Devices of Articulation

Who Ever Said They Have to Be Smart?

Kolks, Laurens

DOI
10.1162/desi_a_00741

Publication date
2024

Document Version
Final published version

Published in
Design Issues

Citation (APA)
Kolks, L. (2024). Devices of Articulation: Who Ever Said They Have to Be Smart? *Design Issues*, *40*(1), 15-30. https://doi.org/10.1162/desi_a_00741

Devices of Articulation: Who Ever Said They Have to Be Smart?

Laurens Kolks

Introduction

In this article, I investigate how certain design projects partake in entangling the social and the material to articulate public issues: controversial phenomena that are too important to be disregarded by designers but—following sociologist Noortje Marres—are not necessarily solvable by political or scientific means.[1] Whereas problems might be fixed, issues are controversies that can only be stabilized temporarily, and I intend to investigate how the creative output of specific design projects might contribute to public engagement with these collective concerns.

I have chosen to examine two design projects in which artifacts are conceived and materialized that do just that:[2] sustain public engagement with collective concerns through specific forms of articulation. I use the verb "articulate" to describe an active process of associating elements into new collectives that changes the meaning, identity, or consequences of these elements.[3] Even so, I use the noun "articulation" to describe the specific form of such a newly established connection.

As we shall learn, many artifacts and materials—ranging from specialist to mundane—might qualify as a means for articulating concern with public issues by engaging in material forms of political participation.[4] However, to assess more specifically how designers—through their creative output—can actively and knowingly partake in publics articulating collective concerns, I aim to expand design scholar Carl DiSalvo's concept "device of articulation" as a distinct type of artifact that is specially designed and deliberately created for this purpose.[5]

I will first paraphrase DiSalvo's explanation of the concept, "device of articulation," in comparison to Marres's related concept, "device of participation."[6] I then investigate possibilities to combine theoretical ideas from these authors to expand application of the term "devices of articulation" beyond the realm of computational artifacts. Furthermore, I describe two specific case studies to empirically illustrate why I consider certain noncomputational artifacts—which, following DiSalvo's understanding, are excluded from this

1 Noortje Marres, "The Issues Deserve More Credit: Pragmatist Contributions to the Study of Public Involvement in Controversy," *Social Studies of Science* 37, no. 5 (2007): 759–80.

2 I use the term "artifacts" to denote objects, environments, services, and systems.

3 See Ernesto Laclau and Chantal Mouffe, *Hegemony and Socialist Strategy* (1985; London: Verso, 2001).

4 Noortje Marres, *Material Participation: Technology, the Environment and Everyday Publics* (London: Palgrave Macmillan, 2012).

5 Carl DiSalvo, *Adversarial Design* (Cambridge, MA: MIT Press, 2012).

6 Marres, *Material Participation*.

https://doi.org/10.1162/desi_a_00741

category—to be proper and fully-fledged devices of articulation. Finally, I explore how specific design decisions underpin devices of articulations' value as artifacts to support public engagement with collective concerns.

Taking Devices of Articulation Beyond the Realm of the Computational

In *Adversarial Design*, DiSalvo describes three case studies that feature artifacts that use computational systems for exchanging and interpreting data to construct "connected collectives that function as political provocations. … As devices of articulation, the products … both enable and participate in the ongoing endeavor of establishing linkages between elements in the collective."[7] DiSalvo argues how these devices link heterogeneous "elements together in a manner that transforms the individual identity and meaning of each object as it is folded into the collective and transformed. With this transformation, each object acquires new political significance as affordances, dependencies, and responsibilities are established by the design and use of the system."[8]

Hence, as their political significance is related to their affordances, the actual use value of these artifacts is essential for realizing their full potential as devices of articulation sustaining "provocative collectives." These artifacts' utilitarian value enables publics to incorporate them in material forms of political participation that are action oriented. In short, it is the combination of (1) being able to alter symbolic associations through transformations of meaning and (2) their specific utilitarian value that seems to set these devices of articulation apart as means for supporting public engagement with collective concerns.

DiSalvo says that ubiquitous computing[9] is a crucial feature of devices of articulation because "the design of that connectedness can foster the production of agonistic collectives."[10] He applies the phrase "device of articulation" to a number of "ubicomp artifacts," arguing that these devices construct "connected collectives" with the capacity "to establish linkages among objects, people, and actions to create open, interpretive, and participatory spaces of contest."[11] I argue, however, that these particular characteristics of establishing connections, enabling (political) participation, and igniting controversy can also be attributed to designed artifacts beyond the realm of ubiquitous computing: "dumb" artifacts, without any electronically mediated networking capabilities, that similarly sustain public engagement with collective concerns.

I aim to expand the application of DiSalvo's term to non-computational artifacts that—just like DiSalvo's "ubicomp" examples—are intentionally designed to establish relations between (non)humans, objects, environments, systems, and activities to create participatory spaces of controversy and contest. Artifacts,

7 DiSalvo, *Adversarial Design*, 93–96. DiSalvo describes the project Natural Fuse (2009) by Haque Design + Research and the projects Ad-hoc Dark (roast) Network Travel Mug (2009) and CCD-Me Not Umbrella (2009) by Mark Shepard to empirically illustrate the device of articulation.

8 Ibid., 100.

9 DiSalvo describes ubiquitous computing as "a system of multiple everyday objects embedded with computational capacities and networked together to exchange data and interact with each other." Ibid., 99.

10 Ibid.

11 Ibid., 93.

moreover, that were likewise purposefully created as means to articulate public issues by establishing new relations, meanings, and consequences among elements that were considered unrelated before,[12] but without using computation to exchange or interpret data.

Devices of Articulation vs. Devices of Participation

Like DiSalvo, science and technology (STS) scholars such as Noortje Marres have investigated "how the material form of [political] participation is actively accomplished with the aid of devices."[13] Marres uses the phrase "material participation" to describe a mode of political engagement that organizes publics by material means, that focuses "on *action and impact*—on what people can do about the issues in question."[14] This modality of political participation involves the use of artifacts—which Marres refers to as "devices of participation"—that may or may not be purposefully created for the specific goal of making one's concern with a particular issue public. In short, whereas DiSalvo's "devices of articulation" only concern artifacts specially created for articulating issues, Marres's "devices of participation" include mundane artifacts and materials (such as lightbulbs and compost) that are "issuefied."[15] The identities of these artifacts and materials are being altered by forging them into an alliance with a public issue and its consequences.[16]

As "material participation" is geared toward "*action and impact*—on what people can do about the issues in question," "devices of participation" are typically solution-oriented.[17] Marres argues how "material publics" (politically engaged publics organized by material means) locate political participation "in everyday material practices."[18] "Material publics" seek to articulate their concerns through actions aimed at providing "solutions," rather than by activities intending to "raise awareness." Although the case studies DiSalvo describes might be considered solution-oriented, the author also refers to a case that "instead of using design as a means of providing a solution, … uses design to problematize the situation."[19] Therefore, a second important difference between devices of participation and devices of articulation is that the latter term also depicts artifacts that are not primarily geared toward problem-solving but seek to problematize a situation.

To expand application of "device of articulation," I build on DiSalvo's and Marres's thinking about the role of artifacts in material forms of political participation. Following DiSalvo's argument, I consider devices of articulation to be artifacts purposefully designed and created for issue articulation that can be solution-oriented and/or aimed at problematizing a particular situation. To expand use of "devices of articulation" to include several specific

12 Ibid.

13 Marres, *Material Participation*, 65.

14 Ibid., 3.

15 Ibid.

16 For scholars such as Stuart Hall and Lawrence Grossberg, this is what articulation is all about: an act of actively forging new, temporary alliances between various elements that—before being articulated into a particular collective—appear to be disparate or even unrelated. New alliances that produce new meanings. See Stuart Hall, "Signification, Representation, Ideology: Althusser and the Post-Structuralist Debates," *Critical Studies in Mass Communication* 2, no. 2 (1985): 91–114. See also Lawrence Grossberg, *We Gotta Get Out of This Place: Popular Conservatism and Postmodern Culture* (New York: Routledge, 1992).

17 Marres, *Material Participation*, 3.

18 Ibid., 4.

19 DiSalvo, *Adversarial Design*, 100.

noncomputational artifacts, I follow Marres's assessment that material forms of political participation can be enacted by using both "smart" and "dumb" artifacts and materials.[20]

Devices of Articulation Reconsidered

Political theorists Ernesto Laclau and Chantal Mouffe describe articulation as "any practice establishing a relation among elements such that their identity is modified as a result of the articulatory practice."[21] Hence, devices of articulation are artifacts purposefully created to entangle heterogeneous elements in a collective and alter their relations, meanings, and consequences. In contrast to "discursive designs," which are typically disseminated through publications and exhibitions,[22] the full political potential of devices of articulation is only realized when these artifacts are actually put to use, when they are actually employed by publics to support "concrete" political work.[23]

Well beyond their discursive characteristics as "problematizing entities," devices of articulation support publics engaged in action-oriented modes of political participation by channeling their engagement with collective concerns into the enactment of specific activities. Activities that connect individual participants as members of a particular public; activities that act as a platform to negotiate controversies by establishing a common focus;[24] activities that are relevant for the sustainment of collectives by forging and reinforcing political and moral bonds between their members.[25] As such, creating devices of articulation appears to be an opportune way for designers to partake in the entanglement of the social and the material to articulate public issues.

In the rest of this article, I describe two case studies to empirically underpin my expanded understanding of devices of articulation. The studies feature "dumb" physical artifacts that I consider to be rather smart, but not in the sense of embodying computational capacities. Instead, the designs investigated in these case studies resourcefully process, configure, transform, and combine existing materials to create new relations, meanings, and consequences. In doing so, they entangle the social and the material in specific ways to articulate a public issue—in this case, environmental pollution.

Smogware: Tableware That Is Impossible to Clean

Smogware is a partnership between architect Iris de Kievith and designer Annemarie Piscaer and involves a range of activities, including designing and materializing artifacts, organizing workshops, and staging events.[26] The subject matter linking these various activities is the public issue of atmospheric pollution.

The name "Smogware" refers to an ongoing number of

20 Marres, *Material Participation*.

21 Laclau and Mouffe, *Hegemony and Socialist Strategy*, 105.

22 Bruce M. Tharp and Stephanie M. Tharp, *Discursive Design: Critical, Speculative, and Alternative Things* (Cambridge, MA: MIT Press, 2018).

23 See Carl DiSalvo, "Design and the Construction of Publics," *Design Issues* 25, no. 1 (Winter 2009): 48–63.

24 See Bent Steeg Larsen and Thomas Tufte, "Rituals in the Modern World: Applying the Concept of Ritual in Media Ethnography," in *Global Media Studies: Ethnographic Perspectives*, eds. Marwan Kraidy and Patrick D. Murphy (London: Routledge, 2003).

25 See Noortje Marres, "The Environmental Teapot and Other Loaded Household Objects: Re-connecting the Politics of Technology, Issues and Things," in *Objects and Materials: A Routledge Companion*, eds. Penny Harvey, Eleanor Conlin Casella, Gillian Evans, Hannah Knox, Christine McLean, Elizabeth B. Silva, Nicholas Thoburn, and Kath Woodward (New York: Routledge, 2014).

26 See www.smogware.org (accessed March 29, 2023).

Figure 1
Smogware (2017–present), "harvesting" particle pollution. Source: author.

place-specific crockery sets created by the designers: ceramic tableware that is colored using a glaze with particulate matter, a mixture of solid particles and liquid droplets suspended in the atmosphere, also known as particle pollution. The particulate matter used to color an individual, place-specific set of Smogware pieces is first collected from objects on which it has settled in a specific urban area (such as noise barriers, guardrails and walls), a curated activity (see Figure 1) the designers refer to as "harvesting."[27] Consequently, Rotterdam Smogware is materialized using particle pollution harvested in the Dutch city of Rotterdam, and Milan Smogware using particulate matter harvested in the Italian city of Milan. As such, Smogware has created place-specific sets of tableware for a number of European and Asian cities.

The Rain Project: Clear and Present Danger

The Rain Project is a design project that cleverly tapped into the Taiwanese custom of entrepreneurs handing out free food samples on the street and passers-by accepting and consuming them. Designer Alice Wang and her team transformed rainwater—collected from various places around the world—into custom-designed popsicles wrapped in packaging material that disclosed the product's single ingredient: frozen, unfiltered rainwater. The designers—wearing bright blue raincoats—distributed some five thousand

27 Ibid.

Figure 2
The Rain Project (2011), handing out popsicles to passers-by. Source: Maciej Korbas.

popsicles among passers-by at various public locations throughout Taiwan, catering to diverse publics (see Figure 2).[28]

The Rain Project's popsicles were not intended as experimental food design items but as artifacts carefully developed to articulate the issue of environmental pollution.[29] Like with Smogware's crockery, the ice pops' raw ingredient was collected cooperatively. Via social media, the designers asked people to send in their locally collected rainwater (see Figure 3), which was eventually processed into a food product designed to double as a conversation piece, purposefully created as an immediate way to get into a conversation about the differences in quality of local rainwater in particular,[30] and the issue of environmental pollution in general.

Forging New Relations, Meanings, and Consequences by Design

By using locally "harvested" particle pollution as raw material to glaze place-specific crockery, Smogware establishes new relations, meanings, and consequences between elements that are commonly deemed unrelated—particulate matter and tableware—to articulate the public issue of air pollution. Likewise, by creating consumable popsicles out of locally collected, unfiltered rainwater, the Rain Project forges new connections between the alarming

28 Alice Wang, interview with the author, July 7, 2020.

29 Rain is an important indicator of air pollution. It acts as a transport medium for various airborne particles and harmful substances. Rain therefore connects atmospheric pollution to contamination of the soil and bodies of water. In other words, rain is related to environmental pollution in a more general sense. These relationships are not straightforward but rather complex. For example, rain that is not acidic can transport substances that actually make the soil acidic and therefore damage ecosystems. See Colin Tudge, *The Secret Life of Trees: How They Live and Why They Matter* (London: Penguin Books, 2005).

30 The designers received rain samples from locations around the world, ranging from Germany and Ireland to Sri Lanka and Bali. Wang, interview, July 7, 2020.

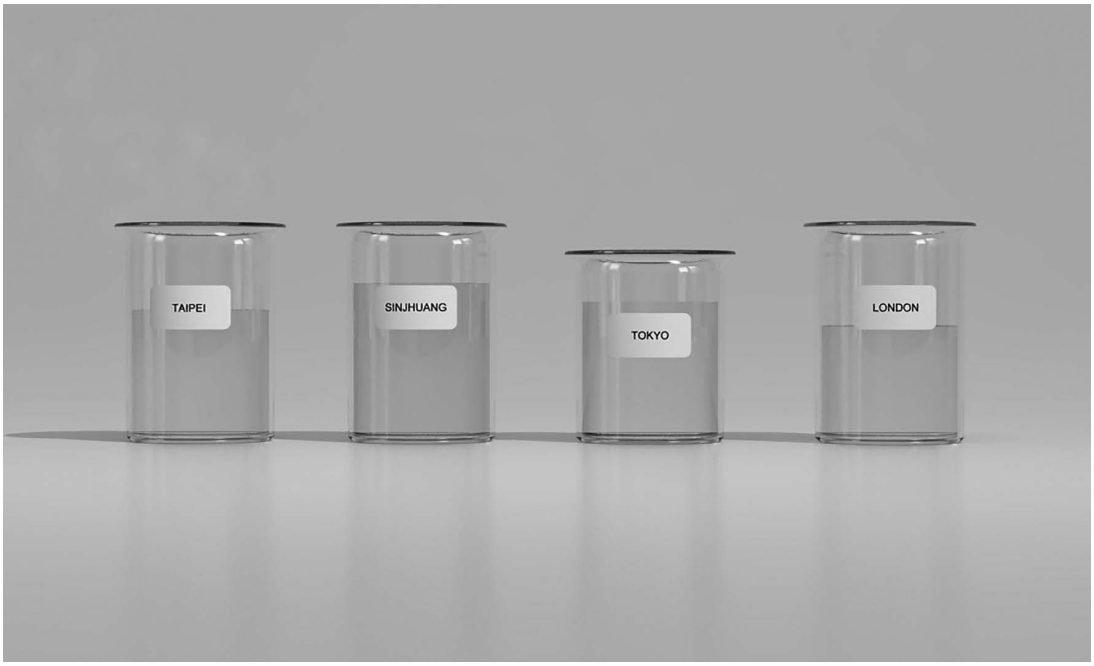

Figure 3
The Rain Project, unfiltered rainwater collected from different cities around the world. Source: Alice Wang.

issue of environmental pollution and the far-from-distressing ice pop—an artifact typically associated with carefree pleasure. Hence, Smogware and the Rain Project objectify and materialize problematic relations, forge unexpected alliances, and modify the meaning and consequences of elements that are actively associated with new collectives. In short, both Smogware and the Rain Project produce devices of articulation.

These design projects make the issue of environmental pollution "known by making it experientially accessible."[31] In them, the physically experientable consequences of environmental pollution are used as raw materials to design with. Controversial materials, moreover, that are processed in such a way as to stay legible (and retain their "normative charge")[32] while being seamlessly integrated into utilitarian objects. As such—beyond their qualities as "discursive designs"—these artifacts can be used to locate political participation "in everyday material practices."[33]

When using a piece of Smogware crockery or licking a Rain Project popsicle, the mundane activities of drinking or eating are rendered controversial and become material forms of political participation. In Marres's words, these mundane activities are being "issuefied"[34]—altering their hitherto innocent or unproblematic identity. This transformative process of issuefication is where the act of designing—understood here as an iterative practice of exploring options and projecting several specific choices—has the potential to be particularly important. Although many artifacts and materials (including very mundane ones) may be used to make

31 DiSalvo, "Design and the Construction of Publics," 57.
32 Marres, *Material Participation*.
33 Ibid., 4.
34 Ibid.

public one's engagement with a particular issue, some artifacts (and the activities, routines, and rituals they are entangled with) have more capacities to capture the imagination, ignite controversy, or hold a more powerful "normative charge" than others.

Designers are typically trained to communicate via artifacts and explore several possible options before settling on a particular outcome. Accordingly, the artifacts that were eventually used in the Rain Project and Smogware were developed for specific reasons and selected from many design possibilities. The specific forms given to the relations these artifacts aim to problematize—the result of specific design choices translated into an actual material articulation—were carefully considered. As Rain Project designer Alice Wang explains:

> Originally, I just wanted people to try rainwater. I wanted them to drink it. Like in a shot glass or a little glass. But I tasted it myself and it was horrible. … So I thought: Okay, [in Taiwan] everybody is very shy, nobody is going to speak to me, and I'm asking them to try this very horrible, disgusting-looking thing. Who is going to queue up and try for this thing? So one day I went to the supermarket and I realized that people would queue up for food samples. So this gave me the idea that I should package this rain in some sort of food, but without changing the taste too much. There were lots of options, like turning it into soup, ice creams, juice. . . . But with a lot of [these] options we had to add flavoring or coloring. So that kind of put me off. In the end we decided to package it into a popsicle.[35]

Similarly, Smogware designers De Kievith and Piscaer describe how they value the ways tableware is used in everyday routines for specific reasons. Explicitly forging new alliances while simultaneously tapping into its specific utilitarian value, Smogware's designers consider using crockery to be an act of intimacy, just like breathing:

> Every day, we unnoticed [*sic*] inhale soot, nitrogen oxides and particulate matter, of which we are the producers ourselves. [We] found a way to harvest fine dust and use it as glaze for ceramics. With the colour that the particulate matter gives, the poor air quality is made visible, and even tangible. Because the use of tableware, your breakfast plate and your coffee cup, in intimacy, is related to breathing, it was chosen as a medium for raising awareness of air pollution.[36]

Smogware, like the Rain Project, thus problematizes the issue of

35 Wang, interview, July 7, 2020.

36 www.smogware.org (accessed August 18, 2022).

air pollution to "raise awareness," but does so in very specific ways that entangle tangible physical consequences of the issue at stake (particle pollution), public participation ("harvesting"), and the utilitarian value of specific artifacts (routines and rituals). Likewise, by transforming an actual sample of environmental pollution into a consumable food product, the Rain Project's popsicles establish new relations between a collective concern commonly described at a high level of abstraction and the intimacy of one's body. Both projects create newly designed artifacts to articulate the issue of environmental pollution (instead of issuefying existing ones) that acquire "new political significance as affordances, dependencies, and responsibilities are established by the[ir] design and use."[37] Let us take a closer look at some of the affordances that make these artifacts relevant to the construction and sustaining of participatory spaces of political contest. In other words, what affordances make these artifacts function as devices of articulation?

Artifacts Stirring Controversy

As a collective, the notion of "environmental pollution" is being sustained by the active association of numerous human and nonhuman actants,[38] such as (imagery of) smoking chimneys and exhaust pipes, respiratory patients, measuring equipment, soot-stained buildings, scientific data visualizations, and face masks—to name only a few.[39] Smogware's designers take part in activities that entangle different combinations of these elements in several ways. In the various incarnations of their project, De Kievith and Piscaer incorporate issue-related actants, such as governmental air pollution data, face masks, and artifacts representing air pollution sources (such as exhaust pipes and dairy products). The specific design of Smogware crockery and staging of Smogware events (re)combine, transform, and translate these actants, forging new alliances between them to articulate the issue of air pollution.

Likewise, the Rain Project forges new alliances between such miscellaneous actants as ice pops, raincoats, and data visualizations. Well beyond addressing environmental pollution, the Rain Project articulates this issue by distributing custom-designed conversation pieces that can be inspected, licked, eaten, spat out, or even digested before being talked about. The project explicitly incorporates a strategy of learning through physical experience by creating an artifact that makes the issue of environmental pollution "known by making it experientially accessible."[40] Indeed, after tasting the popsicles and learning about their sole ingredient, many Taiwanese passers-by were physically disgusted. As Alice Wang explains:

Here they believe that the rain is very acidic. If it touches

37 DiSalvo, *Adversarial Design*, 100.

38 On the concept of "actants," see Bruno Latour, *Pandora's Hope: Essays on the Reality of Science Studies* (Cambridge, MA: Harvard University Press, 1999).

39 In STS, the term "articulation" is used to denote the active association of specific human and nonhuman actants into a particular collective.

40 DiSalvo, "Design and the Construction of Publics," 57.

> your hair or your skin, [people believe] it can give you skin problems or hair loss. So, a lot of these people avoid the rain. When there's rain, people just hide or get an umbrella. They don't want the rain to touch them.[41]

Following from Wang's statement, many Taiwanese consider the very matter of rainwater controversial or even dangerous. Therefore, to make full use of rainwater's specific "normative charge"[42] in Taiwan, the designers insisted on keeping their controversial raw ingredient as "pure" as possible. No colorants or flavors were to be added. Instead, the rainwater's state of matter was merely changed from liquid to solid.

As this article seeks to describe how designers might contribute to the articulation of public issues, let us have a closer look at how specific design decisions made in Smogware and The Rain Project (re)combine, transform, and translate some actants that make up the collective "environmental pollution"—forging new alliances between them to create what I consider to be proper devices of articulation.

Designing with Dirt

One of the specific ways Smogware's and the Rain Project's devices of articulation entangle the social and the material to articulate environmental pollution is by integrating this issue's actual physical consequences into materializing utilitarian artifacts. These devices of articulation were by no means created in a straightforward way. They are the outcome of experimentation and exploring various possibilities, the result of meticulous design contemplations exploring a field of technical possibilities, communicative and aesthetic considerations, official scientific data, place-specific behavioral patterns, and governmental legislation.

Smogware's designers created vast amounts of ceramic samples (see Figure 4) to find that it is indeed possible to create a proper glaze out of "raw" particulate matter without adding supplementary materials. The very visibility of this "pure pollution glaze," however, depends on both the material composition and quantity of the particle pollution being used in relation to the type of ceramic material and the dimensions of the surface to which it is applied. When fired, porcelain delivers a far lighter (unglazed) end result than other ceramic materials, such as stoneware. Consequently—considering the pollution glaze's visibility—porcelain became the designers' material of choice when creating Smogware crockery.

Furthermore, relatively small amounts of particle pollution applied to relatively large surfaces of porcelain need additional glaze materials to achieve a level of visibility that the designers deem "communicatively acceptable." Therefore, the designers

41 Wang, interview, July 7, 2020.

42 Marres, *Material Participation*.

Figure 4
Smogware, a collection of samples and prototypes. Source: A. Piscaer and I. De Kievith.

determined threshold quantities based on minimal visibility and created customized glaze recipes for different amounts of particle pollution. Also, in several crockery designs, surfaces are left partially unglazed to underpin the visibility of the tainted parts (see Figure 4).

Particle pollution transformed into a glaze has the potential to make the experienceable consequences of air pollution apparent and known,[43] both as a tangible sample of the issue's actual physical consequences (a thing) and as a data visualization indicating the severity of its (foreseeable) implications (a sign).[44] To make full use of this potential, Smogware's designers decided to align the amount of particulate matter used to glaze a particular piece of crockery with the number of years it would take a person to inhale this amount of particle pollution while living in the actual area the material is harvested in.

To achieve this relationship between materialization and living conditions, the designers extrapolate numeric air quality data supplied by official governmental organizations and translate them into specific glaze recipes, resulting in varying colors, tones, and shades. The meaning of these extrapolated, place-specific data translated into glazes is communicated using a custom coding

43 DiSalvo, "Design and the Construction of Publics," 48–63.

44 Bruno Latour, *We Have Never Been Modern* (Cambridge, MA: Harvard University Press, 1993).

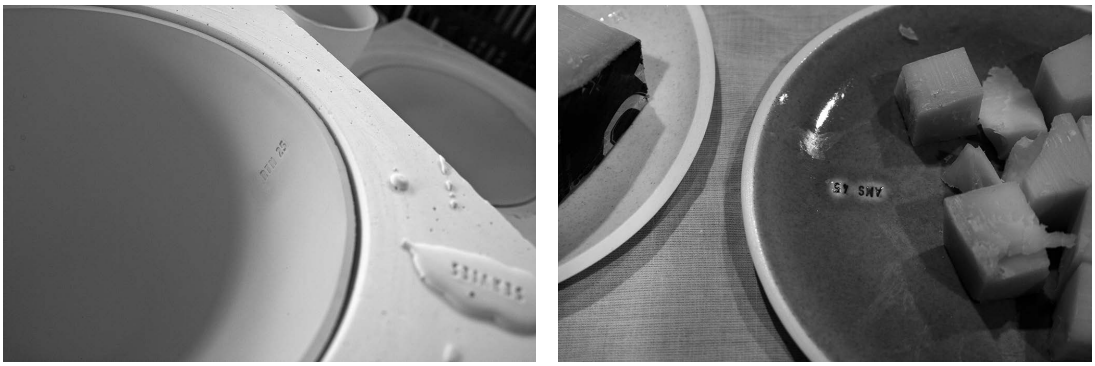

Figure 5
Smogware coding system. Left: RTM 25 code imprinted in the drying clay of an unfinished bowl inside its mold. Right: AMS 45 code on a finished glazed plate. Source: author.

system consisting of letters and numbers imprinted on individual pieces of crockery (see Figure 5). Hence, the code AMS 45 represents the amount of particle pollution a person might inhale during forty-five years of living in the city of Amsterdam (see Figure 5, right). RTM 25 represents the amount of particulate matter one might inhale during twenty-five years of living in Rotterdam (see Figure 5, left).[45]

Filth Transformed into Symbolic Language

The translation of extrapolated, place-specific data into specific glazes combined with imprinted codes from the Smogware coding system can be regarded what STS scholars refer to as "inscriptions":[46] signs that are "materially embodied in some medium" and therefore can be "shared by several agents."[47] Wolff-Michael Roth and Michelle K. McGinn explain the significance of inscriptions as social entities: "Because of their material embodiment, inscriptions (in contrast to mental representations) are publicly and directly available, so that they are primarily social objects."[48] Moreover, inscriptions "are usually crafted to be relevant to particular purposes," thus they "serve interests" and are "matters of practical, political, and economic choice."[49] Even more importantly regarding the topic of this article, inscriptions have the potential to function as "central organizers that foster the creation and development of new discourses."[50]

Accordingly, the specific way Smogware crockery embodies a translation of place-specific air quality data opens several distinct possibilities for sparking discourse regarding the condition of a certain location's air quality in particular, and the public issue of air pollution in general. First, it enables one to compare crockery tainted with particulate matter harvested from the same environment that each feature inscriptions representing different temporal extrapolations (for example, a cup labeled MI 25 and a cup labeled MI 45; see Figure 6, left). Second, it enables one to compare crockery tainted with particulate matter harvested from different physical locations that feature inscriptions representing the same tempo-

45 Whereas coarse airborne particles "may trigger adverse responses in the lungs requiring hospital treatment," research suggests that "increases in mortality are mainly related to an increase in PM2.5"—particulate matter consisting of particles with a diameter of 2.5 microns or less (World Health Organization, "Health Risks of Particulate Matter from Long-Range Transboundary Air Pollution," 2006, 15, https://www.euro.who.int/__data/assets/pdf_file/0006/78657/E88189.pdf). Because De Kievith and Piscaer do not filter the particle pollution they collect according to size—and thus particle sizes and their proportions in the overall mixture are not determined—it is impossible to assess to what extent the appearance of a specific glaze represents the actual physical harmfulness to humans of the particulate matter used to create it.

46 See, for example, Bruno Latour and Steve Woolgar, *Laboratory Life: The Social Construction of Scientific Facts* (Princeton, NJ: Princeton University Press, 1986); Wolff-Michael Roth and Michelle K. McGinn, "Inscriptions: Toward a Theory of Representing As Social Practice," *Review of Educational Research* 68, no.1 (1998): 35–59.

47 Roth and McGinn, "Inscriptions," 37–38.

48 Ibid., 37.

49 Ibid., 45.

50 Ibid., 52.

Figure 6 (above)
Smogware codes and glazes. Above left: inscriptions based on extrapolations varying in temporality: particle pollution in the city of Milan, 10, 25, 45, 65, and 85 years. Above right: Inscriptions based on extrapolating diverging contemporary air pollution norms: 65 years of "World Health Organization (WHO) norm" versus 65 years of "European Union norm." Source: author.

Figure 7 (right)
Smogware "Soot Breakfast" at Amsterdam's city hall prior to a city council meeting debating the city's air quality. Source: author.

ral extrapolation (for example, a plate labeled RTM 45 and a plate labeled AMS 45). Finally, it enables one to inscribe onto the same physical artifacts different speculations on what impact certain behavioral changes—such as alternative governmental policies—might potentially have on the local air quality (see Figure 6, right).

The particular affordances of these devices of articulation—being both sign and thing, data visualization and utensil—render Smogware crockery useful in relation to constructing and sustaining participatory spaces of contest. Whereas the first two modes of inscription were initiated by the designers, the third modality (comparing the potential consequences of different pollution norms) was suggested by a Dutch nongovernmental organization that had learned about the Smogware project and decided to cooperate with its designers.[51] Moreover, the tableware's use value as utensils for eating and drinking inspired local activists concerned with their hometown's atmospheric pollution to collaborate with the designers in organizing a "Soot Breakfast" at Amsterdam's city hall, seeking to positively influence the city's air quality policies (see Figure 7). As such, these affordances of Smogware's tableware designs trigger publics to cooperatively develop new ways of articulating the issue of atmospheric pollution.

Form Cementing Meaningful Relationships

51 That Dutch organization was *Longfonds* (Lung Foundation). Annemarie Piscaer, interview with the author, July 13, 2021.

Just as specific design decisions by Smogware's designers create affordances for publics to engage with the issue of atmospheric pollution, the Rain Project's design strategy seeks to evoke public engagement with environmental pollution by "tricking" passers-by into physical participation. Whereas Smogware's crockery renders variations in local environmental pollution comprehensible through designed inscriptions that require a certain amount of cognitive imagination, the Rain Project's popsicles enable people to actually taste them—directly stimulating the senses.

To be sure, the designers' desire to use unfiltered and unaltered rainwater as the sole ingredient for the Rain Project's consumable devices of articulation was not motivated by any risk-seeking behavior. Instead, the designers reasoned that if the collected rainwater's composition were to be changed beyond recognition, the popsicles' "normative charge"[52] as devices articulating the experienceable consequences of environmental pollution would have been vastly weakened. However, to legally distribute their devices of articulation in public locations, the designers had to convince government officials:

> They said if you want to serve this in public you have to filter it.
> We said: once it's filtered then there's no point. Because then it would be just like [regular tap] water.
> They said: "What if someone gets sick?" Like … you know, that's the point of the project: you get sick from nature. Then you have to rethink about what you are doing to the planet. And then they went like: "Okay, we'll [get] back to you." So they had a meeting and they came up with this… [safe] quantity [ensuring that] you couldn't serve one person too much rain. . . .
> So we made these tiny popsicles of about six to seven centimeters. … The second rule was we had to label it. We had to say that it's rainwater and where it's from. They said: "If they see that it's rainwater and they open it and eat it voluntarily, then it means they know what's inside and we don't have responsibility to take if they do get sick."[53]

Alice Wang Design was able to convince Taiwanese government officials that to achieve a high normative charge for their proposed device of articulation, it was essential to keep the rainwater unaltered. By determining the official preconditions that allowed the designers to pursue their aim to create clear, unflavored popsicles out of unfiltered rainwater (see Figure 8), the civil servants co-created

52 Marres, *Material Participation*.

53 Wang, interview, July 7, 2020.

Figure 8
The Rain Project, controversial matter shaped into consumable popsicles.
Source: Maciej Korbas.

these devices of articulation. Around five thousand popsicles were eventually handed out during several sessions organized in various public areas.[54] Therefore, a relatively large number of citizens had the opportunity to literally put the experienceable consequences of environmental pollution into their own bodies—eat them, spit them out, even digest them.

Both the Rain Project and Smogware illustrate how processes of creating material articulations to support public engagement with collective concerns are entangled with other contexts, such as technical possibilities, legislative frameworks, scientific data collection, and place-specific customs and routines. But more important even for design theory: these projects illustrate that specific design decisions matter when it comes to how designers might contribute to articulating public issues through material forms of political participation.

Conclusion

I argue to expand application of the concept "devices of articulation"—a term signifying artifacts that are purposefully created as means to articulate public issues by establishing new relations, meanings, and consequences among elements that are typically understood to be unrelated—to also include certain noncompu-

54 Ibid.

tational artifacts. Describing two case studies, I suggest that well beyond their discursive characteristics as "problematizing entities," devices of articulation support publics engaged in action-oriented modes of political participation by channeling their engagement with collective concerns into enacting specific activities. I argue that specific design decisions constitute specific affordances—regarding their symbolic and utilitarian value—that render devices of articulation useful for supporting the articulation of public issues by capturing the imagination, establishing connections, igniting controversy, provoking interaction, and thus creating spaces of contest.

Acknowledgments

I thank Iris de Kievith, Maciej Korbas, Annemarie Piscaer, and Alice Wang for their generous cooperation. I thank Prof. Willem Schinkel and Prof. Bregje F. van Eekelen for their unremitting encouragement and invaluable feedback on my work.