4 Specification writing		1.7 CASA
		4.3 Synectics			
4		4.3 Removing mental blocks		4.1 Brainstroming	
Boudaries located		5.3 AIDA		4.2 Synectics	5.3 AIDA
sub-solutions		5.4 System transformation		4.3 Removing mental blocks	
described and		5.5 Boundary shifting		5.3 AIDA	
conflicts identified		5.6 Functional innovation			
		5.7 Alexander's method			
					1.2 Value analysis
					3.5 Questionaries
					3.6 Investigating
5					3.7 Systemic testing
Sub-solutions					3.8 Selecting measurement scales
combined into					3.9 Data logging and reduction
alternative designs					6.1 Checklists
					6.2 Selecting criteria
					6.3 Ranking and weigthing
					6.4 Specification writing
					6.5 Quirk's reliability index
6					
Alternative					
designs evaluated					
and final design					
selected					

Figure IV

Design & Emotion Society Search Engine

Description: The Design & Emotion society is established in 1999 as an international network of researchers, designers and companies sharing an interest in experience driven design. The network is used to exchange insights, research, tools and methods that support the involvement of emotional experience in product design. The daily board is based in The Netherlands and includes professionals from design companies as well as professors from the Delft University of Technology. They organize conferences and next to it their website provides information for anyone interested in the design and emotion research field. (Design & Emotion Society, 2006)

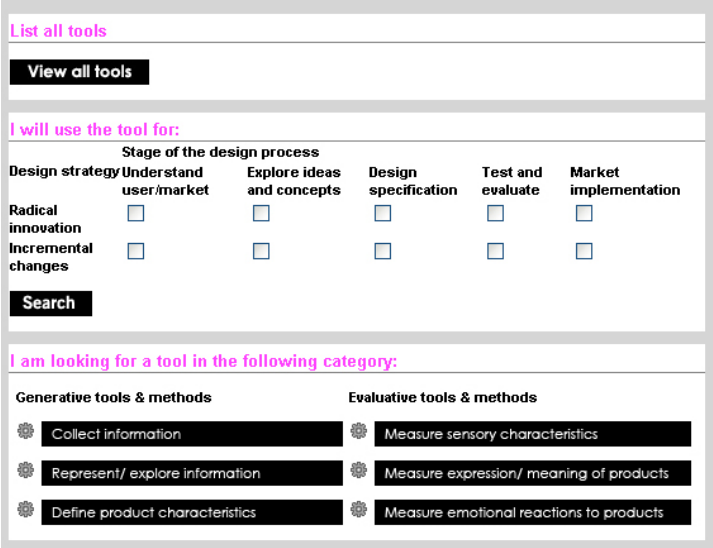

Figure V

A database including all kinds of methods and tools on this subject can be found on this website. Members can add their own tools/method. By filling in a template, they are put on the site. When you want to find a tool from this database, the search engine can be used to find the one that serves the purpose of your project. The search engine is based on the specifications that need to be filled in when you upload a tool.

The picture below shows the start point of the search engine. The user can choose from three search options:

4. List of all tools: by clicking on the button you find an alphabetic sorted list of all tools in the database.
5. 'I will use the tool for': when you know your design strategy and the stage of the design process, you can fill them in by clicking the empty boxes and then push the search button. The search results will give you a list of suitable tools and methods.
6. 'I am looking for a tool in the following category': all tools and methods are categorized. By clicking on a category that matches the intentions you have with the tool, a list of tools will disappear. When you are not satisfied with it, you can refine your search. Therefore you have to choose from a list of characteristics and practical issues.

Format: Online search engine, which can be found on: http://www.designandemotion.org/society/knowledge_base/tools_methods.html

Aim: Share information about design and emotion and use this information so other designers can find the tool that serves their purposes.

Application: Everyone can use this tool during a design project with focus on user experience (design & emotion). Because members can upload their own tools and methods, the database will grow over time. Therefore the tool can be used over and over, because new tools and methods can show up.

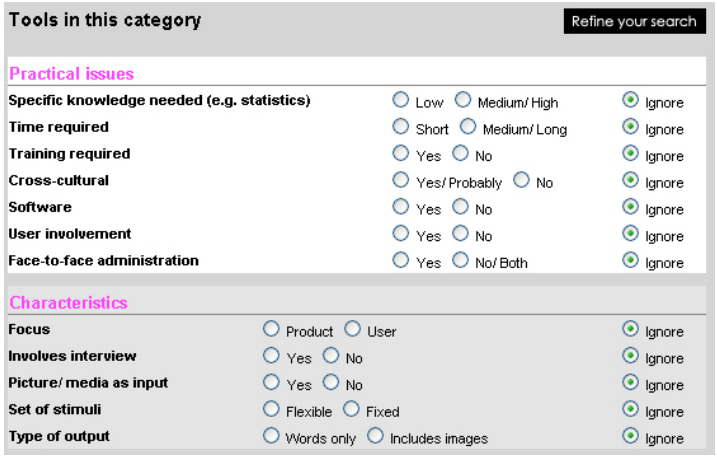

Figure VI

Input: what you need to know about your project before you use the search engine, depends on what search option you choose. The first one gives only a list of all tools and methods: this has no relation to your project specifications. The second option can only be used when you have knowledge about your project; the same can be said about the third search option.

Result: Suggestions of tools and methods that can be useful during the design process.

Generic Work Process Toolkit

Description: The online toolkit is developed by Bas Leurs from the Rotterdam University of Applied Science. It is still under construction and shows version 1.0.

The website shows an overview of five phases in the design process: Research&Analysis, Concept, Design, Develop and Implement. Underneath each phase a list of tools is enumerated. From this list, the designer can look for suitable tools that fit his project. (Leurs, Conradie, Lauman, & Verboom, n.d.)

Format: website with a list of tools classified to the design phase, which can be found on: http://project.cmd.hro.nl/cmi/hci/toolkit/card.php?recordid=101

Aim: The toolkit offers an overview of the methods and techniques that can be used throughout the user-centered design process.

Application: Designers who are working on a user-centered project, can benefit from the toolkit. They can browse through the list and select the ones that get your attention. A short description is given and more information can be found in the references.

Input: To select a method or technique that suits your project, you first need to define in what phase you want to use the technique.

Result: After you have read the list of descriptions of potential useful techniques, you can check the references to find more information about the technique you like most and start using it.

Figure VII

Appendix D

For the final design of the tool that is intended to stimulate the use of scenarios during the design process, is of high importance to know what format they prefer.

Objectives:

3. Evaluate the example and concept tools from a practical point of view.
4. Discuss the weaknesses and strengths of each format.

Questions:

1. Is a tangible or digital tool more favoured?
2. Is it preferred to see only the result or all available techniques?
3. Does Panton prefer one or several suggestions for techniques that could be useful?
4. How much required input is best in practice (none to a lot of details)?
5. Is it valuable to have the option to add more techniques in time?
6. What goal must the tool meet (e.g. inspiration, decide complete strategy)?
7. Is the tool desired in a specific phase of the design process or in all phases?

Approach and planning:

1. This interview will be carried out on July 27
2. This session will be voice recorded for documentation.
3. Because of holidays, this interview will be held with one designer (Mario de Zeeuw) instead of two.

Programme:

1. *Define "tool"* (5 minutes)
   Before we start talking about the desired tool, it is of high importance to agree on the definition to prevent misconceptions. Therefore we will discuss the definition of method, tool and technique.
2. *Goal of the tool* (3 minutes)
   Next I will amplify on the goal of my tool so the designers are well-informed about the purpose and result of this interview.
3. *Example tools* (5 minutes)
   A couple of example tools that already exist are will be showed. These tools all share the same goal: help designers in choosing techniques for their design process in product development. They do not in particular help designers with scenarios in the design process. In spite of this some tools include techniques that could be useful when a tool only serves scenario development. These tools will be presented by clear pictures and I will give a short oral description.
   The tools I will include are:
   - IDEO Method cards: 52 cards that give suggestions of potential useful techniques.

- UsabilityNet Methods Table: online wizard that comes up with techniques after choosing a design phase and selecting one or more conditions.
- Input-output chart: by choosing your desired output from the first row and the available input from the left column, you will find one or more useful techniques.
- Design&Emotion Society Search Engine: this online search engine has three options to find a suitable technique, for instance by selecting a category or application.
- Generic Work Process Toolkit: online toolkit that includes a list of potential useful techniques for each phase of the design process.

4. *Discussion (5 minutes)*
   When all tools are presented and all questions about how they work are answered, I will ask the designers to express which tool they like and why. The example tools hopefully provoke a good discussion about the merits and demerits of each format.
5. *Concept tools (5 minutes)*
   Finally I will show the designers the concept tools. Though these tools are still very early concepts, I hope to get useful reactions for further development.
6. *Content (optional, 5 minutes)*
   If there is still time left and we did not discussed the content of the tool yet, I will ask for their ideas about the content of the tool. What kind of techniques they would like to include, what relationships they see between several techniques and so forth.