

Anticipating Future System States

Jamer Hunt
The New School
USA

The profession of design is undergoing a paradigmatic shift away from the design of artifacts as solutions to problems. Instead, we are now starting to see these problems themselves as the symptoms of dysfunctional, larger macro-systems that are themselves shaping the problem space.

In her foundational book *Thinking in Systems*, Donella Meadows illustrates for us the basic building blocks of systems. She writes, “A system is a set of things—people, cells, molecules, or whatever—interconnected in such a way that they produce their own pattern of behavior over time” (Meadows, 2008, p. 2). In her formulation, a system is not simply a random gathering of parts (like snowflakes on the sidewalk); in its unfolding its structure must demonstrate some higher level of order or purpose.

This is, perhaps, the most bedeviling characteristic of systems: the purpose cannot necessarily be derived from the elements. A droplet of rain does not communicate that it plays a central role in thermal regulation of climate or in the transpiration necessary to make plants grow. That system we must intuit from a point outside of the raindrop.

Systems do not exist; we posit them. This is their second bedeviling characteristic. This means that systems are political, first and foremost. To constitute a system one must make exclusions and draw boundaries. What is included, what is not, and who is doing the deciding all imply a politics of boundary and set determination that is little different from the cartographer’s drawing of territorial borderlines. The system-maker must constitute boundaries and edges and insides and outsides and elements and nodes and connections in order to circumscribe the contours of a system. We might all agree that textbooks are a part of the education system, for instance, but would we all agree that a nutritious breakfast is? Or domestic disharmony? Put differently, the ontological status of a system is always provisional and motivated. A system does not exist until we claim that it is one.

Two points are central here: first, there are no systems per se. Systems are constructs or assays that actors devise to shape reality in particular ways and for particular ends. As Meadows writes, “There is no single, legitimate boundary to draw around a system” (Meadows, 2008, p. 97). Second, to constitute a system we must stand at some Archimedean point outside of it, and yet there is no such standpoint that allows us to fully grasp a system that does not, in some way, include us (as the shaper of that system). As with the Heisenberg uncertainty principle, our presence as system-boundary-makers ineluctably redraws the system according to our own, distorting sightlines.

While we may speak about redesigning public education or food systems or politics, it is simply impossible for designers or other actors alone to influence in any deterministic way the complex systems they see misbehaving. Counter-intuitively, intentional fixes to dysfunctional systems often produce results that would be worse than doing nothing. For example, one of the most assured ways to increase traffic congestion is to add more lanes for cars—as this only incentivizes more people to commute, worsening the problem. Horst Rittel and Melvin Webber, in their famous essay on the blind spots of modern planning, see this quandary as defining what they term “wicked problems” (Rittel & Webber, 1973).

Designing for systems is, in fact, radically different than designing artifacts. An artifact condenses and freezes a set of relations into a state of being, utilizing scripted physical cues to choreograph a user’s behaviors

towards a set of predetermined, target actions. Hold here. Turn there. Power-up over here. Sit there. Read like this. Look here. Enter there. Even service design, with its complex constellation of actors, behaviors, scripts, and spaces circumscribe a bounded set of possibilities, with the service blueprint serving as the template. The design artifact forecloses possibilities—though not in a pejorative sense. It is the instantiation of an instrumental objective enabled by the subtle reconfiguration of a set of physical or processual affordances.

Systems, on the other hand, are comprised of elements, relations, connections, and flows that together demonstrate macro-level behaviors. Whereas the traditional products of design are configurations of matter in a state of being (finished, bounded, and knowable), the design for systems must instead open up a space of becoming—partial, indeterminate, and open. The aim is not to resolve a system—to fix it into a forever-ideal state—but to model the possibilities that system interventions might provoke.

In terms of how one intervenes into systems, Donella Meadows lyrically writes, “The future cannot be predicted, but it can be envisioned and brought lovingly into being. Systems cannot be controlled, but they can be designed and re-designed” (Meadows, 2008, p. 169). Rittel and Webber reach a nearly identical formulation, “Social problems are never solved. At best they are re-solved—over and over again” (Rittel & Webber, 1973, p. 160). Both statements reveal a hard-earned truth of wrangling with systems: the best a designer can do is to envision or model possible future system states...how they may come into being and how they might evolve over time.

Even though systems do not “exist” and are unruly, that does not mean that we cannot develop strategies for materializing their presence and modeling their behavior in an intentional way. We codify and model immaterial abstractions in a variety of disciplinary domains: urban planning, quantum physics, medical diagnoses. In each of these cases we conceptualize possible system states to explore the symptoms of systemic dysfunction, even though we may not be able to clearly identify the root cause. If the ultimate aim of systems design is to perturb socio-technical systems so that they manifest new, more desired behaviors, because of their complexity there is little guarantee that any change will yield the desired results.

Envisioning future system states requires designers to adopt the strategies of anticipation, speculation, modeling, and prefiguring the unknown. US Secretary of Defense Donald Rumsfeld, of all people, surprisingly captured the contours of this challenge while speaking about military planning in the aftermath of the September 11 terrorist attacks. Bemoaning the radical indeterminacy of the counter-insurgency efforts, Rumsfeld pontificated, “as we know, there are known knowns; there are things we know we know. We also know there are known unknowns; that is to say we know there are some things we do not know. But there are also unknown unknowns—the ones we don’t know we don’t know” (Rumsfeld, 2002). Designing artifacts brings us into the realm of the known unknowns—will the vacuum cleaner be lifted from this point or from that? Will the reader plunge in all the way into the information or only skim the headlines? Is the staircase designed invitingly enough to encourage occupants to walk rather than take the elevator? In designing for complex systems, however, we are in the Rumsfeldian realm of the unknown unknowns. We don’t even know and cannot even anticipate what an intervention into a system might produce. It presents a particularly knotty problem.

Recently, in my collaborative studio teaching, we have begun to experiment with ways of designing for future system states, deploying a variety of strategies in an attempt to model the unknown unknowns.¹ Because systems are immaterial and abstract (though still comprised in part by material elements), we have taken to using video as means of modeling the human behaviors that perturbed systems might generate. Human behavior is an index of system behavior, because systems are abstractions made manifest by the behaviors of human and non-human actors. Rather than simply contrasting diagrams of existing and modified systems—before design and after—we use speculative, future scenarios to explore the unknown unknowns. Anthony Dunne and Fiona

Raby, pioneers in the practice of speculative and critical design, suggest that, “Although operating at a systemic scale, large-scale speculative thinking...contests ‘official reality’...it aims to be inspirational, infectious, and catalytic...blurring distinctions between the ‘real’ real and ‘unreal’ real (Dunne & Raby, 2013, p. 160).” Working in this speculative systems space, *Landfull* (a studio project Colleen Doyle, Ashley Graham, and Chisun Rees)², for instance, considers what our world might look like and what role objects may take on when we’ve produced so much garbage that our landfills are full. Creating multiple temporal layers (between scenes of figures scavenging objects on a beach (Figure 1) and a voiceover from an archaeologist who is explaining in retrospect the origins of their condition) the designers do not redesign our landfill system (i.e. try to *fix* the problem) as much as model a possible future state of it and the human behaviors that result from that system change. They extrapolate forward in time the possible scenarios of our current system of overproduction, consumption and waste. Video’s multiple channels allow them to juxtapose future speculations (the haunting scavengers on the beach), retrospective explanations (the archaeologist’s voiceover explaining the system’s collapse), and singular artifacts of indeterminate origin (melted plastic toys actually hemorrhaged from and melted by eroded landfills on New York City’s Dead Horse beach (Figure 2). Together, these kaleidoscopic channels capture not the way to solve the problem of waste, but a way to illustrate one scenario of what might happen when we do not.



Figure 1. Still from the Video “Landfull” by Colleen Doyle, Ashley Graham, and Chisun Rees



Figure 2. Still from the Video “Landfull” by Colleen Doyle, Ashley Graham, and Chisun Rees

In the film for the project, *Choices* (studio project by Rachael Fried, June West, and Joseph Wheeler)³, the designers construct a series of visual vignettes in which everyday objects seem to instantiate a dizzying array of possible gender identities: a six-way electrical outlet that allows users to plug in their peripherals based on six gender choices (Figure 3); or a unisex bathroom that offers seven different styles of toilets based on anatomy and preference. Envisioning the collision of fluid gender identification with our hyper-consumptive habits, the designers create a series of future false “choices” that rewrite our physical landscape and reanimate our everyday life-world. The system that the actors and objects enact becomes a lens through which we see both the limitless variety of human gender expression and the bald manner in which business dimwittedly tries to capitalize on customer gender stereotypes. In each of these videos artifacts, spaces, clothing, speech, and landscape indicate the contours of possible systems—but only ever in ways that are partial. They juxtapose the familiar with the strange; designed artifacts stand in for the “whole” of a reconfigured system (Figure 4), pointing at possible futures without claiming that these futures are inevitable, likely, or even desirable.

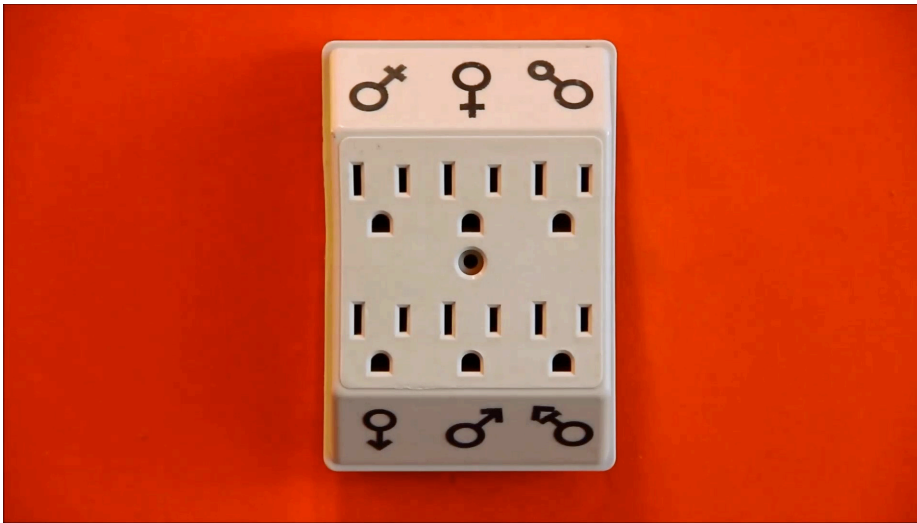


Figure 3. Still from the Video “Choices” by Rachael Fried, June West, and Joseph Wheeler



Figure 4. Still from the Video “Choices” by Rachael Fried, June West, and Joseph Wheeler

Two more recent projects, for a studio entitled *Design for the Microbiome*, explore the quandary that started this essay: can we reimagine systems that will accommodate the invisible, beneficial microorganisms that help us to live, adapt, and thrive. In a brilliant bit of historical revisionism, Alix Gerber, Aya Jaffar, and Mei-ling Lu’s studio project *Microbiotic Covenant*⁴ suggests that religion and ritual have always been and will continue to be a means for creating stronger bonds with these invisible mutualists. The team designed rituals—that seem both of our past and our future at the same time—in which the exchange of human bodily fluids carries a sacramental—but also evolutionary—purpose (Figure 5). Rituals, their work suggests, have been for a long time the microbes’ strategy of using humans as a means to circulate, proliferate, and strengthen their

evolutionary presence (Figure 6). Through their staging of a series of ritual moments within a non-denominational system of religious worship, they juxtapose human intention with microbial evolution. Their work challenges us to imagine whether we must redesign our contemporary rituals in order to further sanctify, strengthen, and make central the microbe-human relationship.



Figure 5. Still from the video “Microbiotic Covenant” by Alix Gerber, Aya Jaffar, and Mei-ling Lu



Figure 6. Still from the video “Microbiotic Covenant” by Alix Gerber, Aya Jaffar, and Mei-ling Lu

Other unknowns are raised by Isabella Brandalise, Gui Curi, and Sneha Srinivasan in their studio project *Corporation*⁵, which plumbs the interactions between low-wage female labor, luxury services, and the instrumentalization of the microbial body. Situating their vignette in the moment of exchange between a pedicurist and a male client, they introduce us to several microbe-oriented “services” that supplement the traditional routine and raise shrewd questions about the systems of gender, class, ethnicity, power, and the exchange of bodily fluids. As the pedicurist uses her own saliva to activate microbial colonies that will boost her client’s wellbeing (Figure 7), the project forces us to consider who will be harvesting their own microbiome for the benefit of larger, commercial interests. Are we the microbes, or are they an independent colony of silent workers that we will cultivate for their own labor and services to the benefit of others? As the female provider narrates her duties, her actions introduce us to news ways in which microbes will play a more active role in these commercial and corporeal exchanges (Figure 8).



Figure 7. Still from the video “Corporation” by Isabella Brandalise, Gui Curi, and Sneha Srinivasan



Figure 8. Still from the video “Corporation” by Isabella Brandalise, Gui Curi, and Sneha Srinivasan

Blueprints do not exist for designing for complex systems. In our attempts to struggle with this challenge we’ve patched together a range of tactics that form the basis of a larger strategy of systems design. Across these four examples—alternately dystopic, playful, ambiguous, and critical—we can identify several consistent tactics: we never “see” systems *in toto*, but systems are enacted, perturbed, and animated through the interactions of humans, non-humans, and the designed

environment that scaffolds them all; the time period is unclear, raising questions about precedent, causality, and the interleaving of past, present and future system states; and the design interventions into complex systems do not fix—in both senses of the word—the situation, but instead model possible scenarios extrapolated from current conditions.

Systems surprise. To design in the context of complex systems one must be attuned to the perverse and unintended consequences that might emerge. It is not a question of taming or solving the unknowns but modeling how they may play out and anticipating widely divergent futures. Designing to solve complex systems is impossible. But that doesn't mean we shouldn't strive to model heuristically their tendencies, potentialities, and misbehaviors.

Correspondence

Jamer Hunt
Vice Provost for Transdisciplinary Initiatives
The New School
USA
E-mail: huntj@newschool.edu

Notes

1. These examples come from Studio 2, taught in the graduate Transdisciplinary Design program at Parsons School of Design, with Elliott Montgomery and Jane Nisselson in 2014 and 2015. Much of this work is inspired by Elliott Montgomery and his work on extrapolation and his speculative diagram tool: www.extrapolationfactory.com. Filmmaker Jane Nisselson has helped us to understand how we can utilize video and its visual and narrative strategies to realize system diagrams cinematically www.vbnyc.com.
2. The full video may be viewed at: <https://vimeo.com/111375087>
3. The full video may be viewed at: <https://vimeo.com/94870320>
4. The full video may be viewed at: <https://vimeo.com/124678368>
5. The full video may be viewed at: <https://vimeo.com/128258451>

References

- Dunne, A., & Raby, F. (2013). *Speculative Everything: Design, Fiction, and Social Dreaming*. Cambridge, MA: MIT Press.
- Meadows, D. (2008). *Thinking in Systems: A Primer*. White River Junction, Vermont: Chelsea Green Publishing.
- Rittel, H., & Webber, M. (1973). Dilemmas in a General Theory of Planning. *Policy Sciences*, vol. 4.
- Rumsfeld, D. (2002). DoD News Briefing—Secretary Rumsfeld and Gen. Myers.
U.S. Department of Defense. <http://archive.defense.gov/Transcripts/Transcript.aspx?TranscriptID=2636>

