Rachel Carson Center

Perspectives

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Experiencing Tomorrow: The Importance of Immersive Scenarios for Climate Science Communication.

Scientists all over the world agree that climate change is happening,[1] that humans are the dominant cause, and that we urgently need to change our behavior. And yet, although the scientific and public consensus grows stronger, too many people seem to be unmotivated to take action.[2] What has caused this divide between expert, academic knowledge on climate change and public behavior? I argue that the communication of climate-change science is to blame, which at present relies heavily on the idea that facts alone can convince people to take individual or collective action. It is well established that the academic community has for centuries seen itself as the main and most impactful producer of knowledge, and although there is now a greater diversity of actors involved, science still wants to retain its supremacy. Thus, we end up with models of climate-change communication that center science, following the logic that if knowledge exists, it is the responsibility of the public to understand it and act on it. However, more information does not always lead to better understanding,[3] and when it does, it does not necessarily result in action.

This essay highlights the important role of contemporary immersive art, speculative design, and multimedia storytelling, which transmit information very differently than formal scientific thought and political debates do. Consequently, I call for scientists and policymakers to team up with arts and communication experts to engage the public to take action in a more effective way.

In recent decades, a considerable number of studies have examined what influences public attitudes and behavior related to climate change.[4] They have shown that a variety of factors affect individual pro-environmental behavior, including worldviews, social

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1   See various sources on https://climate.nasa.gov/scientific-consensus.

2   See, for example, Kari Marie Norgaard, "'People Want to Protect Themselves A Little Bit': Emotions, Denial and Social Movement Nonparticipation," *Sociological Inquiry* 76, no. 3 (2006): 372–96.

3   Dan M. Kahan, Ellen Peters, Erica Dawson, and Paul Slovic, "Motivated Numeracy and Enlightened Self-Government," *Behavioural Public Policy* 1 (2013): 54–86; Yale Law School, Public Law Working Paper No. 307.

4   See, for example, Martin Patchen, *Public Attitude and Behavior about Climate Change*, Purdue Climate Change Research Center. PCCRC Outreach Publication 0601 (2006).

norms, political viewpoint, knowledge, personal disagreement with certain actions, and perceived usefulness of one's actions. Hence, knowledge is just one aspect that can influence human behavior, but it is not the only one and must be understood in a much broader sense: the mental action or process of acquiring knowledge and understanding works through thought, experience, and the senses.[5]

Hence it is important to communicate factual information that appeals to our rational and conscious sense-making, alongside emotional pleas that arrive from stimuli through our senses. Emotions have been identified as the missing link in how we become aware of the relationship between personal experiences on the one hand, and society and environment on the other, and they have been emphasized in the study of social movements in recent years. Going one step further, merely knowing about the causes and effects does not inspire people to take action because they do not perceive the effects as alarming or even relevant, especially because of what is called the "present bias."[6] In other words, people put greater weight on satisfying their present needs than considering what may serve them best in the future. This psychological distance can be explained by construal-level theory: the less immediate an individual experience or situation is, the more abstract and less concrete it seems—people don't seem to care about the effects of climate change, because these slowly creep in and are often not something people can feel all of a sudden in their daily lives. Given these cognitive barriers, might more people change their behavior if we make climate change seem more immediate, more tangible, and more connected to their daily life? Put another way, if people could experience the possible futures that academics model based on climate-change data, would they act differently?

Embodied theories (which refer to the assumption that thoughts, emotions, feelings, and behaviors are grounded in sensory experiences) started gaining momentum within social psychology at the start of the new millennium, but the topic of embodiment and efforts to understand the power embodied experience has over people are long established in other fields. Within art and media history, the phenomenon of creating illusionary, experienceable spaces is described as "immersive culture" and dates back to

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5   Definition of cognition, https://en.oxforddictionaries.com/definition/cognition, retrieved 25 January 2019.
6   Sheldon Ungar, "Public Scares: Changing the Issue Culture," in *Creating a Climate for Change: Communicating Climate Change and Facilitating Social Change*, ed. Susanne C. Moser & Lisa Dilling (New York: Cambridge University Press, 2007), 82–89.

antiquity.[7] In every epoch, people have used the technologies available to them to pro-
duce spaces that were, or still are, impossible to access, be they distant places on earth
or in the universe; imagined places like paradise, the past, or the future; or forbidden
places that the public was or is not allowed to access. These illusions offer possibili-
ties for thought experiments, imagination, testing concepts, anticipating other worlds,
and probing options. Fields like critical and speculative design are currently using this
experiential approach to explore future possibilities. After years of speculating about
technological developments and probing their possible effects on the individual and
society,[8] scholars and practitioners of speculative design today are creating works that
increasingly address climate futures. At the same time, planning and foresight fields

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7   Oliver Grau, *Virtual Art: From Illusion to Immersion* (Cambridge, MA: MIT Press, 2002).
8   See, for example Anthony Dunne and Fiona Raby, *Speculative Everything: Design, Fiction, and Social
    Dreaming* (Cambridge, MA: MIT Press, 2013), or Stuart Candy, "The Futures of Everyday Life," PhD diss.,
    University of Hawaii, 2010.

are teaming up with speculative artists and designers to offer a better understanding of possible future developments to decision makers who are grappling with long-term developments.

In 2012, Liam Young created an installation called "Singing Sentinels: When Birds Sing a Toxic Sky" at the Mediamatic Fabriek in Amsterdam, using canaries to show how rising levels of carbon dioxide in the atmosphere would affect our environment, especially birdsong. Canaries were once used in coalmines to keep miners safe: underground mines can contain potentially deadly gases, which are odorless and colorless. Canaries are much more susceptible to the gas, and react more quickly than humans do, thus alerting the miners of dangerous gas leaks through their behavior. In Young's installation, birds were once again used to monitor the air: living birds were introduced into the exhibition space as an ecological warning system, providing audible feedback on the state of the atmosphere. Across the course of the intervention, Young, equipped with a gas mask, performed "Silent Spring" and altered the air of the room in line with the predicted atmospheric composition for 2050, making Rachel Carson's 1962 forecast tangible. To accompany the experience, visitors were given binoculars and a "Birdwatcher's Guidebook to Toxicity Sentinels" so that they could fully immerse themselves in the experience of accelerated atmospheric change and listen to the birdsong being subtly silenced.[9] Young's installation blurred the boundary between the present and a possible future by creating an installation that allowed visitors to experience a future scenario themselves, addressing various senses. This had the effect that the information was made more present, tangible, and personally relevant than facts presented in a formal academic article. In this sense, the installation is similar to distortion of reality in contemporary Virtual Reality (VR) experiences, which sets it apart from traditional forms of media and content used within the context of contemporary climate change science in three ways: different levels of immersion, interactivity, and presence.[10] Immersion is best described as the sensation of being completely surrounded by another reality. A physical immersion might be being submerged in water, whereas a psychological immersion can be created by affecting the senses on different levels, without being in the specific environment. This is interwoven with the second factor, interactivity, where the visitor or user can experience and

9   For an impression of the installation, see Young's video "Silent Spring," https://vimeo.com/43378138.
10 Bob G. Witmer and Michael J. Singer, "Measuring Presence in Virtual Environments: A Presence Questionnaire," *Presence* 7, no. 3 (1998): 225–40.

Red Radars

Highlight
Geomagnetic Orientation capabilities are engineered to detect
subsurface anomalies

Description
The Red Radars of the Archaeology Institute scan the land for remnants
of abandoned towns and lost villages. Geomagnetically sensitive to the
presence of underground ruins, the birds gather and flock above the
walls of buried settlements throughout the countryside. Being typically
locked away in a university's Archaeoptical Aviaries means that natural
sightings are quite rare, but the chance to see the birds' red plumage
trace the ghosted lines of forgotten cities against a blue sky is well worth
the trip to any distant dig site.

Plate 5

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Figure 4 & 5:
Red Radars. Excerpt
from "A Field Guide
to Singing Sentinels."
Images by Liam
Young. Used with
permission.

interact with the created environment through touching, feeling, smelling, hearing, and seeing the other world, adding other levels of realism. Presence tricks the visitor's mind into perceiving something as real.[11]

Recent research into VR's impact on sustainable behavior in the real world supports the assumption that immersive environments influence behavior.[12] In one experiment, Ahn et al. compared the effects of hearing about a tree being cut down to the effects of virtually cutting down the tree. After the experiment, they tested how many paper napkins each group used when the researcher "accidentally" spilled water. Those who had virtually felled a tree used 20 percent fewer napkins—a statistically significant

11 James J. Cummings, Jeremy N. Bailenson, and Mailyn J. Fidler, "How Immersive Is Enough? A Foundati-
on for a Meta-Analysis of the Effect of Immersive Technology on Measured Presence," in *Proceedings of
the International Society for Presence Research Annual Conference*, 24–26 October 2012, Philadelphia,
Pennsylvania, USA.
12 Sun Joo (Grace) Ahn, Jeremy N. Bailenson, and Dooyeon Park, "Short- and Long-Term Effects of Embo-
died Experiences in Immersive Virtual Environments on Environmental Locus of Control and Behavior,"
*Computers in Human Behavio*r 39 (2014): 235–45.

finding that suggests VR can influence climate-change-related behavior in the real world. Research on immersive spaces (especially using new media forms like VR) and their impact on human behavior is in its infancy, but early experiments point to the potential for using immersive environments to affect unconscious decision-making. Immersive installations, regardless of whether they are created with traditional or advanced forms of media, offer researchers not just an exciting tool with which to test new hypotheses, but also the possibility to mobilize on a large scale and to enable positive (as well as negative) behavioral change.

Young's installation and Ahn et al.'s experiment reveal that the tangible immediacy of an immersive event resonates on a deeper emotional level than factual communication through a conventional channel does. These examples also highlight a new truth for climate-change communication: exploring the possible effects of climate change on society and communicating those findings to the public are crucial, but it is similarly important to consider how those messages are communicated. This is especially urgent if research is to be impactful and foster change. Scientific knowledge used to be produced foremost for academic peers, and scientists advanced their skills on communicating for this specific purpose. Yet the moment climate-change science aims to address a wider audience—which at its broadest is all of humankind—other forms of communication need to be added to be successful in this new context. This, too, requires a new skillset and therefore this essay is also a call for action for a new, communications-focused, interdisciplinary approach to research related to climate-change science. Thus, the challenge is not the decentering of science in climate-change communication per se, but rather pushing scientists to communicate in new ways. Companies and government services have already started collaborating with experts in communication to translate research on unknown technological and social futures into emotional appeals to bring insights to a broader audience. Climate-change researchers must follow.

Suggested Further Reading

Ahn, Sun Joo (Grace), Jeremy N. Bailenson, and Dooyeon Park. "Short- and Long-Term Effects of Embodied Experiences in Immersive Virtual Environments on Environmental Locus of Control and Behavior." *Computers in Human Behavior* 39 (2014): 235–45.

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Witmer, Bob G., and Michael J. Singer. "Measuring Presence in Virtual Environments: A Presence Questionnaire." *Presence* 7, no. 3 (1998): 225–40.

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