Moyo, Dambisa (2009). *Dead Aid: Why Aid is Not Working and How There is Another Way for Africa*, London: Allen Lane.

Sachs, Jeffrey D. (2005). *The End of Poverty: How We Can Make it Happen in Our Lifetime*, Foreword by Bono, London: Penguin.

Salemink, Oscar (2004). 'Development Cooperation as Quasi-Religious Conversion', in Oscar Salemink, Anton van Harskamp and Ananta Kumar Giri (eds.), *Development of Religion/The Religion of Development*, Delft: Eburon, 125–31.

Stiglitz, Joseph (2002). *Globalization and its Discontents*, London: Penguin.

Stirrat, Roderick. L., and Henkel, Heiko (1997). 'The Development Gift: The Problem of Reciprocity in the NGO World', *Annals of the American Academy of Political and Social Science,* Special Issue on 'The Role of NGOs: Charity and Empowerment' 554 (November): 66–80.

Meaning-making in Climate (Video) Games: An Appraisal Framework

Ayşem Mert, Sandra van der Hel

Today, *Candy Crush Saga,* a simple match-three puzzle with few characters and a very limited narrative, is played by half a billion people, whereas massive multi-player games such as *Second Life* involving online role-playing can attract up to one million regular users. The latter does not just 'allow' the players to create their own stories: the game basically consists of these stories. Video games, and specifically online simulation games (i.e. virtual games) constitute the most recent realm of collective story-telling and meaning-making. According to Lemke (2006), 'affective elements of meaning-making are far more prominent' in *virtual* games due to their complex relationship with reality, virtual reality, and hyper-reality. Furthermore, they have been more commercially successful than films on a global scale for over a decade (Lemke 2004). It is no wonder, then, that virtual games are being taken up by states, corporations and NGOs alike, as a new medium through which opinions are transformed, behaviour is predicted and manipulated, data are collected, and so forth. This functional dimension aside, games provide common narratives about ongoing conflicts and dilemmas in the contemporary world, even on issues as complex as climate change. They provide various scenarios through which decision-making is simulated and the players learn through trial and error. This transformative side of video games is as under-researched as most of the potential ideological and political effects of virtual media (Lemke 2004). Our contribution aims to partially address this deficit with regard to climate simulation games (henceforth

climate games), and proposes ways of understanding and analysing them.

Why study Climate Games?

Hajer and Versteeg (2005: 176) argue that, in addressing complex issues such as climate change, 'it is not the climate phenomenon in itself that is important, but the way in which society makes sense of this phenomenon'. The socially constructed meanings attributed to climate change materialise in the virtual worlds of climate games. Their increasing number and diversity provide a potentially fertile ground to explore the socially constructed meanings of climate change reflected in and articulated by them. We aim to propose a method through which climate games can be analysed, and illustrate how this approach can be applied, based on our preliminary findings.

How can we study 'play'?

Play is an important component of every human life and every culture. Dutch historian Johan Huizinga (1964[1938]) studied the relationship between 'play' and other concepts such as 'culture', 'decision-making' and 'language' in *Homo Ludens,* arguing that play not only precedes but also permeates all cultures and civilizations, continuously. He regarded play as a necessary condition of culture creation, without being 'born of scientific or logical thinking but [rather of] creative language' (ibid: 28). Secondly, Huizinga recognised that utility cannot be the aim of play: He highlighted its non-utilitarian, non-obligatory, unproductive and emancipatory nature. This position is in stark contrast to the concept of serious games (cf. Michael and Chen 2006) wherein playing has either an advertising goal or a learning function. So some of the questions that must be addressed about climate games pertain to their utility: Are climate games utilitarian in nature or sufficiently futile and enjoyable while generating new meanings?

If play is born of creative language, we should also relate language and play: In Ludwig Wittgenstein's (1976 [1953]) analogy between language and game, grammar would represent the rules of the game and a statement would be making a move. Wittgenstein's concept was, from its inception, about a plurality of language games: He is concerned with marking distinctions between a wide range of activities in which language users engage. We have found this relevant to our study, as players as much as the game developers have such a variety and plurality of reasons, ideological tendencies

and most importantly activities in their culture production practices. Furthermore, Jean-François Lyotard (1979) drew upon this concept of language games in his conception and rejection of metanarratives. Instead he argued for more modest and localised narratives that can dislocate the metanarrative by bringing into focus the singular event. This became important in our analysis as we have found climate games to be relatively nonlinear and heavily on the post-modern side with their plural storylines, interweaving scenarios and at times catastrophic surprises.

Finally, the interactive formation involved in the playing and production process brings the structure and agency problem back into the spotlight: As the player socialises into the game, the extent to which her formation as a political subject and as an agent changes, as does the possible outcomes of the simulation game. On the other hand, most decisions have an influence (and often an immediate one) while playing a game, which separate games from real-life decision-making. This is particularly important in the context of climate politics, as policy decisions often suffer from implementation deficits.

Based on these theoretical observations, we find the following research questions of critical interest for the study of climate games:

- How do the game narratives co-constitute climate discourses?
- What kind of subjectivities emerge when the game is played?

We infer that a problem as complex as climate change is structured into at least three layers, based on an earlier categorisation developed by Espen Aarseth (2003). The first layer highlights the relevant real-life structures: characteristics of the medium, and the subject positions of the game designers, producers and distributors. The second layer focuses on the content, and can be analysed using three logics[1] inherent in all climate games: The *logic of simplification* refers to the representation of real-world situations as constricted by the game medium. The *logic of problematisation* is the conception of the problem (of climate change) that is inherent in the game design. Finally, *goal attainment* refers to how the players can win the game and the strategies they can deploy to this end. When juxtaposed with the characteristics of the medium and the perceived subject positions of game-makers, this level of data allows us to analyse the structure of the game. The third layer consists of more specific details wherein symbols, trade-offs between political, economic and ecological necessities, scientific facts and uncertainties, and regional/international conflict and cooperation can be examined.

[1] We understand 'logic' as the basic unit of critical explanation, which refers to 'the purposes, rules and ontological presuppositions that render a practice or regime possible and intelligible' (Glynos and Howarth 2007: 15). In this context the logic of a practice describes, categorises, but also reveals the underlying conditions that make the practice possible and operational (also see Glynos and Howarth 2007, Chapter 4).

Changing Subjectivities

'Earth's future is in your hands! You are president of the European Nations and must tackle climate change from 2000 to 2100.'

Thus begins *the BBC Climate Challenge,* an online simulation game in which the gamer takes on the role of European President to reduce carbon emissions while achieving economic prosperity and staying popular enough to remain in office. Achieving this goal is possible, but it is made difficult by the rules and restrictions inherent in the game. *The BBC Climate Challenge* is just one of the games addressing the issue of climate change developed over the last decade, but there are as many as twenty such games of various difficulty levels available in 2015. A decade ago, studies pointed out that 'we actually know relatively little about the consequences of game play on the cognition of those who play them' (Squire et al. 2005: 34). Today, both popular and academic sources attribute positive impact to games designed for learning purposes: they are said to improve learning skills, raise awareness and even contribute to the formulation of new solutions to global problems (e.g. McGonigal 2011). This raises questions about the content of these games. How is the problem of climate change constructed in simulation games? What meaning is attributed to the causes and consequences of climate change? And how do these games narrate potential solutions to/protection from the advancing effects of climate change?

The socially constructed meanings attributed to the climate phenomenon 'materialise' through narratives, visualisation and storylines in the virtual worlds of climate games. Based on our research questions, our foci are the co-constitution of the climate discourses in the game environment and of subjectivities of game players.

The former relates to a well-established observation in cultural studies: that cultural artefacts do not passively express or reflect social phenomena, but should be viewed 'as specific machineries that produce, reproduce and transform social phenomena' (Carpentier and De Cleen 2007: 274). Making climate change the central issue of a game requires translation of the climate change phenomenon to the game medium. To capture the complex and multifaceted issue of climate change in the format of a game means determining the rules, defining the nature of conflict, and constructing quantifiable goals. The process of reproduction and transformation is based on explicit and implicit assumptions about the nature of the climate phenomenon and reflects those aspects which are perceived as essential. How climate change is problematised in games reflects common ideas and deep-rooted assumptions about its causes, consequences and dynamics. In other words, games co-constitute climate discourses.

The second co-constitution mentioned above is that of subjectivities. Various subjectivities are constructed in a game, as it 'creates cognitive and epistemological environments that position the player [in an environment of play] in meaningful ways' (Flanegan 2009: 6). Subjectivities are constructed explicitly and implicitly. Explicitly, the player takes up a certain position, aligning to a specific role and task. Implicitly, game play itself is part of the construction of subjectivities, as the structure of the game constrains the player's actions and confronts her with the results of her decisions. The decisions that can be taken by the player depend on the game's rules and the way it narrates (and simulates) 'reality'. Hence, the game allows certain ways of thinking but restricts others. Ian Bogost (2007: 57) refers to this phenomenon as 'meaning-making through the selective simulation of specific rules', wherein the game does not 'tell' a specific meaning to the players but 'rather [confronts] them with the results of their actions through the game rules,' making them complicit in this reality.

Structuring 'Game Data'

Over recent decades, dozens of computer games that take climate change as their central theme have been developed. We focus on four games: *BBC Climate Challenge, Fate of the World, CEO_2* and *Clim'Way.* These games were selected because

- they take place in different settings (global, city, business), which facilitates meaningful analysis of the discursive construction of climate change in diverse virtual worlds;
- the game world is comprehensive and detailed, which is necessary to draw inferences about the discursive construction of climate change (all games allow at least a few hours of gameplay);
- the games have been developed by (a combination of) different actors (NGOs, science, businesses).

All four games are easily accessible. *BBC Climate Challenge*, *CEO_2* and *Clim'Way* can be played online whereas *Fate of the World* is available on DVD and can be ordered online. All games can be played in multiple languages.

While the phenomenon of climate change is the main component of all four games, they differ substantially in their co-constitution of the climate discourses. In *CEO_2,* the gamer takes the role of the CEO of a large company and is tasked with reducing CO2 emissions while keeping customers and investors happy. In *Clim'Way,* the gamer

must implement city-wide energy policies to address climate change. Besides the 'game module', *Clim'Way* also has a 'context module' where the player can learn more about the causes, consequences and responses to climate change. *BBC Climate Challenge* focuses on European politics and global negotiations (Table 1). Finally, in *Fate of the World,* (the follow-up to the *BBC Climate Challenge),* the gamer acts as President of the Global Environmental Organisation (GEO) and has to deal with the challenges that arise from a world torn by climate change. Depending on the chosen scenario, the gamer has 60 to 200 years to achieve particular goals such as keeping global temperature increase below 3°C, keeping the global human development index above 0.5, and ensuring that no species become extinct. Economic downturns, regional conflicts and natural disasters are recurrent challenges.

We approached our data as multi-modal texts, paying attention to the way in which the graphics, the music, the jargon, the decision-making options, and the narration operate interdependently to establish a semi-fictional narrative in the game. We structured the data into three layers, which we introduced in the previous section. The first layer highlights the relevant real-life structures such as the characteristics of the medium, and the subject positions of the game designers, producers and distributors. This includes the authority on which designers and produces rely, and the extent to which they claim scientific accuracy.

The second layer focused on the games' content, the logics of *simplification* (representation of real-world situations), *problematisation* (conception of climate change), and *goal attainment* (how players win). The logic of simplification reflects how the complexity of climate change in general and decision-making in particular have been constricted in the game. By translating the complexity of social and natural phenomena into game narratives, various ideological choices are made, which reflect the meaning given to these phenomena (e.g. the specific context, setting and actors). Each game also puts forward a conception of the climate crisis inherent in the game structure. The logic of problematisation focuses our attention on the causes and consequences of climate change, the inherent conflicts of interest, and the possible solutions as assumed by the game. Finally, each game sets a goal to be achieved by the gamer and certain strategies can be deployed to achieve this goal. Examining these goals and strategies uncovers the dominant meaning given to climate change, as opposed to others which cause the players to lose.

The third layer consists of a finer analysis. Next to the main logics described above, each game contains a combination of signs, symbols, visuals, graphs, etc. that co-constitute a certain discourse. This includes the specific trade-offs (e.g. between politics, economics and ecology), relations between scientific 'facts' and uncertainties, and regional/international conflict and cooperation that are inherent in the narratives. Table 1 shows how this framework is applied to *BBC Climate Challenge*.

Table 1. An overview of layers of meaning-making in the *BBC Climate Challenge*

Layers of meaning-making	Description	Example
Real-life structures	Characteristics of the medium, subject positions of the game designers and producers, authority on which designers and produces rely, claims of scientific accuracy, etc	**Medium:** The *BBC Climate Challenges* is a flash game that can be played on the BBC website. The game is freely available and is thus accessible to a broad audience. **Producer:** The BBC commissioned and funded the development of the game. **Developer:** The game was developed by Red Redemption (UK), in cooperation with Oxford University's Centre for the Environment. **Purpose:** On its website, the BBC explains that the aim of the Climate Challenge is to provide 'a good introductory route into climate change and some of the issues this creates for governments around the world'. The medium of a game was chosen as a fun and accessible way to communicate the challenges of climate change. The game is tailored to an educated audience of 'young professionals'. **Science:** The game is based on the A1B scenario of the IPCC, which, as is explained on the BBC website 'provides a good mid-line scenario for carbon dioxide output and economic growth, [and] leaves scope for the player to either improve or worsen emissions levels'. The science behind the game, and the choices made in developing the game, are discussed on the BBC website. The BBC explicitly states that the game 'should not be taken as a serious climate change prediction'.

Content of the game		
Logic of simplification (game-world)	Representation of real-world situations as constricted by the game medium	**Context:** The game focuses on decision-making on climate change at the European and international level. The timeframe for the game is 2000–2100. **Setting:** The game has two different settings. The majority of the game is played in the 'policy screen' where the player selects policies for the European nations. Five buildings represent the different policy areas: National (=EU), Trade, Industry, Local and Household. The policy screen also shows some people representing the voters. The other setting is an International Roundtable on climate change attended by delegates from North America, South America, Europe, North Asia, South Asia, Africa and the Pacific. **Actors:** The player takes on the role of President of the European Nations. No other (policy) actors at the European level are represented, except for the 'voters', whose approval rating is given for every policy decision. At the international level, actors are the delegates from seven other world regions, including the player as delegate for the European Nations.
Logic of problematisation (game structure/ rules of the game)	Conception of climate change, causes and consequences, trade-offs, conflicts of interest, possible solutions	The problem of climate change is represented as a policy problem which requires action at the European and international level. CO_2 emissions are a central metric in the game and are presented as the (only) cause of climate change. At the European level, the game displays clear trade-offs between (economic) development, public opinion and climate change. As the game tutorial explains, the player 'must choose policies for the European Nations that balance the need to lower carbon dioxide emission with [the] responsibility to maintain vital resources'. At the international level, the game draws attention to the global scale of the climate change issue, the need to set international reduction targets, and the different positions of and challenges facing world regions.
Logic of goal attainment (game play: 'how the player is able to interact with the game-world and how that game-world reacts to the choices the player makes')	The goal of the game and the strategies that players can deploy to win the game (as well as strategies that cause the player to lose)	**Goal**: To tackle climate change while staying popular enough with the voters to remain in office **Game play:** The game consists of ten turns, each representing a decade between 2000 and 2010. In each turn the player can select up to six 'policy cards' in one or more of the five sectors mentioned above. Each policy card has a positive or negative effect on the available resources (money, energy, food and water), the environment (represented as CO_2 emissions), and voters' approval rating. Playing certain cards unlocks further options (e.g. new technologies). At each turn, the player is confronted with the results of her policy choices. Every three turns, international negotiations of emission targets take place. The player, as the European Nations delegate, can encourage other delegates to set a target by opting to subsidise their green policies. Between turns, the player is also confronted with (catastrophic) events, reflecting the unpredictability of climate change. **Winning/losing**: The game ends after ten turns, when the player is presented with an evaluation showing the results of her policy choices on CO_2 emissions and resources, as well as a final voter approval rating. If the approval rating falls to zero during the game, the player is voted out of office and the game ends. The game can thus not be 'won' (the player can only do better or worse in terms of balancing action on climate change with resource needs and approval rating), but it can be lost when the president is voted out of office.
Details of the game	Visuals, symbols, signs, graphs, tables, music, etc.	The game takes place in a highly abstract environment, representing five European policy sectors and the population of Europe in one setting, and the delegates of seven regions of the world in another. Between turns, a newspaper is shown which provides feedback on progress and public opinion. The impact of the player's actions on resources and CO_2 emissions is reflected in graphs and tables, using scientific language. Most game graphics focus on Europe. (Particular symbols can be analysed in further detail.)

Sources:

- The BBC Climate Challenge: http://www.bbc.co.uk/sn/hottopics/climatechange/climate_challenge/
- Background info on the BBC website: http://www.bbc.co.uk/sn/hottopics/climatechange/climate_challenge/aboutgame.shtml
- Interview with Gobion Rowlands, producer of the Climate Challenge: http://www.gamasutra.com/php-bin/news_index.php?story=12478
- Online directory of environmental games: http://ecoplayer.org/environmental-games/bbc-climate-challenge-climate-change-game

The next step in the analysis is to compare the different narratives emerging from this three-layered framework. For the purposes of this volume, we finish with the critical issue emerging from our approach and application of the framework.

Emergent issues

A central proposition in the field of game studies is the difference between narratives as expressed in traditional media and in games. Video games are inherently non-linear: On the one hand, they depend on decision-making; on the other, decisions have to pose real, plausible alternatives that are comprehensible to the players. It must be entirely reasonable for a player to make a decision one way in one game, and a different way in the next and reach different results. The ability of the player to take decisions and hence shape the story is critical. In climate games this results in overdetermination of agency and power: First, decidability and certainty are overstressed compared to any real-life situation. Climate change is not a phenomenon which is understood perfectly, and nor are the results of the possible decisions taken. Second, the decision-making processes are simplified, whereby the player's agency is overstressed: No leader on her own can effectively stop climate change in real life. Finally, the impact of decisions is overstressed: In games, (almost all) decisions make a difference. This characteristic of simulation games signals an important divergence between real-life politics and decision-making in games. The 'implementation deficit' that characterises real-life politics is practically absent in games, where the intended policy and the implementation of the policy fully correspond.

The assumption underlying this research is that it is important to understand the way societies make sense of the climate phenomenon. Games simplify, problematise and set a goal for the player; through these mechanisms, the (dominant) meanings attributed to the phenomenon of climate change materialise. However, games do not passively express or reflect phenomena, but actively produce, reproduce and transform. The methods proposed here aim to illuminate the co-constitutions of climate discourses (also see Mert 2013) and subjectivities of the player in climate games, and in doing so shed light on the meaning-making on climate change. The concluding question we would like to leave you with is *'how can we simultaneously remember/reflect on the fact that games (or fiction in general) are representations and not equals of real-life decision-making and yet study them?'*

REFERENCES

Aarseth, E. (2003). Playing Research: Methodological Approaches to Game Analysis, DAC Conference 2003, Melbourne, Australia. Retrieved from http://www.cs.uu.nl/docs/vakken/vw/literature/02.GameApproaches2.pdf

Bogost, I. (2007). *Persuasive Games: The Expressive Power of Videogames,* Cambridge: MIT Press

Carpentier, N. and De Clee, B. (2007). 'Bringing Discourse Theory into Media Studies. The Applicability of Discourse Theoretical Analysis (DTA) for the Study of Media Practises and Discourses', *Journal of Language and Politics 6* (2): 265–93.

Hajer, M. and Versteeg, W. (2005). 'A Decade of Discourse Analysis of Environmental Politics: Achievements, Challenges, Perspectives', *Journal of Environmental Policy & Planning 7* (3): 175–84.

Huizinga, J. (1964[1938]). *Homo Ludens; A Study of the Play-Element in Culture,* Beacon Press.

Lemke, J. (2004). *Critical Analysis across Media: Games, Franchises, and the New Cultural Order,* Paper presented at the First International Conference on CDA (Valencia).

— (2006). 'Towards Critical Multimedia Literacy: Technology, Research, and Politics', in M.C. McKenna et al. (eds), *International Handbook of Literacy and Technology,* Volume II, New York: Routledge.

McGonigal, J. (2011). *Reality is Broken: Why Games Make Us Better and How They Can Change the World,* USA: Penguin Group

Mert, A. (2013). 'Discursive Interplay and Co-constitution', in C. Methman, D. Rothe, and B. Stephan (eds.), *Interpretive Approaches to Global Climate Governance: (De)constructing the Greenhouse,* Oxford: Routledge, 23–39.

Michael, D., and Chen, S. (2006). *Serious Games: Games that Educate, Train, and Inform,* Boston, MA.: Course Technology

Squire, K. (2006). 'From Content to Context: Videogames as Designed Experience', *Educational Researcher 35* (8): 19–29.

Wittgenstein, L. (1976 [1953]). *Philosophische Untersuchungen. Philosophical Investigations,* translated by GEM Anscombe, reprinted, Blackwell.

Game references:

Climate Challenge. BBC; Red Redemption Team. 2006
weblink: http://www.bbc.co.uk/sn/hottopics/climatechange/climate_challenge/

CEO_2 The climate business game. WWF & Allianz; LGM Interactive. 2010
weblink: http://knowledge.allianz.com/ceo2/en_ext.html

Clim'Way. Cap-sciences. n.d.
weblink: http://climcity.cap-sciences.net/us/index.php

Fate of the World, Red Redemption. 2011