DESIGN STORYTELLING WITH FUTURE SCENARIO DEVELOPMENT; envisioning “the museum”

ABSTRACT
There are different ways to tell stories with design. This paper shows possibilities of telling stories by envisioning the future. Overall, design has the very ability to envision, visualize and express things that do not exist yet. We introduce the Future Scenario Development Design methodology as a process for research through design. This methodology consists of a six step scenario development approach, combined with a general conceptual design phase. The scenario of a (plausible and thinkable) future society provides the requirements, the opportunities and the constraints for the design. So, while the creative design process is free, an ‘anything goes’ and an ‘anything will apply’ approach will not ‘work’.

With a case study, based on the results of an Industrial Design Engineering Master course concerning the design of Future Museums, we show how this Design of the Future methodology is able to explain the present and future interplay between Society, Culture and Technology.

Eventually, the linkage of future scenario development and design, provides a powerful tool to investigate society with a combination of knowing (future based on trend analysis and expert opinion) and making (design). In short, by envisioning the future we can reflect on its past and present structure.

KEYWORDS
DESIGN STORY TELLING

There are different ways to tell stories with design; this paper shows possibilities of telling stories by envisioning the future. Overall, design has the very ability to envision, visualize and express things that are not there yet. As an old Chinese expression says ‘Unless we change the direction in which we are headed, we might end up where we are going’. Especially Design has the ability to change the direction in which we are heading: by envisioning the place where we want to end up. This ability comes with a responsibility that should be fostered, as Victor Papanek stated:

‘It is important to remember that architecture and design are the social arts par excellence. […] It is possible to avoid theatre and ballet, never to visit museums or galleries, to spurn poetry and literature and to switch off radio concerts. Buildings, settlements and the daily tools of living however, form a web of visual impressions that are inescapable.’ (Papanek, 1995, p. 174)

In this paper we show how the method of Future Scenario Development is connected to Design for the Future. With a case study, based on the results of an Industrial Design Engineering Master course concerning the design of Future Museums, we show how the Design of the Future methodology is able to explain the interplay between Society, Culture and Technology. Ultimately, we show how the Design for the Future eventually plays a role in a virtuous circle of (knowledge) creation, characterized by analysis and development.

FUTURE SCENARIO DEVELOPMENT

Design is always future oriented, ultimately dealing with artefacts and contexts that do not yet exist. However, for making plausible designs for the not so near future (for instance for over 25 years) one needs to envision a dedicated future design context. To envision the future, several forecasting techniques have been developed to stretch the time horizon beyond the common sense. These include (quantitative and qualitative) trend-analysis, (expert consensus) Delphi studies, expert studies, simulation, time-series, causal modelling and scenario writing (Porter et al., 1991). One of the most powerful of these
techniques, fit to product design, is scenario-development (Fahey & Randall, 1997). The advantages of scenario development that makes it especially suitable for design are its flexibility in time dimensions, details and imagination, and the possibility to include the results from other methods. The scenarios can be written text or visualized in any way, adapted to the underlying design problem. By writing and visualising multiple scenarios, designers can also take into account the inherent uncertainty of the current developments and the accompanied ambiguity of trends. And although one might discern typical and strong patterns in product development and product use, combined with other technical and social developments, tensions may arise, with unpredictable (but not unthinkable!) outcomes as a result (Schwartz, 1991).

The Master course where the examples of our case study come from is built around using explorative context scenarios. This scenario technique, based on the methodology developed for future energy business research by the Shell Strategy Group (2008), was adapted to the aims of product design, emphasizing the structure and visualisation of the scenarios (Eggink et al., 2009). The result consists of six successive steps.

**STEP ONE: ACTOR AND SECTOR.**

The Future Scenario development process starts with defining the sector which will be researched. This can be for instance a cultural sector, the food sector, or transportation. Then, an actor has to be chosen within that sector. The chosen actor will be the central focussing point for the development of scenarios, product concepts and strategic issues of the actor. This can be; a commercial company, a government body, an NGO or a special interest group, but it is essential that it is likely that future developments will affect the actor.

**STEP TWO: FOCAL ISSUE.**

Once the sector and the actor have been determined, it is crucial to map the problem definition and the question of the actor, who acts as the principal of the forecasting study. This question, for instance “what role do science museums play in education and entertainment in 2040?” is the focal issue that frames and guides the foresight study. In this example, ‘education’ and
entertainment (in a social context) are the main, but not the only issues, as they are related to other factors (work, transportation, consumption, living, income, health).

**STEP THREE: ANALYSIS**

Analysis of an industrial sector, commercial market or societal field (like agriculture, public transport or entertainment) related to the chosen actor, by identifying other main actors that operate in the same sector (See for an example of an actor map figure 2), as well as critical factors and main drivers of future developments. For further analysis these are mapped in an uncertainty/importance matrix. Items in this matrix that are identified as both important and uncertain, are the building blocks of different scenarios.

![Figure 2](image-url)  
*Figure 2 Strategic Space, Actor Map and Scenario Visual for the context of Science Museums. The chosen scenario is called ‘Culture of Excellence’, and is situated in an egalitarian society, combined with a societal perspective on Science that is characterized by knowledge [by Henk Soppe, Willem Haanstra & Vassilis Alexandrakis].*  

Items that are important, but also certain are called TINAs (There Is No Alternative) and will be part of every future scenario. Other ‘secondary’ items can either be neglected or used to make
scenarios livelier, recognisable and easily to adopt. The analysis in this step is based on (quantitative and qualitative) trend analysis, Delphi studies and expert opinions.

**STEP FOUR: STRATEGIC SPACE**
The next step is the development of a two-dimensional strategic space (See for an example Figure 2), which axes represent both the key long term uncertainties in, and the ‘drivers’ of the future of the field. These axes are derived/distilled from the important and uncertain items that were identified and ranked in the Uncertainty/Importance matrix. Sometimes related items can be grouped to include more aspects in the graph. An example of such a key uncertainty for the museum sector could be the extent by which museums will be funded publicly or privately, which is determinant for their role in society. See also Figure 2 for an example from the context of Science Museums.

**STEP FIVE: SCENARIOS**
Writing scenarios that fit with balanced developments and extremes in the strategic space. Scenario writing includes systematic analysis of how certain typical developments will work out for the specific combination of uncertainties indicated by the chosen scenario plot. It also includes creative writing and imagination. It is possible to write any number of future scenarios to cover more possible futures, however experience shows that three scenarios give sufficient coverage of a strategic space (see also Figure 2).

**STEP SIX: PRESENTING**
Presenting the scenarios visually. This can be done with
traditional collages and timelines, but also with future online newspapers, blogs, advertisements and even examples of future packaging. The challenge is to present the information appealing, accessible and consistent. See Figure 3 for an example of a scenario timeline visualisation.

**SCENARIO DEVELOPMENT AND DESIGN**

When the set of scenarios is developed and visualised, one of them will be selected to serve as a new future design context, posing specific requirements for the chosen actor. The actual design process is not in any case limited and can be derived from either theory or practice, as long as the designers are aware that they are making their designs to fit in the envisioned scenario context. During the design it is important not to try to ‘solve’ the chosen scenario, i.e. try to ‘design out’ aspects of the scenario that seem unwanted from a present day perspective, but to stay true to the envisioned future and its requirements and demands. The use of these type of scenarios has proven to be suitable for a wide range of design problems, from future Solar technology applications (Reinders et al., 2006) to electric mobility (Eggink & Reinders, 2013).

However, in a good scenario development process, attention should be paid to both technological advancements and societal factors and trends. For instance for museums, new technologies for displaying, scanning and printing techniques (including 3d colour printing of the pastiche of paintings) are providing opportunities for displaying collections in new ways, but also putting a strain on the concept of authenticity. At the same time the role of museums in society is due to change because of reduced government funding, competition of experience based leisure, and online content from all over the world. This emphasis on both technology *and* social issues makes the scenario method particularly suitable for design problems that are characterised by a strong cultural factor. Not in the least for one of the most important aspects in contemporary design; the relationship between technology and society (and her inhabitants), that elsewhere has been coined as one of the ‘grand challenges’ (European Commission, 2012).
We have argued that the scenario development method is suitable for the design practice of sectors with a strong social and cultural factor. With the following design case we will also show that the design of museums is particularly suitable to investigate the future interplay between Technology, Culture and Society. The history of the museum already shows that there is a strong relationship between, social developments, social and political demands, and the way museums are organized and operate. In the era of the enlightenment, museums started off as places to investigate and study nature, and to exchange knowledge within a privileged club of members. Technology played a role as enabler of this investigation, revealing more and more of the natural world to the human eye through microscopes, telescopes and later also electrical and radiation equipment. The Teylers museum in Haarlem (Netherlands) is a good example of a remnant of such a ‘natural philosophy’ museum as place of knowledge development (Figure 2). Another example in another era is the museum for entertaining the masses. In the period after the Second World War, technology development became the main driver of economic success. Society had a great belief in progress, propelled by technological innovations. Together with the increasing prosperity came the concept of leisure time, which was to be filled with amusement and amazement. This resulted in places where new technology could be encountered and people could have unprecedented experiences. The Philips Pavilion, designed by Le Corbusier for the world fair in Brussels and executed in 1958 was an example of such a place where the visitors were treated with a delicate show of integrated lights and sounds called Poème Electronique (Figure 2). A multimedia spectacle avant-la-lettre, developed by Le Corbusier, his assistant Iannis Xenakis and composer Edgar Varèse (Treib, 2009). Here the technology was no longer an enabler to investigate our environment like in the example of the Teylers museum, but rather a goal in itself.

These two examples show how the organisation and manifestation of the concept of museums can be understood in both cultural and technological terms and tell us something about the relationship between these two.
DESIGN CASE: THE FUTURE OF MUSEUMS

The future of museums was investigated within the course *Create the Future*. This course is part of the master curriculum Industrial Design Engineering, which consists of a set of mandatory courses that range from the past (Design Histories) via the contemporary (Design & Emotion) to the future. These are accompanied by electives in topics both from technology as well as behavioural sciences.

The course itself was set out as project oriented education (Ponsen & Ruijter, 2002), arranged around the museum theme. Total duration of the course was 10 weeks, part-time with a total workload of 10 European Credits. The first part of the course was dedicated to the future scenario development and concluded with a session where the groups presented the scenarios they created for the principal, including the Rijksmuseum Twente (the Netherlands), which participated in the project. In the second part of the course the students developed their design concepts within the scenarios they developed previously. During the course, additional input was provided by guest lectures from museum professionals. In total 30 students participated in the course, organized in seven working groups, resulting in seven different future designs from which we present three examples.

DESIGN EXAMPLE (1): THE DISTRIBUTED MUSEUM

In this project the main actor was the Rijksmuseum Twenthe (RMT), a general art museum based in Enschede, and also participant in the project. The focal issue was then formulated as “How should a future medium-sized art museum apply its resources to better meet the demands of the 2040 society concerning the leisure time and education activities?” The students chose a future context, i.e. one of the scenarios they developed during the first part of the course, in which creativity development played a decisive role, characterised by an integrating role of technology and a free economy. In this future context a lot of jobs are taken over by robot technology, making that only jobs that demand creativity and flexibility or a lot of interchange with other humans remain. The students state that: “Work related stress will […] disappear, but will be replaced by a
social pressure to explore new interests. The given right of choice will change into a duty to exploit this freedom*. Therefore the resulting museum concept was designed to foster creativity, inspiration and cooperation.

In the concept the museum expands and transforms into a network of communicating museum ‘islands’, each providing their own interface for inspiration and participation (See Figure 4). The islands can be traditional entities like other museums, galleries and art schools, but also commercial parties like enterprises, shops and associated artist workshops.

In this design the inhabitant of the future creative society can always encounter an instance of the distributed museum, as the students for instance showed in a visual of an interactive statue in a public space (See Figure 4). To stitch all these islands together, the students also developed a strong brand image for the central organization. The central museum itself remains in a role in guarding over the quality of the contributing islands and their content. To make this ballot process transparent, the central

*quote from John Stuart Mill
DESIGN EXAMPLE (2): THE MUSEUM AS A COMMUNITY

In our second example, the main actor was the Dutch Ministry of Science, Culture and Education. The focal issue that formed the basis of their research was “What is the role of Science Museums in the Netherlands in 2040?” The group chose a scenario in which society will be egalitarian and in which science is considered to be both a source of social knowledge and a social product, rather than a source of entertainment (See also Figure 2).

This scenario requires active participation of the museum audience in all museum activities. The students solved this by introducing the metaphor of the museum as a sports club. The museum then becomes a provider of space, knowledge resources and facilities. The visitors will become the members of the club who visit the museum on a regular basis to develop knowledge and skills, organised in teams and leagues. The concept that was presented consisted of a robot football club, with a central stadium, training facilities, workshops, and a historic collection of robots for reference and inspiration (Figure 5).

DESIGN EXAMPLE (3): THE MUSEUM AS A PROBLEM SOLVER

In our third example, the future of Natural History museums was taken into account. The students chose Museum Naturalis, located in Leiden as the main actor and formulated the focal issue as: “How can Naturalis in the future enthuse and teach
visitors about biodiversity and stimulate them to help counter the loss of biodiversity?“ In their solution business model of the museum was transformed from an educator into a problem solver. Not organised in a traditional consultancy business, but by involving the visitors of the museum (in this case children) in a creative process. The students visualised in a user scenario how children could interact with the collection and database of the museum to create new life forms that could help resolving the future electronic waste problem. In the scenario the proposed solutions were then simulated in a virtual environment, and the most successful creatures would serve as inspiration for the technology development process of the professional clients of the museum (See Figure 6 for a selection of slides from the scenario).

**Figure 6** In the future Natural History museum concept, children help to solve societal problems by designing new animal forms, inspired by the museum’s collection [by Mike Broekman, Luuk van Ewijk, Bernd Rutgers, Robin Vermeulen & Tjitte de Wolff].

**FUTURE DESIGN & KNOWLEDGE CREATION**

Now we showed how this project resulted in a set of different concepts for the museum of the future. In these future concepts, several perspectives were elaborated how museum organizations can overcome the challenges that they face today and that they expect to face in the future. One can say that the
future concepts create insight in the present situation by showing an alternative in the future. In this case the future scenario development process served as an analytical tool to contextualize and inform the design process. As a result, knowing and making became intertwined, the core of knowledge production.

This is in a way similar to the mechanism of how the analysis of history can be used as a tool to inform the design process. A brief example can illustrate this. Suppose that a student receives the assignment to design a solution for people who have to cross a river. In the work of mapping the requirements of crossing a river, the student can collect data about the amount of people that have to cross the river, the frequency of river crossing, crossing times, modes of transport, and so on. One can also ask river crossers what they want, or what they aspire. An important source for design information is however also the knowledge about existing solutions and practices. But it is not only the knowledge about actual and existing solutions (bridges, ferries, tunnels, jumping, etc.) that will give insight in the design problem, but also the historical trajectory that led to the existing solutions.

As studies in the domain of Science, Technology and Society (STS) studies have shown how the interaction between technical, social and cultural issues determine the development and success of a new solution (Kranakis, 1997), this trajectory with path-dependencies is a crucial source of information. In our example of crossing the river, one can imagine that in a specific social and spatial context people for a long time have been crossing the river with their bicycles on a ferry. From an efficiency perspective it can be good to introduce a tunnel, but from the social history of both river crossing and tunnels, one can foresee that the tunnel will be perceived as dangerous, expensive, technically risky, and scary.

So we are used to the process that knowledge of history and the developments that have led to the present day situation helps us to create insight in our current situation. With the examples from the future of museums project, we have shown that we can expand this process with a future (exploratory) component. The design of the future will then serve as a development tool in a similar circular process, raising awareness and insight in actual problems, but especially in the (often too easy) way actual

**Figure 7** Two Virtuous Circles; analysis of history creates insight in present situation, and design of the future creates insight in present situation.
developments are extrapolated in linear, and thus incomplete, manners. As a result, our method for the design of the future has the ability to inform the present day design problems (Figure 7).

DISCUSSION

Future Scenario Development is of course by its very nature subjective. The method itself provides a solution for this inherent uncertainty by the possibility to develop multiple scenarios. The translation of the scenarios into possible design concepts is then also subjective, which is in our example even more apparent because we worked with student designers in an educational setting. However the mere possibility to envision the future in a structured way opens up new perspectives that otherwise would stay concealed. For the design phase we do not propose a particular methodology, because this is dependent on the characteristics of the design case and also the abilities of the designers involved. However one should consider a method which explicitly addresses both Technology and Humanities aspects (Mader & Eggink, 2014). In future research, we want to investigate how the design phase is influenced by the parameters of the scenarios, and what design methodologies eventually make the best combination.

As such, we can propose the Future Scenario Development Design methodology as a process for Research Through Design. A term originally coined by Frayling (1993) for particular research in arts and design, and which is today generally understood as a process where the act of designing itself is explicitly used as a method to research a particular problem. Our method seems especially effective through the emphasis on visualisation and representation (of both scenarios and future concept design), which is put forward as an important component of the quality of a design research project (Aprile & Mirti, 2009).

CONCLUSION

The linkage of future scenario development and design, provides a powerful tool to investigate society. By envisioning the future in scenarios, and by designing products and systems that fit this future, we can reflect on societies’ past and present structure.
REFERENCES


