

# Winning the ‘game’ against sea level rise

## *A textual analysis of The Ocean Game*

Jessy de Cooker

The Ludification of Culture (MCMV17004)

Lecturer: René Glas

Student no.: 6566901 [j.decooker2@students.uu.nl](mailto:j.decooker2@students.uu.nl)

Word count: 3673

Citation style: Chicago Notes & Bibliography

Climate change is currently one of the main talking points in human civilisation and entails multiple problems for humanity. One of these problems are the impacts of climate change on ocean, coastal and polar ecosystems, and the human communities that depend on them.<sup>1</sup> Nearly two billion people living in coastal areas may be affected. According to the Climate Panel of the United Nations, today’s sea level is already about twenty cm higher than in 1900. It is projected to rise with 1.1 metres before 2100 if co2 emissions will not drastically be lowered.<sup>2</sup> However, politicians and policy makers have to decide on the political measures and the issue has to be addressed by scientists and voters in order for the necessity for behavioural change to be evident.

Researchers have been warning policy makers with reports on climate change and recently global protests have gathered millions of people, urging politicians to act according to the Paris Agreement.<sup>3</sup> So-called serious games have been ubiquitously used in this process, as it has increasingly been shown that contemporary digital games are used not only to entertain people, but also to “educate, train, and inform” them. Under the umbrella-term “serious games”, games with completely different aims or rhetorical strategies (such as newsgames and eco-games) are included.<sup>4</sup> These games are often designed as ideological spaces or conceptual play spaces, as worlds that aim to convince players of certain ideas.<sup>5</sup>

A recent example of a newsgame with this goal is *The Ocean Game - The sea is rising. Can you save your town?*<sup>6</sup> This game was developed by the American newspaper *Los Angeles Times* and

---

<sup>1</sup> IPCC, “IPCC Special Report on the Ocean and Cryosphere in a Changing Climate (SROCC)”, Intergovernmental Panel on Climate Change, accessed on October 4, 2019, 1, <https://www.ipcc.ch/site/assets/uploads/2019/09/SROCC-factsheet.pdf>

<sup>2</sup> Pörtner et al., “IPCC, 2019: Summary for Policymakers,” In: *IPCC Special Report on the Ocean and Cryosphere in a Changing Climate*, 48 & 49.

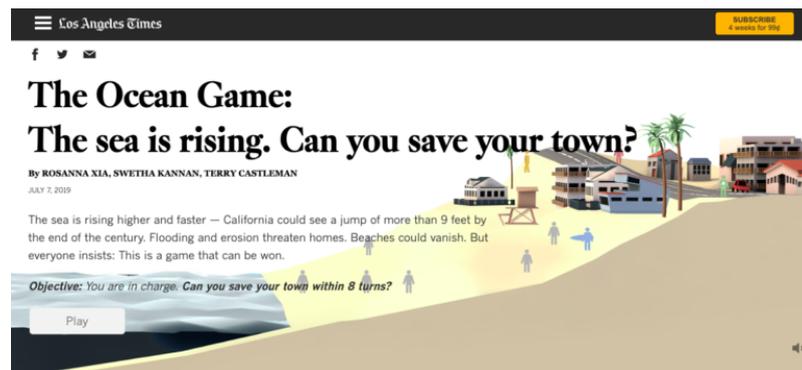
<sup>3</sup> Matthew Taylor, Jonathan Watts and John Bartlett, “Climate crisis: 6 million people join latest wave of global protests,” *The Guardian.com*, September 27, 2019, <https://www.theguardian.com/environment/2019/sep/27/climate-crisis-6-million-people-join-latest-wave-of-worldwide-protests>

<sup>4</sup> Valentina Rao, “How to Say Things with Actions I: a Theory of Discourse for Video Games for Change,” *DiGRA '11 - Proceedings of the 2011 DiGRA International Conference: Think Design Play* Volume 6 (January 2011), 8.

<sup>5</sup> Joost Raessens, “The ludification of culture,” In *Rethinking gamification*, ed. Mathias Fuchs, Sonia Fizek, Paolo Ruffino, and Niklas Schrape, (Leuphana: Meson Press, 2012), 107 & Daniel Hickey, Sasha Barab, Adam Ingram-Noble and Steven Zuiker, “First Things First: Design principles for worthwhile educational videogames,” in *Proceedings of the 8th International Conference of the Learning Sciences (ICLS) 2008*, 351.

<sup>6</sup> Rosanna Xia, Swetha Kannan and Terry Castleman. 2019. ‘*The Ocean Game - The sea is rising. Can you save your town?*’ [Safari]. *Los Angeles Times*. From this point onwards, this paper speaks about this game as *The Ocean Game*.

published on its website as part of a multimedia news production that combined text, video reports, infographics, photographs and *The Ocean Game* to widen the scope of reporting.<sup>7</sup> The idea for the game developed as reporter Rosanna Xia started looking into how cities up and down the coast were confronting sea level rise. It became clear that the people and details may have been different in each place – the stakes and existential questions were the same. In order to get people to truly “see the finite number of choices – and the costs and trade-offs inherent in every one of these choices”. It lets the player be mayor of a fictional coast town for eight turns. It’s aim is to come to a solution to the rising sea-level that endangers the town’s existence.



*Figure 1* Screenshot of the home screen of *The Ocean Game*.

Newsgames aim to create and influence discourse around real-life issues. However, questions arise around this possibility. Grace et al. describe that news move faster than developers, that the growth of mobile games has supported an increased focus on development speed of games. For newsgames, this means more developers and players are thinking about games as micro engagements of a few minutes, instead of a few hours or days.<sup>8</sup> Although creating understanding through experience certainly contributes to a more engaged examination and exploration of issues, critics of newsgames claim that reflection and critical distance suffer if users/players are absorbed in an immersive 'flow' of game-experience and enjoyment.<sup>9</sup> With this in mind, I will try to answer the question how the game rules and game mechanics of *The Ocean Game* invite reflexive engagement between the game and the player. Firstly, I will analyse how the game is situated on the schism of the serious gaming categories of newsgames and eco-games. Secondly, I want to distinguish which modes of engagement are on show in the game and I want to see how the game invites the user/player to explore and critically question underlying mechanisms, rules and dynamics – not only within in the game, but the underlying dynamics in the 'real world' as well?

<sup>7</sup> Rosanna Xia, “The California coast is disappearing under the rising sea. Our choices are grim,” *La Times.com*, July 7, 2019, <https://www.latimes.com/projects/la-me-sea-level-rise-california-coast/>

<sup>8</sup> Lindsay Grace, Mike Treanor, Chris Totten and Josh Mccoy, “A Case Study in Newsgame Creation: Why Game Designers and Journalists are Still Learning to Work Together,” (2016), 2.

<sup>9</sup> Anna Wiehl, “Newsgames: Typological approach, re-contextualization and potential of an underestimated emerging genre,” 11.

### ***The Ocean Game: in-between news and ecology***

Contemporary digital games do not merely have the aim to entertain players, but to “persuade people, raising their awareness and changing or reinforcing their attitudes and behaviour for the good of society”.<sup>10</sup> Digital games have encouraged support, sympathy, and called for action for several ecological issues. However in this paper, I will frame *The Ocean Game* as a newsgame rather than an eco-game. Although the makers acknowledge climate change as being fundamental issues, they do not seek to only contribute to ecological thought and “to make people become ecological citizens”.<sup>11</sup> The game namely simulates how things work by constructing models that people can interact with. This is a capacity Bogost calls “procedural rhetoric”.<sup>12</sup>

Newsgames potentially allow one not to only follow the news, but to interactively engage with the content and gain a deeper understanding of it.<sup>13</sup> While there is no accepted definition of the term “newsgame”, Plewe and Fürsich argue that there are certain characteristics of newsgames that scholars seem to agree on. According to them, there is agreement on definitions that newsgames: 1) are created in response to actual events; 2) are easy to access; 3) have persuasive intention; 4) are supplementary to traditional news.<sup>14</sup> *The Ocean Game* is accessible via the *LA Times* website through a special-assigned webpage and a widget in the article that directs the reader towards the game webpage. This approach provides new opportunities for telling stories, but also raises new challenges. It has been argued that the different media formats should complement rather than repeat one another.<sup>15</sup> According to Xia, the game aims to “give readers the chance to make these emotional and strategic decisions themselves”.<sup>16</sup> Games offer compelling storytelling opportunities. They can simulate systems, where different outcomes result from different choices. They have the possibility to create a sense of emotion and urgency in the players and connect them with experiences they have never encountered in their actual lives. As Sisi Wei claims, “our job as journalists is to inform the public. By using emotion and empathy, games allow us to inform readers in a new way, one they both remember and understand.”<sup>17</sup>

---

<sup>10</sup> Joost Raessens, “Collapsus, or how to make players become ecological citizens,” in *The Playful Citizen: Civic Engagement in a Mediatized Culture*, ed. René Glas, Sybille Lammes, Michiel de Lange, Joost Raessens and Imar de Vries, Amsterdam: Amsterdam University Press, 92 & David Michael and Sande Chen, *Serious Games. Games That Educate, Train, and Inform*, Boston, MA: Thomson, 2006, 23.

<sup>11</sup> Sherilyn MacGregor, “Ecological citizenship,” in *Handbook of political citizenship and social movements*, ed. Hein-Anton Van der Heijden, Cheltenham: Edward Elgar Publishing, 2014, 120.

<sup>12</sup> Ian Bogost, Simon Ferrari and Bobby Schweizer, *Newsgames: journalism at play*, Cambridge: The MIT Press, 2010, 6.

<sup>13</sup> Bogost, Ferrari and Schweizer, *Newsgames*, 52.

<sup>14</sup> Christoph Plewe and Elfriede Fürsich, “Are Newsgames Better Journalism?”, *Journalism Studies* 19:16 (2018), 2472-2473.

<sup>15</sup> Neil Thurman and Ben Lupton, “Convergence calls: Multimedia storytelling at British news websites,” *Convergence: The International Journal of Research into New Media Technologies* Vol 14(4) (2008), 445.

<sup>16</sup> Kirsten Hare, “The LA Times made a simple game to help readers understand a complicated issue.” Poynter.org, accessed on October 4, 2019, <https://www.poynter.org/reporting-editing/2019/the-la-times-made-a-simple-game-to-help-readers-understand-a-complicated-issue/>

<sup>17</sup> Sisi Wei, “Harnessing the Power of Video Games for Journalism,” interview by Rose Eleveth, Nieman Storyboard, January 11, 2016, <https://niemanstoryboard.org/stories/harnessing-the-power-of-video-games-for-journalism/>

Newsgames do this as they are often designed as ideological spaces, as worlds that aim to convince players of certain ideas.<sup>18</sup> Joost Raessens uses *Food Force* to explain his concept of ideological spaces.<sup>19</sup> Closer inspection yields that the game is built on the metaphor of the West as the helping parent.<sup>20</sup> *Food Force* appeals to our sympathy, but it particularly shapes the paradigms of guilt and responsibility.<sup>21</sup> Education games, a different form of serious gaming, follow the same process with the concept of conceptual play spaces. As elaborated by Barab et al., conceptual play spaces are contexts that leverage what is known about how people learn, the metaphorical power of narratives, and game design principles, to establish an educational, entertaining, and personally transformative context for learning.<sup>22</sup> As Hickey et al. claim, these conceptual play spaces are characterized by four modes of engagement: conceptual, immersive, transactive and reflexive engagement<sup>23</sup> Such participation enhances knowledge about legitimacy (established by conceptual engagement), intentionality (established by immersive engagement), consequentiality (established by transactive engagement), and accountability (established by reflexive engagement).<sup>24</sup>

The form of reflexive engagement is essential to newsgames, Anna Wiehl argues.<sup>25</sup> As they are mostly are designed in 2D graphics with often extreme stylization of current events, newsgames prevent unthoughtful immersion into the game environment and the fact that they *presuppose* a thorough consideration of possible actions within this restricted framework, they are naturally *reflexive*.<sup>26</sup> Depending on the kind of engagement, the risk of (unintended) uncritical absorption in ludic enjoyment and gaming-thrill as well as the risk of massive subversive gameplay can be minimized.<sup>27</sup> However, Grace et al. claim that this engagement is affected by the contemporary mobile game environment, as web games are not dominated by Flash Technology to run games in web browsers.<sup>28</sup> This has led to a rapid growth in mobile games, which are playable on web browsers and mobile devices. For newsgames, this means more developers and players are thinking about games as micro engagements of a few minutes, instead of a few hours or days. This approach treats games more like disposable artefacts.<sup>29</sup> A development that likely alters the thoroughness of the engagement players have with newsgames.

---

<sup>18</sup> Joost Raessens, "The ludification of culture," In *Rethinking gamification*, ed. Mathias Fuchs, Sonia Fizek, Paolo Ruffino, and Niklas Schrape, (Leuphana: Meson Press, 2012), 107.

<sup>19</sup> Deepend. 2005. *Food Force*. [browser]. United Nations World Food Programme.

<sup>20</sup> Raessens, "The ludification of culture," 107.

<sup>21</sup> Ibid.

<sup>22</sup> Sasha Barab, Melissa Gresalfi, Tyler Dodge and Adam Ingram-Goble, "Narrativizing disciplines and disciplinizing narratives: Games as 21st century curriculum," *International Journal of Gaming and Computer-Mediated Simulations*, 2(1) (January-March 2010), 17-18.

<sup>23</sup> Hickey et al., "First Things First", 351.

<sup>24</sup> Hickey et al., "First Things First", 352.

<sup>25</sup> Wiehl, "Newsgames: Typological approach," 12 (Emphasis in original).

<sup>26</sup> Ibid. (Emphasis in Original).

<sup>27</sup> Wiehl, "Newsgames: Typological approach," 11.

<sup>28</sup> Lindsay Grace, Mike Treanor, Chris Totten, Josh Mccoy, "A Case Study in Newsgame Creation: Why Game Designers and Journalists are Still Learning to Work Together," (2016), 3.

<sup>29</sup> Lindsay Grace et al., "A Case Study in Newsgame Creation," (2016), 3.

Participant observation has shown that the effectiveness of newsgames in creating more knowledge gained from gameplay, enjoyment, or subsequent reading of related news is not affected by the realistic features of a specific newsgame.<sup>30</sup> This leaves to wonder about the effectiveness of the newsgaming engagement and the possibilities newsgames have in order to fully deliver a message or teach a lesson to players.

### **Method: post-structuralist playing with the Active Player Model**

Studying *The Ocean Game* as a case study provides answers to questions about the ways in which current newsgames aim to engage the players. It shows how the game lets them reflexively explore and critically question underlying mechanisms and dynamics – not only within in the game, but the underlying dynamics in the 'real world' as well. In order to answer the main question how *The Ocean Game* aims at enhancing this form of engagement, this paper performs a textual analysis on the game in order and approach it as an object from which it is possible to analyse and categorise the textual elements.

By playing and analysing the game as a text via the post-structuralist manner, I will focus on the processes of sense-making of the rules and mechanics while playing this game, the context in which it is played, and how it may be understood and reflexively engaged with by its players.<sup>31</sup> It has therefore be played from the perspective of what Smith calls the “susceptible player”, a player model that implies that the player’s post-gaming behaviour is predictably influenced by features of a game played. A violent game may not be considered alarming, as it rewards non-violent approaches.<sup>32</sup> By describing which types of engagement can be identified from playing the game as a susceptible player, this paper will try to recognise how the game-rules and mechanics potentially prioritise reflexive engagement with *The Ocean Game*.

---

<sup>30</sup> Jih-Hsuan Tammy Lin and Dai-Yun Wu, “Newsgames for the Greater Good: The Effects of Graphic Realism and Geographic Proximity on Knowledge Acquisition and Willingness to Help,” *Journalism & Mass Communication Quarterly*, (March 2019), 4.

<sup>31</sup> Clara Fernández-Vara, “The Whys and Whereofs of Game Analysis,” in *An Introduction to Game Analysis*, New York: Routledge (2014), 11.

<sup>32</sup> Jonas Heide Smith, “Plans and Purposes: How Videogame Goals Shape Player Behaviour,” PhD diss., Center for Computer Games Research, IT University of Copenhagen, February 9, 2009, 25.

### **Engaging with sea level rise in *The Ocean Game***

As previously mentioned, Hickey et al. identify four modes of engagement that possibly influences player participation: conceptual engagement, immersive engagement, transactive engagement, and reflexive engagement.<sup>33</sup> In *The Ocean Game*, the makers established all engagement forms, which are addressed to the player accordingly:

#### *Immersive engagement*

Immersive engagement involves situating the task in the context of a larger dramatic storyline in which the player participates.<sup>34</sup> Already in the opening window of the game, the player's immersive capacities are being addressed as the game itself by a textual introduction is situated in the current sea level problems.<sup>35</sup> He is informed that the sea is "rising higher and faster", that California could see "a jump of more than 9 feet by the end of the century" and that "flooding and erosion threaten homes and beaches could vanish". He reads that "everyone insists: This is a game that can be won". The player is drawn in by the claim that his participation in the "game" can lead to winning it. What this particular game is, is not mentioned explicitly. However, it may be assumed that "winning" it might lead to the player influencing the bigger picture of climate change and sea level rise. Also, the player is assigned as the one "in charge". The player is experientially situated within the play space, with a legitimate goal in changing the narrative of coastal Californians.

This call-to-action and role-assignment by the game developers is likely to influence the intentionality of the players actions. Knowing that he is the one who can possibly stop the threat of the rising sea, he may engage with the game in a manner that has a positive impact on the game world.

#### *Conceptual engagement*

Conceptual engagement involves enlisting target concepts in the service of solving a particular task.<sup>36</sup> In *The Ocean Game*, this is called-upon to the player in the opening window as he is made aware that he is playing a game against the rising sea. In order to do that, he is given eight turns, each in which he is presented with three playing options: 1) the player can build a rock wall to protect the homes; 2) The player can add sand to widen the beach; 3) The player can hire a consultant for more information, which results in the advice to consider buying out beachfront homeowners, to "to get them out of harm's way". After this option is changed to the possibility of proposing a buy-out plan.<sup>37</sup>

---

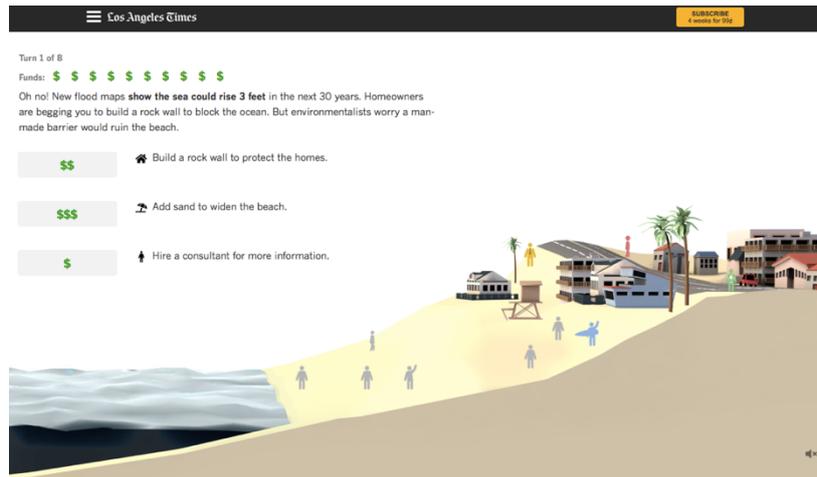
<sup>33</sup> Hickey et al., "First Things First," 351.

<sup>34</sup> Ibid.

<sup>35</sup> See Figure 1 above or see Figure 1 in the Appendix.

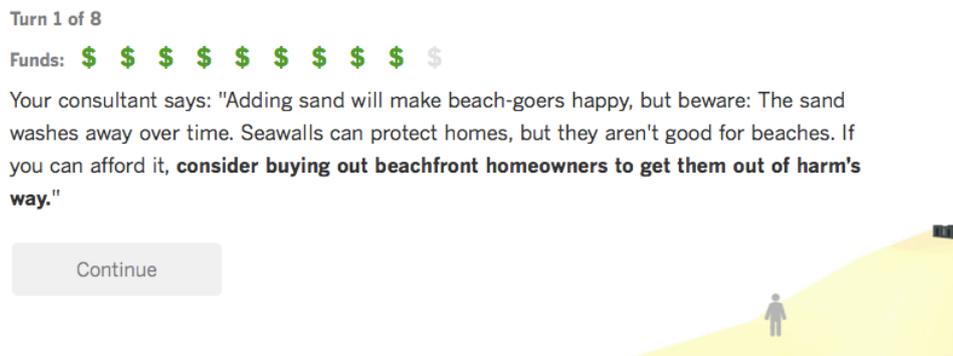
<sup>36</sup> Hickey et al., "First Things First," 351.

<sup>37</sup> See Figure 2 below & Figure 3 in the Appendix.



*Figure 2* The “three playing options” of *The Ocean Game*.

The player is very limited in his participation by this limitation in freedom by the game-rules. He has no other options than the textual one’s given to him by the game software. He can merely click on preset choices. In this way, the game seems to deliver a message, according to the strategy of serious games, that there is a certain legitimacy around the urge of experts on sea level rise. There are not many options left in order to influence the situation.



*Figure 3* The buy-out advise

### *Transactive engagement*

Transactive engagement occurs when player actions affect another, and at the same time, impacts the actor.<sup>38</sup> In *The Ocean Game*, the player can identify drawn images of people at the beach or in the beachfront area. He cannot engage directly with these “people”. When he chooses one of the preset choices, he is spoken to by the people. They react according to different personas to the actions of the player. He is being spoken to from the subsequent perspective of an environmentalist, a homeowner

<sup>38</sup> See Figure 2 below & Figure 3 in the Appendix..

and a surfer.<sup>39</sup>



*Figure 4* “People” engaging with the player of *The Ocean Game*

This form of engagement aims to position the personality of the player in the game environment. The player-mayor must use his own beliefs and understanding of the portrayed groups in order to address the sea level rise and choose the solution that fits these views. The outcome of this strategy has consequences – when a player first pursues the options of building a sea wall and adding sand to the beach, following the pleas from homeowners and surfers, he ends up with nothing as the game mechanics destroy the wall and the added sand washes away. Accordingly, it presents the value of consequentiality to the player, as he is confronted by angry citizens when these proposed solutions end in failure.

#### *Reflexive engagement*

Reflexive engagement involves the players examining how their participation changed the environment. As the player is confronted by angry citizens, he can only succeed in buying-out the homeowners when the sea is near their doorsteps. This by the game mechanics created strategy shows that the game developers may predict how future events will take place at the Californian coast. The fact that one cannot find an in-game solution that fixes the climate change problem and lessens the sea level rise, possibly enables the reflexive engagement. In this sense, *The Ocean Game* is a typical example of a newsgame, being a rule-based artefact that presupposes thorough consideration of possible actions within this restricted framework.

The way in which the game only lets its players engage with its contents via pre-edited questions may leave a sense that there is no escape in this problem. The player then may be triggered to identify this metaphor and see that there is no way in escaping the sea level rise. He is then using this understanding to interrogate the dynamics of the environment problem as well as his own role in influencing this issue.<sup>40</sup>

<sup>39</sup> See Figure 4. The environmentalists state that “adding sand and building rock walls aren’t natural”, the homeowners claim that “sea walls will protect my home” and the surfers want to protect the beach: “This is my favourite beach. Protect the beach!”

<sup>40</sup> Ibid.

The player may be left with more knowledge on the accountability of politicians on the sea level rise and left with ways in which to argue for the inescapability of the current climate problems. The coverage via this newsgame by the *LA Times* takes a more procedural rather than a narrative approach. The game is divided into different sections of the sea level rise and effects of a decision. Each section offers a textual description and a background visual interaction of the effect. The fact that a player cannot finish the game in one move and that he is only congratulated when getting to the solution built-in by the developers, also shows that the procedural character of the reflexive engagement is of importance to the game developers.

### **Gaining a deeper understanding through *The Ocean Game***

Concluding, *The Ocean Game* as newsgame within a form of multimedia storytelling has the goal to interactively engage with the content to gain a deeper understanding of it.<sup>41</sup> The game encourages players to interrogate and reconcile their own beliefs about sea level rise with the opinions presented in a game, and this paper has shown that it uses different kinds of designed engagement forms to achieve this goal. *The Ocean Game* claims that the player is in charge and therefore supports immersive engagement. It raises conceptual engagement by not giving the player many playing opportunities and it induces transactive engagement by built-in human perspectives that are communicated by caricatured people. These are all forms of engagement that lead up to reflexively engaging with the game, a form of importance given the average engagement time that players have with newsgames. However, it may be argued that this dynamic is not as clearly presented to the player. He is congratulated when finishing the game on moving “the coastal homes out of harm’s way”. He is also encouraged to read “the full story” in the multimedia article, in which he reads about the same proposed solutions and the same ideal solution. It may be argued that the abovementioned modes of reflexive engagement in *The Ocean Game* have the function of involving players with the same content that can be read in the main article.

### *Multimedia storytelling and the placement of newsgames*

Multimedia storytelling presents journalists and web developers with ubiquitous opportunities by presenting the opportunity to combine news with gameplay. However, the different media formats should complement rather than repeat one another, there is no aim at playing a newsgame and later in the article reading about the same subjects or solutions. *The Ocean Game* in this sense provides a playful introduction to the solutions of sea level rise in California. Below the game content, the information gained by playing the game is repeated mostly in writing. This opens up discussion and further research on the placement of newsgames in journalistic articles and an evaluation on which engagement this place in the article mostly can provoke.

---

<sup>41</sup> Bogost, Ferrari and Schweizer, *Newsgames*, 52.

## References

- Barab, Sasha, Gresalfi, Melissa, Dodge, Tyler and Ingram-Goble, Adam. "Narrativizing disciplines and disciplinizing narratives: Games as 21st century curriculum." *International Journal of Gaming and Computer-Mediated Simulations*, 2(1) (January-March 2010): 17-30.
- Bogost, Ian, Ferrari, Simon and Schweizer, Bobby. *Newsgames: journalism at play*; Cambridge: The MIT Press, 2010.
- Fernández-Vara, Clara. "The Whys and Whereofs of Game Analysis." In *An Introduction to Game Analysis*, 1-22. New York: Routledge, 2014.
- Hare, Kirsten. "The LA Times made a simple game to help readers understand a complicated issue." Poynter.org. Accessed on October 4, 2019. <https://www.poynter.org/reporting-editing/2019/the-la-times-made-a-simple-game-to-help-readers-understand-a-complicated-issue/>
- Hickey Daniel, Barab, Sasha, Ingram-Goble, Adam and Zuiker, Seven. "First Things First: Design Principles for Worthwhile Educational Videogames." In *Proceedings of the 8th International Conference of the Learning Sciences (ICLS) 2008* (Part 1). 350-357.
- Grace, Lindsay & Treanor, Mike & Totten, Chris & McCoy, Josh. (2016). "A Case Study in Newsgame Creation: Why Game Designers and Journalists are Still Learning to Work Together."
- Lin, Jih-Hsuan Tammy, and Dai-Yun Wu. "Newsgames for the Greater Good: The Effects of Graphic Realism and Geographic Proximity on Knowledge Acquisition and Willingness to Help." *Journalism & Mass Communication Quarterly*, (March 2019).
- Intergovernmental Panel on Climate Change. "IPCC Special Report on the Ocean and Cryosphere in a Changing Climate (SROCC)." Accessed on October 4, 2019. <https://www.ipcc.ch/site/assets/uploads/2019/09/SROCC-factsheet.pdf>
- Michael, David. and Chen, Sande. *Serious Games. Games That Educate, Train, and Inform*. Boston, MA: Thomson, 2006.
- MacGregor, Sherilyn. "Ecological citizenship." In *Handbook of political citizenship and social movements*. Edited by Van der Heijden, Hein-Anton. 107-132. Cheltenham: Edward Elgar Publishing, 2014.

- Plewe, Christoph and Fürsich, Elfriede. "Are Newsgames Better Journalism?" *Journalism Studies* 19:16 (2018): 2470-2487.
- Pörtner, Hans-Otto, Roberts, David, Masson-Delmotte, Valerie, Zhai, Pei, Tignor, Stefanie, Poloczanska, Elvira, Mintenbeck, Katja, Nicolai, Maike, Okem, Ambrose, Petzold, Jan, B. Rama, N. Weyer. "IPCC, 2019: Summary for Policymakers." In: *IPCC Special Report on the Ocean and Cryosphere in a Changing Climate*, Monaco (2019).
- Raessens, Joost. "The ludification of culture." In *Rethinking gamification*, edited by Mathias Fuchs, Sonia Fizek, Paolo Ruffino, and Niklas Schrape, 91-114. Leuphana: Meson Press, 2012.
- Raessens, Joost. "Collapsus, or how to make players become ecological citizens." *The Playful Citizen: Civic Engagement in a Mediatized Culture*. Edited by Glas, René, Lammes, Sybille, De Lange, Michiel, Raessens, Joost and De Vries, Imar. 92-120. Amsterdam: Amsterdam University Press:
- Rao, Valentina. "How to Say Things with Actions I: a Theory of Discourse for Video Games for Change." *DiGRA '11 - Proceedings of the 2011 DiGRA International Conference: Think Design Play* Volume 6 (January 2011).
- Sicart, Miguel. "Newsgames: Theory and Design". *International Conference on Entertainment Computing*. Pittsburgh, PA. 2008.
- Smith, Jonas Heide. "Plans and Purposes: How Videogame Goals Shape Player Behaviour." PhD diss., Center for Computer Games Research. IT University of Copenhagen. February 9, 2009.
- Taylor, Matthew, Watts, Jonathan and Bartlett, John. "Climate crisis: 6 million people join latest wave of global protests." *The Guardian.com*. September 27, 2019.  
<https://www.theguardian.com/environment/2019/sep/27/climate-crisis-6-million-people-join-latest-wave-of-worldwide-protests>
- Thurman, Neil and Lupton, Ben. "Convergence calls: Multimedia storytelling at British news websites." *Convergence: The International Journal of Research into New Media Technologies* Vol 14(4) (2008): 439–455.
- Wei, Sisi. "Harnessing the Power of Video Games for Journalism," Interview by Rose Eleveth. Nieman Storyboard, January 11, 2016. <https://niemanstoryboard.org/stories/harnessing-the-power-of-video-games-for-journalism/>

Wiehl, Anna. “Newsgames : Typological approach, re-contextualization and potential of an underestimated emerging genre.” In: *Libraries, Citizens, Societies: Confluence for Knowledge : The IFLA 2014 Conference Proceedings*. - s.l. : IFLA , 2014 . - S. 1-14.

Xia, Rosanna. “The California coast is disappearing under the rising sea. Our choices are grim.”  
LA Times.com. July 7, 2019. <https://www.latimes.com/projects/la-me-sea-level-rise-california-coast/>

## Ludography

Deepend. 2005. *Food Force*. [browser]. United Nations World Food Programme.

Xia, Rosanna & Kannan, Swetha & Castleman, Terry. 2019. *The Ocean Game - The sea is rising. Can you save your town?* [Safari]. *Los Angeles Times*.

## Appendix

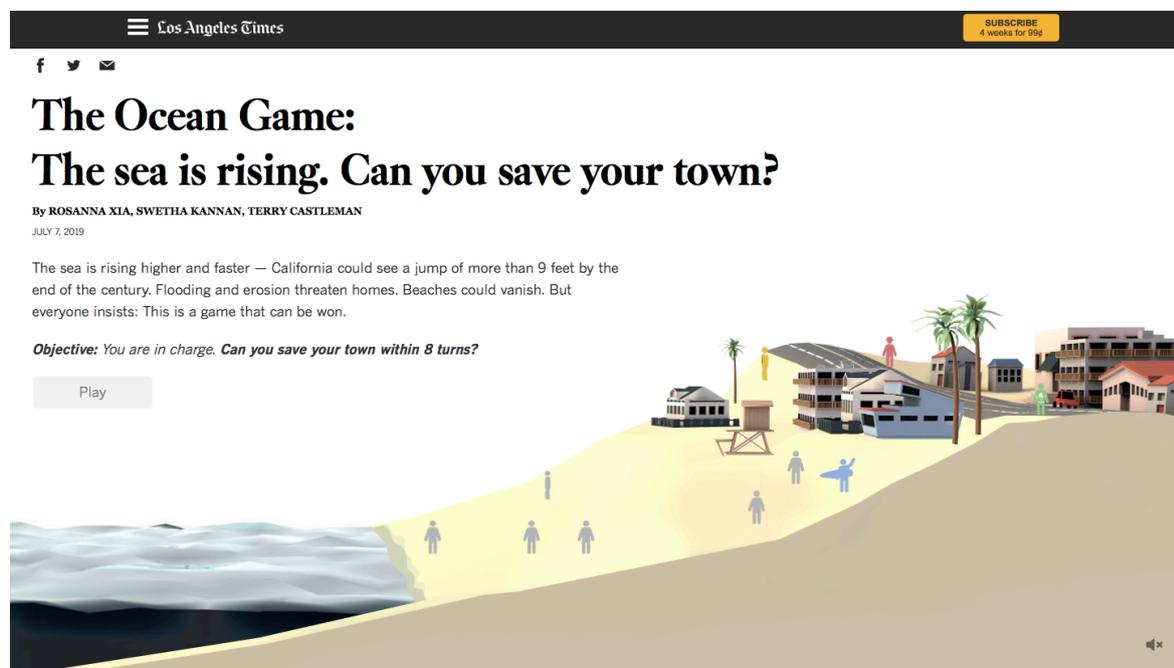
Figure 1: Opening window of *The Ocean Game*.

Figure 2: The “three playing options” of *The Ocean Game*.

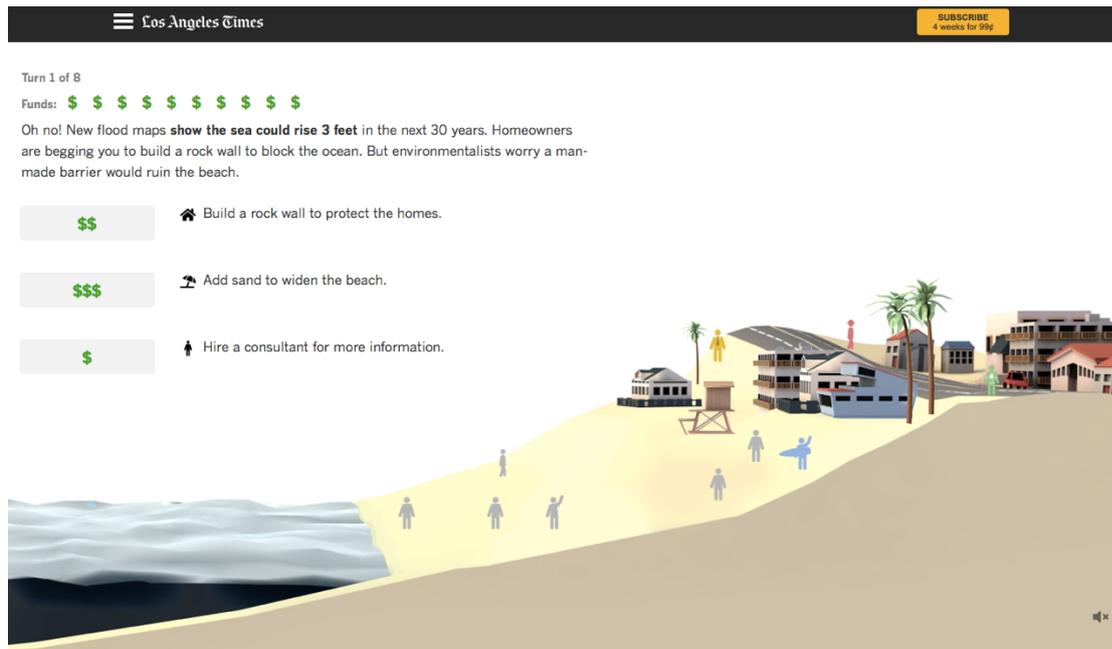
Figure 3: The “buy-out” advice.

Figure 4: “People” engaging with the player of *The Ocean Game*.

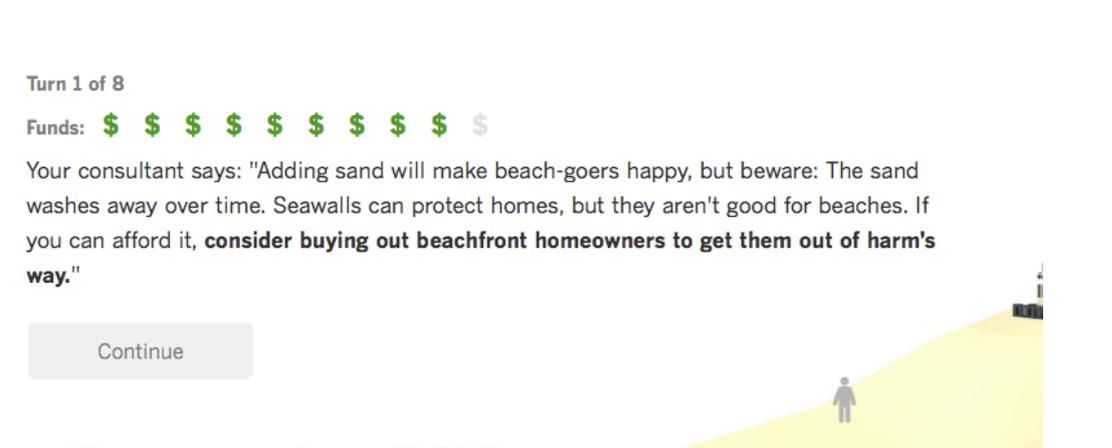
### Figure 1: *Opening window of The Ocean Game*



**Figure 2: The “three playing options” of The Ocean Game**



**Figure 3: The “buy-out” advice**



**Figure 4: “People” engaging with the player of The Ocean Game**

