

Connecting to the future; using serious games and scenario development for responsible design



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Abstract

Design is a medium that allows for storytelling, at the same time design can be inspired, informed, or improved by stories. In Design Education, past year's efforts have been made to let the content speak more vividly to the students. We introduce the Future Scenario Development Play and Design methodology as a process for Research through Design. Based on the Future Scenario Development Design methodology (Eggink & Albert de la Bruheze, 2015), this scenario development approach aims at exploring futures that are more than just a few years ahead of us. We expanded the method with a serious game and a general conceptual design phase. The scenario of a plausible future, broken into three-time horizons (5, 15, and 30 years), provides the requirements, opportunities, and constraints for the design. The serious game SES (Scenario Exploration System) (Bontoux & Bengtsson, 2016) provides a safe sandbox for the students to explore two contrasting future scenarios of their own making. Through this half-day experiential exploration students empathise with relevant stakeholders by taking up their role. This approach allows the students to stumble upon the intricacies of their scenarios and set their own creative constraints for the conceptual design phase to follow.

With a case study, based on the results of an Industrial Design Engineering Master course concerning the design of the "Future of Food", we will show how this Design of the Future methodology is able to explain the present and future interplay between society, culture and technology. We will dive deeper into how the experiences from the game sessions influenced the design phase and eventually the design concepts presented by the students.

From the results of the case study, we can conclude that our proposed method provides the students with an effective arsenal of tools to use in their design process while offering them a well-rounded experience through which to envision, empathise with, design and create for the future.

Author keywords

Scenario Exploration System; Serious Game; Scenario Development; Responsible Design; Futuring; Future Scenario Development Design methodology

Introduction

In an interconnected and ever-changing world organisations are called to overcome challenges in a fast-paced way. To be prepared for future challenges organisations need to have a level of informed foresight. As Anna Valtonen notes: "The arrival of COVID-19 implies that there will be an even greater need for us to be able to address uncertainty and align ourselves with even more radical transformations. What new practices emerge, and how design can contribute to these changes, is a discussion we have only just begun." (Valtonen, 2020, p.523). To form this new alignment, it is important not only to formulate potential future scenarios but also to succeed at understanding them vividly. This process is complex, data heavy and often-times tedious therefore a structured method can help (Daalhuizen, 2014). Especially for the novice designers that students are (Dorst & Reymen, 2004).

Design by its nature is future-oriented since we use design to envision and create things that do not exist yet. While at the same time, when a design becomes reality, it helps shape the future.

As Göransdotter has stated so eminently: "design is not only – or even primarily – about making things that take on material presence in our lives. Even more, design is about proposing that things could be otherwise. It is about proposing that we could do things differently" (Göransdotter, 2020, p.301). Design education therefore needs to prepare the new generation of designers for challenges in the future. Challenges such as the uncertainty that comes with discussing about the future and the difficulty to try and predict potential effects a design might have on a rapidly changing environment.

In this paper we propose the Future Scenario Development Design & Play methodology aimed at helping designers vividly explain the interplay between Society, Culture, Economy and Technology in the potential futures they create. To expand future scenarios to their full social, economic, and environmental implications we use a combination of scenario building, tangible exploration, and practical design. This method allows designers to interact with the envisioned futures and struggle with their challenges. In this paper we will argue that this helps in creating better/fairer/more responsible/more inclusive results and designs.

In addition to highlighting our methodology, we present a

case study, based on the results of an Industrial Design Engineering Master course concerning the theme "Future of Food".

SES & future studies

Since humanity's early times humans have learned through games and stories (Andreu-Cabrera, 2010). Even though both stories and games today are considered primarily forms of entertainment they can be powerful teaching tools. Serious games have been used in a variety of educational purposes such as mechanical engineering (Sousa, 2020), collaborative ideation (Sousa, 2021) and socio-ecological dynamics (Orduña, 2020). Methods for applying (serious) storytelling in education and design have also been introduced in recent years (Lugmayr, 2017).

The serious game used in this paper has its origins in policy making and collaboration. Created by the Joint Research centre of the European Commission, the Scenario Exploration system (SES) has been used "...to engage stakeholders with foresight scenarios created to support the EU policy-making process." (Boutoux & Bengtsson, 2016). We have made several changes to the game mechanics and philosophy to apply it in the design field while keeping in line with the role-playing and turn-based strategic character of the game.

The SES version we used in this course can be described as a way to explore focal issues in future scenarios. It is designed to help players engage in systemic thinking, discover and create alternative futures, and create novel engagements between stakeholders. In the context of this course, the SES was used as a role-playing serious game where the students/designers had the opportunity to embody real stakeholders, discover blind spots in their future scenarios and consider the social, cultural and environmental consequences of their potential design.

At the same time the process of creating and playing a game added fun and enthusiasm in the course and allowed the students opportunities for serendipitous discoveries. We found out that students tended to empathise better with the futures they created and the people who would inhabit them, generating better insight into potential dynamics between stakeholders. Aspects such as counter-movements, friction between powers, unexpected events and social pressure were explored, painting a more realistic picture and helping them to avoid utopian/dystopian tropes.

Scenario Development Method

A scenario is a way to envision a possible and plausible future. By making different scenarios, designers can prepare for future events in an ever-changing environment (Göransdotter, 2020). The future is very uncertain, but for our design methodology it is not necessary that the future plays out in the way it is envisioned in a scenario. As Valtonen (2020) indicated, it is all about anticipating a possible future that might be radically different than our present day. A design for a certain scenario may have relevance for any kind of future. By tactically choosing scenarios, it is possible to capture, and design for, a wide spectrum of different futures.

To find these relevant, possible and plausible scenarios, a seven-step method was followed, building on the 6-step method in the Future Scenario Development Design methodology (Eggink & Albert de la Bruheze, 2015), which in its turn is an elaboration of the five-step explorative context scenario methodology (Eggink, Reinders & van der Meulen, 2009). In

our continuous effort to improve the methodology. Some alterations were made in order to incorporate the Scenario Exploration System (Bontoux & Bengtsson, 2016) serious game. Together this forms the Future Scenario Development Play and Design methodology presented here see Table 1.

At the end of this process the final scenarios are presented in a visual way and one scenario is chosen to continue within the design phase. It is important to note here that the students were asked to come up with daring and thought-provoking scenarios within the confinements of their chosen focal issue and initial research.

Table 1. Future Scenario Development Play and Design methodology.

Step 1	Focal Issue	A confined theme that is relevant within the context of the given area of interest (in our case food).
Step 2	Actors & factors	An actor network of stakeholders involved in the focal issue categorised in: Policy, Business, Civil Society Organisations, Academia and Citizen groups. Relevant aspects are also outlined.
Step 3	Uncertainty/ Relevance matrix	A matrix mapping the actors and factors based on their uncertainty and relevance on a two-dimensional space. Items that are identified as both important and uncertain, are the building blocks for the different scenarios.
Step 4	Strategic space	The two key long-term uncertainties are used to create a second two-dimensional space. For an example of a strategic space see Figure 1
Step 5	Scenario plots	Creation of three coherent and plausible scenarios are inspired by balanced developments and extremes in the strategic space.
Step 6	Scenario elaboration	Scenario Plots are fleshed out into full scenario narratives using the structure of three time horizons in the future, forming the basis for exploration.
Step 7	SES game session	Using materials from the 6 earlier steps an SES version is developed. Two contrasting scenarios are chosen to be explored in a 4-hour session.

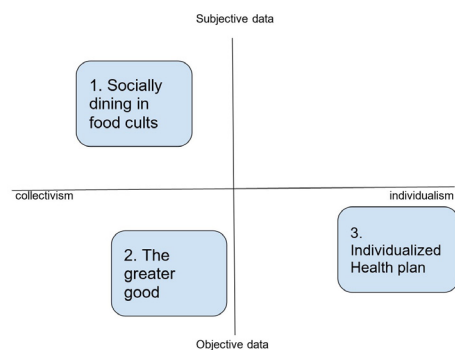


Figure 1. Strategic space example.

Game design//SES

We applied SES as a board game in order to encourage discussion and offer tangible representations of each action, resource and consequence. Yet playing a unique game for each team comes with an amount of necessary preparation. For the game/SES to be played, the outline scenarios of the game need to be created, player's roles as well as event dynamics need to be defined, and finally material needs to be printed.

Starting from the scenarios, these were adapted into three short 200-word stories representing the three time horizons and a short six-bullet summary for conciseness that could fit into cards. Next, four "explorers" (individuals leading existing organisations) were chosen to be played during the game by each of the players. Mostly, actors were chosen to represent a voice from the quadruple helix: Policymaker, Business, Civil Society Organization (CSO) and Academia. Each role has a different dynamic to play in the game, complementing each other from a broad perspective on dynamics at play in future societies. In addition, a large and existing group of individual citizens is chosen, to serve as the "public voice". One participant is assigned to express social judgement of the explorers' actions based on the biases of this group.

Finally, personas were developed for each of the 4 explorers forming a well-rounded character complete with personal information, values and professional goals. The personas were aimed at fostering empathy between the player(student) and explorer(character) as well as offering a framework based on which the player can interpret information and make decisions from the lens of the character. Using the U/I matrix, from the "important & certain region", six so-called mega trends were selected, factors that will be important in any future scenario. In addition, six what-if cards were defined, denoting large-scale events that could disrupt scenarios, to be used in case the game became stale. In addition, one student assistant was appointed for each session as a facilitator. Consecutively, 4-hour sessions were run see Figure 2. The goal of the games was to find the needs or wants of the future society and/or find an opportunity for design.

Directly after the game itself see Figure 3, a short facilitated reflective session was held per group. Making sure to summarise thoughts and get some discussion going about the long session. Events and actions taken in the game were reflected on, answering questions like: How diverse groups of people would feel during the scenario's playing out? Was this a desirable future? What could design do to influence this future, or the road towards it? In the final phase, it was up to the groups



Figure 2. SES game in process.



Figure 3. SES game board at the end of a game.

themselves, using their design knowledge, to make a design set into this future.

Design Case: Future of Food

Food as a broad topic is interconnected with both nature and humanity. Therefore, on a macro level food supply also faces challenges from population increase and climate change, while on a micro level food relates to personal health, culture, lifestyle, and preferences. The future of food is therefore an excellent carrier for the investigation of the future interplay between Society, Culture, Economy, and Technology. A lot of the current and future challenges that food faces (climate change, migration, cultural shifts) are complicated issues calling for transdisciplinary collaboration aimed at transformational change.

The future of Food was investigated within the master course Create the Future. The course itself was set out as project-oriented education (Ponsen & Ruijter, 2002), arranged around the theme of Food. It lasted ten weeks and needed the workload of five European credits. The course was split into two sections: building, exploring and visual presentation of future scenarios, followed by development of design concepts within these future scenarios. Forty students took part in the course organised in eight groups, resulting in eight unique design examples from which we have selected the two examples presented here.

Design Example 1: Lokaal is Lekker (Local is Delicious)

The students chose to focus on the future of Nutrition and Health for adults in the Netherlands. The focal issue was then



Figure 4. "Lokaal is Lekker" design.

formulated as: "How will our society evolve if global trade, mobility and large-scale food distribution becomes non-viable?"

Putting a lot of weight into availability of nutritional information, legislation, marketing, food availability and environmental factors, the students chose one of the four scenarios they developed in the course as their future context. This scenario is characterised by increased general population health and improved wealth equality in the context of a highly regulated market and full transition to local produce. In this future context a stock market crash has limited global trade and caused imported food prices to rise drastically. As a result, population growth and migration slow down while food supply becomes local. The envisioned scenario was also altered during the SES game. While an environmental crisis destabilised national food production, a community-spirit emerged from the collaboration among the explorers.

The students designed the structure of a Community-"Supermarket"-Greenhouse complex (see Figure 4 aimed at helping local communities with food independence in seven steps: Preservation of food and agricultural knowledge via a *Museum*, a *Greenhouse* for local and seasonal food, a *Community* area for collaboration and learning, *Educational* programs with experts, a *Restaurant* for tasting and gathering, a *Supermarket* offering the locally grown crops and *Delivery* for citizens with restricted mobility.

The complex aspires to be self-sustaining by integrating with the infrastructure of the community and reusing resources (such as compost, sewage and rainwater). While at the same time applying old and traditional agricultural methods such as crop rotation to preserve soil fertility.

Design Example 2: Food Delivery / Kitchen of the Future

The students chose to focus on the future of food distribution and delivery in the Netherlands. Based on the growing trend and normalisation of food delivery, attached to health and environmental challenges, the students formulated their focal issue as: "How will our society evolve if food delivery will be the norm instead of an exception?"

They chose one of the four scenarios they developed in the course as their future context. In this scenario, today's platform economy, where restaurants offer meals through a delivery platform, becomes the norm. Positioning themselves as a commodity for every family, these restaurants minimise end-consumer cooking effort while trying to preserve family-style dinners by offering family meal options. Citizens, in this scenario, put emphasis on convenience and are universally accepting of this new system. Everyday food has been indus-



Figure 5. design of "Kitchen of the Future"

trialised, minimising food waste and optimising efficiency. At the same time cooking ability is decreased within the younger generations and is treated as a niche hobby.

The future scenario was altered during the SES session when the need for strict food quality and nutritional standards regulation became clear. At the same time, the social aspect of cooking itself and not just eating was highlighted, prompting the students to envision alternatives for the cooking experience in VR as well as in cooking seminars, similar to today's sewing or woodworking seminars.

The students designed a food delivery system along with a living space arrangement considering emission minimization, preservation of food quality in the supply chain and social structures Figure 5.

Discussion

While envisioning the future it is easy to fall into our own biases and overlook social and environmental side-effects of a design. For us to think about the future and have future-oriented discussions in a structured and informed way futuring methods are needed, despite the level of complexity and uncertainty they force us to accept. An explorative process can therefore be beneficial to fully utilise future predictions, and in that regard, we succeeded in introducing this new method to students. We managed to get them some preliminary experience with futuring methods and by extension, role-playing and explorative methods at large, so that they can apply it when they are called to design for our future.

One remaining challenge is for the students to fully immerse themselves in the scenarios, which would be advantageous to help them empathise more with the situations at hand and the people involved. Not all groups achieved a satisfactory level of immersion. Compared to other methods, like day in the life scenarios, it helped them to look at all aspects of the theme. Students depended on their teammates to embody their characters fully, therefore some teams lacked the right degree of dynamics in their play. Of course, this kind of method requires practice, and it was apparent that students who already had some role-playing experience were easier to adapt and embody their characters. Interestingly even a small amount of experience appeared to be sufficient. When the second scenario was played (about 1,5h of play) students appeared more motivated and immersed. A break in between the two time horizons, with some discussions about the flow of the game, may have facilitated this improvement.

From a practical perspective, the course had been quite intensive on academic staff resources, as for every SES session a facilitator needs to be hired for a 4-hour session plus preparation. To lessen the burden on the resources, we would like to try expanding the teams to 6 students and allow the students to self-moderate their own sessions.

In the Design Phase, students focused on a need they discovered in their scenarios after the exploration phase. In our opinion a lot more can be done with addressing the responsibility of Designers regarding their creation (Eggink et al., 2020). A design is at risk of becoming one-sided, especially when real (future) stakeholders do not exist yet (Dorrestijn, Van der Voort & Verbeek, 2014), and tools to understand the influence on people can be quite suitable. An example of such a tool that fits this method well is the Product Impact Tool (PIT), that looks at different modi of influence of designs on people (Dorrestijn & Eggink, 2014; Raub, Dorrestijn & Eggink, 2018). In addition,

there is value in looking at the social implications of introducing such a technology, to establish some kind of dialogue with future societies. A tool that would be well suited for this is Constructive Technology Assessment (CTA) (Rip, Misa & Schot, 1995; Kuhlmann, 2012). In future research, we would like to explore how together these tools can add to the Future Design & Play method to allow for a more comprehensive way for responsible future design.

Conclusion

Futuring projects are complicated and uncertain yet they are needed for us to think about the future and have future-oriented discussions. An explorative matter is necessary, and in

that regard, we succeeded in introducing this new method to students.

Linking the previous six-step scenario method to the SES tool, creates a powerful way to envision the future and at the same time empathise with the stakeholders in the envisioned future situations. It allows for designing propositions that can be relevant for the future, even if the future does not play out as in the scenario. This allows designers to prepare for many futures.

The method worked to make scenarios more tangible, stretched the students' thinking and helped understanding the possibilities and uncertainties they will inevitably face.

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