

Approaches to Gaming the Future: Planning a Foresight Game on Circular Economy

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Abstract. Foresight is used to anticipate future developments and trigger responses to them. Serious games can enhance foresight by creating engaging experiences and increasing interaction between participants. In this paper I study how serious games can be used to generate new insights about alternative futures. I structure existing approaches based on their type and purpose and describe a case study of developing a web-based foresight game on circular economy. Based on the review and case study I suggest that foresight games that are balanced between the dimensions of idea generation, informing and experience are well suited to provide insights into the practices and strategy of the players' organisation.

1 Introduction

Major disruptions and systemic changes such as a transition to the circular economy require a long-term perspective and challenging of existing mind-sets. Companies and other organisations as well as whole industrial sectors need to anticipate future developments in order to be prepared for them [1]. While it is relatively easy to prepare for short term linear changes, longer term shifts in the socio-technical system and the impacts of technological disruptions are harder to cope with and are regarded as the “black hole of strategy” [2]. Foresight is an approach to support the longer term anticipation of alternative futures and for triggering responses to them [1, 3].

However, if not integrated well into the everyday activities of the organisations, foresight processes can become separate and laborious interventions with little impact [4–7]. The process may have too much focus on collecting information about the futures and less on creating future-orientation and a futures mindset. Too much focus on knowledge synthesis does not facilitate the challenging of existing mindsets. It omits the learning opportunities in a foresight process, which are crucial especially in the context of socio-technical transitions or major disruptions. Thus, the results of foresight are not internalised or utilised to their full benefit.

Serious games offer one solution to enhance learning in foresight. They can be used to support internalising knowledge, communicating and sharing ideas, increasing

and broadening participation and creating new futures knowledge [7, 8]. Games can create fun and engaging experiences that increase the interaction between participants to the foresight process as well as with the data gathered.

In this paper I study how serious games can be used to generate new insights about alternative futures. As a case study I analyse the development of a game aimed at creating new business models in the emerging circular economy. Circular economy (CE), a term rather unfamiliar just a few years ago, has now caught the imagination of thought-leaders across the world, and is taking shape as a viable, practical alternative to the current linear economic model. The challenging of the old mind-sets and opening up of new perspectives is especially important in the case of systemic changes, as in the case of the shift to the circular economy. The linear take-make-disposal model is coming to its end, which is due to diminishing availability of natural resources and rising environmental consciousness.

The idea of CE is based on systemic innovation meaning that the dynamics of how business will be done in future have to change. In CE, new actors and business models create emerging markets that offer innovative products and services to consumers. The circular economy business models are by design or intention restorative. Companies have to renew their operations in order to keep and gain competitive advantage. To make this happen, radical innovations and disruptive business models will be needed. The paradigm shift from a linear economy to a circular economy is a complex and multidimensional phenomenon. Understanding the changes in the way business is done in CE requires future-orientation and challenging of existing mind-sets. Innovating business models in this challenging and dynamic environment sets a big challenge while currently many actors and processes supporting these business models are still lacking. The game in the case study is aimed at supporting learning about the shift to circular economy and generating new applicable business models for the players. Thus, it is an example of how to use games to both anticipate and understand the consequences of a paradigm shift as well as support action in the present.

The article is structured as follows. After this introductory section I give a short review of what type of games have been used in foresight. Based on this I describe a categorisation of three purposes of foresight games: idea generation, informing and experience. Then I describe the process and challenges encountered in the foresight game development in the case study, focusing especially on problems arising from future-oriented nature of the game. I conclude with general discussion on using foresight games for generating insights about alternative futures.

2 Types of Games in Foresight

The IT-based tools to support foresight have been categorised into databases, prediction markets, social rating systems and collaborative scenarios [9]. Of these four categories, the tools in collaborative scenario development have most game-related characteristics in them. The most prominent example, and one that is most relevant for the scope of this paper, are MMORPGs (massive multiplayer online role playing games), such as the foresight engine by IFTF (Institute for the Future) [10].

These foresight-oriented games can bring together up to thousands of players to create, share and rate ideas about future development. However, the end result is often a relatively unstructured massive dataset, which then needs to be analysed and interpreted after the game [9].

Game-related characteristics, such as points and reputation levels, have also been applied in databases, prediction markets and social rating systems to motivate the collection and assessment of futures knowledge [9]. For example, the TrendHunter website¹, which crowdsources ideas and trends, has top lists for the best contributors. Likewise the iKnow Innovation, Foresight & Horizon Scanning Community² tracks member contributions. However, apart from collecting points or trying to “level up”, these systems lack game dynamics and a specific goal. They also face the same problem as the games in collaborative scenarios: how shape the gathered and assessed data into something that is of use in the present?

In addition to the four categories of IT-based tools mentioned by Schatzmann et al. [9], also computer simulation has been used to support foresight [11]. While simulation is more closely connected to forecasting, it can be used to support more qualitative futures work. Simulation enables games that mimic a real world situation, possibly taking place in the future. It has been used in so called business games [8]. The downside of simulation related to futures work is that it often requires fixing a lot of assumptions in place, effectively closing down the range of possible futures. In other words, it is useful for exploring and learning about defined futures, but often not flexible enough for defining futures.

IT-based games are of course not the only type of games played in foresight. Since participation is a key characteristic of foresight [3, 12], many methods have been created to facilitate the joint futures exploration of foresight exercise participants. These include card based games introducing different future developments, as well as board games for exploring futures. For example, both Foresight Cards³ and the Drivers of Change cards by Arup Foresight⁴ present different trends and future events to the participants, who then have to make sense of what it would mean for the topic at hand. Other card games such as Mobility VIP⁵ and The Thing From The Future⁶ are aimed at facilitating the imagination of alternative futures based on the frame provided randomly by the cards. Likewise, Board games such as the Foresight eXplorer⁷ and JRC Scenario Explorer⁸ support the creation and exploration of alternative future scenarios.

In addition to card and board games, improvisation, role-play and drama skits have been used in foresight [13, 14]. A notable example is the Sarkar game [14], which puts emphasis on learning and surfacing the assumptions about the current and future situations and systems. In the Sarkar game, the players adopt one of four roles – worker, warrior, intellectual and capitalist – and play through an everyday situation

¹ <http://www.trendhunter.com/>

² <http://community.iknowfutures.eu/>

³ <http://foresightcards.com/>

⁴ <http://www.driversofchange.com/tools/doc/>

⁵ <http://www.mobilityvip.com/>

⁶ <http://situationlab.org/projects/the-thing-from-the-future/>

⁷ <https://www.unteamworks.org/node/454008>

⁸ In development in the Joint Research Centre

related to the topic of the foresight exercise. Through role-play new insights about the problems, assumptions and preferences emerge, and they are discussed after the game.

There have also been performances using role-playing to simulate a future scenario, such as the case of *Byologic*⁹, which described the rise and fall of a biotech company. The *Byologic* story unfolded through social media, websites, different types of events and live-action theatre, demonstrating the possible implications and threats of biotechnology. In these types of performances the audience does not necessarily realise they are players in an elaborate game about a specific futures scenario.

3 Purposes of Games in Foresight

As the previous short review illustrates, games of various forms have been developed and used in foresight. In addition, they have been used for different purposes. I categorise the approaches to games in foresight roughly based on their emphasis on three purposes: idea generation, informing and experience (fig 1). By idea generation I mean the creation and aggregation of signals, trends and future developments without processing them further. Idea generation is emphasised especially in web-based games such as the Foresight engine by IFTF, although they also aim at enhancing learning through experiencing the future. On the workshop method side, the card games mentioned above are usually aimed at facilitating ideation.

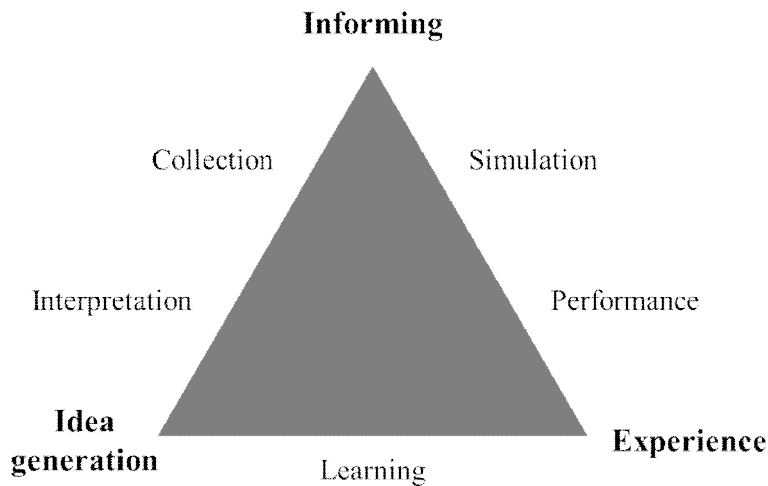


Fig. 1. Three main purposes of games in foresight.

By informing I mean the communication of existing ideas, scenarios, trends etc. In idea generation the future is open, while in informing it is closed [15]. The motivation behind informing is often educating the player about a certain topic, as is the case in

⁹ <https://www.singularityweblog.com/april-fools-the-truth-about-byologic%E2%80%8F/>

C2C BIZZ¹⁰, a game on circular economy. Close to informing, but more towards ideation is the collection of different signals, which is the main aim of databases such as TrendHunter, as well as services such as FutureScraper and SenseMaker [7]. Further towards ideation is interpretation, which exploits existing futures knowledge to create new insights and explore alternative futures, as is the case with the JRC Scenario explorer board game.

By experience I mean moving towards other “ways of knowing” [16], that is feeling, sensing and going through alternative future developments. Role-playing, especially the Sarkar game, is a good example of experiencing the future. Performances, such as the Byologyc example, are also ways of creating experiences about futures. Coming back to the IT-based tools, business games aim to produce experiences by simulating different real world scenarios [8]. In performances, business games and simulation the future is more closed and the emphasis is also more on informing than it is in role-playing.

The purpose of the game depends of course on its use. If the game is used only at the starting phases of an foresight exercise for gathering ideas, then emphasis on idea generation is suitable. On the other hand, if the idea is to present readymade scenario, then the emphasis should be on informing. However, in both of these cases putting more emphasis on experience could be useful. In idea generation it enables learning and in informing it supports internalising the presented futures knowledge. In the next section I describe an attempt to develop a game with a balance between all of these three purposes.

4 Case Study: Developing “Circulate.Now”

This section describes the process and problems the project team I belong to has faced when trying to develop a foresight game on circular economy called Circulate.Now. The process is still on-going. In our game development we set out to emphasise experience and learning. The aim was to design a game where players develop new ways of creating value for their company by tapping into the potential in circular economy. In the game players create new business ideas that are economically, socially and environmentally sustainable and aligned with future trends. Idea generation is an important part of the game, but the business ideas are also assessed and “implemented” in the game, and have an influence in how the game moves forward.

The players act as both CEOs and investors in the game, creating ideas and investing in others’ ideas. For each idea a self-assessment of key indicators is made, which is then validated by the other players. If many players disagree with an assessment, it is changed and the idea proposer gets a penalty for trying to mislead investors. The score is based on the indicators and divided into three parts: economic, environmental and social. The return on investment for a business idea is based on all three of these. There are also changing trends in the game, which impact how much

¹⁰ <http://www.c2cbizz.com/cradle-to-cradle-game/>

emphasis is put into a specific indicator. For example, if the regulations concerning landfill are tightening, increasing the amount of recycling is emphasised.

Below is a short narrative of the game play, set in the context of future of office furniture business:

The player adopts the identity of Frank Circular, a CEO of a company that currently makes office furniture. He joins his colleagues in the game, who have also created alter egos for themselves. Frank starts his round with a glimpse of the current situation. He checks the current trends: urbanization is continuing, people value access increasingly over ownership and regulations regarding landfill are tightening. He decides to create a new business idea for his company based on the trends.

He writes the headline and description of the idea and some other details, so other players can have a clear picture of what the idea is all about. He then assesses the impact using the indicator list. Impact to recycling? Sales? CO2 footprint? Finally he sets the amount of money to be invested in the idea and submits it so other players can see it too.

He still has some time left in the turn so he browses through the ideas that other players have submitted. Brenda Business has submitted an idea that sounds promising. Frank reviews the idea and decides to invest in that too. Also Rick Recycler has submitted an idea, but upon closer inspection Frank disagrees with some of the assessments made by Rick. He pushes the “disagree” button next to the indicator, submits a value he thinks is right and briefly argues why.

The time for the round is up and the next round starts. Frank gets a summary of how the ideas he invested in – his own and others’ – scored. Frank is happy. He got more money from the ideas than he invested and also earned an achievement: “Social entrepreneur” for creating an idea with high social impact. Compared to others, his score is average. He notices that he needs to pay special attention to environmental impacts.

The next round starts and there is now a new trend: digital nomads. Frank reads the short description about it and continues investing and creating ideas...

4.1 Challenges in Capturing the Future Development to a Web-Based Game

There are many challenges in developing a serious game such as ensuring that the game is fun, educational and visually appealing [8]. In our case there were additional problems related to the future-orientation of the game (see table 1). First, there was a need to simulate a future world without modelling it. Modelling would have required too much resources as well as data on an emerging shift, the implications of which are still largely unknown. We did not want to “get stucked with” a small number of alternative futures that the modelling would have resulted in, but rather wanted to

have multiple, surprising and open futures in the game. We resolved this by basing the future world on relevant trends and their implications. We gathered a trend pool from which to draw randomly a set of five trends for a game. The trends also change during the game, simulating a changing operational environment. The trends provide the weights to the indicators, therefore influencing the how different ideas are scored.

Table 1. Problems faced during the development of the Circulate.Now game.

Problem	Key question	Our solution in the game
Avoiding world simulation	How to have enough information about the future world, without simulating it in detail, and how to keep the future open?	Describe only the relationship between trends and key indicators, draw randomly from a pool of trends.
Solving assessment	How to assess the business idea without detailed information about the future world?	Player self-assessment validated by other players.
Ensuring actionable outcomes	How to facilitate the creation of new ideas, which are relevant for the present?	Assessment and ranking of ideas through gameplay, iteration of ideas.
From preaching to insight	How to teach the mindset of circular economy without being preachy?	Designing the scoring and gameplay based on the principles of circular economy to enable implicit learning.
Balancing accuracy and simplicity	How to have a scientifically solid depiction of circular economy while ensuring the game is simple?	Choosing what is essential for gameplay and leaving other aspects for later iterations of the game.

Related to avoiding simulation was the question of assessment. Since the game revolves around creating and assessing ideas for new business models for circular economy, it was important to create an easy and educational way of assessing these ideas. Again we did not want to create an elaborate computer model. Instead we decided to rely on player self-assessment with peer-control. Players assess their ideas themselves according to a set of indicators. Other players can disagree with the assessment, which creates a dynamic of self-control. Furthermore, the formula to calculate the score for each idea is hidden from the players and dependent on which trends are chosen for the game. Since the goal is not so much to win the game, but rather to collectively explore new business opportunities, we decided to try if self-assessment would work. As the game testing is still in progress, this remains to be seen.

The third problem we faced was to ensure that the ideation in the game results in actionable results, or at least something that is relevant for the players and does not require too much further analysis. This tension between exploration and exploitation is common in foresight and strategy development [17, 18] and also apparent in the examples of foresight games mentioned above. We tried to find the right balance by building assessment and ranking of ideas generated to the gameplay itself. This also enables the iteration of ideas during the game.

During the game players get an implicit idea of what works and what does not. We wanted to avoid explicitly telling the players what would be the best action in order to enhance the learning experience. In other words, we did not want to preach, but to enable the generation of own insights. This is especially relevant in foresight, since while the principles of future-orientation or foresight can be articulated [3, 15], they are more likely embodied through practice [19]. The aim of our game is that the players learn about circular economy and the implications of various trends, and can apply the insights gained also outside the game.

Emphasising the implicit learning experience led to the fifth problem: ensuring that the game represents circular economy and the implications of trends accurately enough while still keeping it simple enough for playing. At first we had a rather complex version of the game from a player viewpoint that included different categories of business models [20] and assessment of value to various stakeholder groups [21]. In the end we decided to focus on the indicators of circular economy [22]. The business model categories and stakeholder value was approached through these indicators, but not explicitly mentioned, as they were not essential to the gameplay. We also decided to start from a simple version and build more aspects of circular economy into it based on feedback from players.

In summary, the future-orientation of the game brought along problems related to the uncertainty and openness of futures. Our solutions are one attempt to respond to these challenges, but I do not claim that they would be the most appropriate in other contexts. Rather, the point is that during the development of a foresight game choices have to be made about how to approach the future. The key question is how open or closed are the futures i.e. how much is given and how much is left for the players to create? In the next section I discuss this question from the viewpoint of using games to generate new insights about alternative futures.

5 Discussion and Conclusion

Depending on their purpose, foresight games have different assumptions about the openness of futures, and thus different approaches to the pluralism of futures. Games that emphasise only idea generation assume – implicitly or explicitly – that there are infinite possible futures and imagination is the only restriction. At the other end, games that are aimed just to inform have narrowed the possible futures to a finite set of scenarios to be explored. In practice, most games fall somewhere in between these two extreme ends of the openness – closedness continuum.

Games emphasising experience take a slightly different approach regarding the openness of futures. They assume a finite number of possibilities, but try to simulate

the surprising and dynamic nature of future. Thus the focus is not on how open or closed the futures are, but rather what can be learned from them, not just through thinking them through explicitly, but also through living and experiencing them. Feelings, emotions, intuition, associations etc. play a key role in this experience. The learning process is not about learning to predict the future, but about orienting towards the future. This means being open to alternative futures, sensing weak signals of change and proactively working towards a preferred future.

Games, especially more formal ones such as IT-based games, require much more effort than working with post-its and pen, which are the common tools of a foresight practitioner. Therefore the benefit from them needs to be significantly greater. In addition to the possibility of introducing complex dynamics and easily gathering and analysing information, one of the key benefits of well-designed games is enhanced learning. A game that is balanced between the dimensions of idea generation, informing and experience provides insights into the practices and strategy of the players' organisation. This requires the game to be relevant for the players' context. A common approach to ensure this, used in the IFT foresight engine as well as in the Circulate.Now game, is to make the game easy to modify to different contexts.

Foresight games can be used in a multitude of situations to support the generation of insights about alternative futures. For example, the Circulate.Now game can be used to support a larger foresight exercise, as a stand-alone process to enable thinking differently about business opportunities or as a continuous part of the foresight culture of an organisation. The key thing is that it provides opportunity to experience and learn from alternative futures.

Finding the balance between idea generation, informing and experience in foresight games is challenging and dependent on the context. But once the balance is found the end result is a game that opens up new opportunities but is connected to the everyday work of the player – a game that can be used to generate new insights about alternative futures.

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