
Artifacts as a Means to Investigate Alternate and Future Realities

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ABSTRACT

As design evolves and moves from the creation of physical objects to the creation of services, the methods and approach to prototyping have undergone a radical transformation, fundamentally altering the design process. Where once conceptual objects signaled the designer's view of the future, and sparked conversations about potential future realities; today, wireframes and frameworks are often used for the targeted refinement of specific interventions. As designers seek to shift the design process towards more participatory methods (Srikanth, 2023), perhaps there is a new space for artifacts to be reintegrated into the design process, in a way that would facilitate new kinds of interactions, interventions, and discourse; from the use of actual and situated artifacts for critical inquiry, to speculative objects that allow for descriptions of, and interactions with, possible future worlds, physical objects can be a valuable tool in participatory design. Such artifacts can serve as boundary objects between communities and between disciplines, as the design process becomes increasingly interdisciplinary. Furthermore, they can facilitate a deeper understanding of the value systems of different communities, as studying their interactions with objects allows us to decenter the human user in the design process and better understand how non-human objects fit into the larger systems they inhabit. This paper compares and contrasts speculative objects with material speculation. It examines the evolution of these two concepts, the key differences between them, and their potential applications in the context of participatory design. It also compares them to boundary objects and to the conceptual prototyping methods of the past, and examines how these types of objects and prototyping techniques have been used in different eras and their wide-ranging influence on different industries.

Keywords: Speculative design, Participatory design, Prototypes, Prototyping, Material speculation

DESIGN AS AN UNREALIZED UTOPIA

The goal of design, for the most part, is to shift things to a preferred state, as posited by Simon (1969). Consequently, the practice of design itself involves the creation of a possible future state. Every single sketch, model, or render is in some way, a vision of an idealized future state, represented in an object, interaction, or service that has not yet been developed. These unmade objects represent a future in which friction is eliminated, processes are improved, and individuals' quality of life is enhanced. This is, in many ways, similar to utopian thinking.

Bardzell builds upon this idea in the article “Utopias of Participation [2018]” in which they compare and contrast the fields of utopian thinking and design thinking. They posit that “design features its own equivalents of utopia-as-vision (in its sketches and models) and utopia-as-a-cognitive-act (in what is sometimes referred to as “design thinking”).” Bardzell goes on to explain that design thinking functions in similar ways to utopian thinking: Both create holistic yet concrete representations of alternative worlds and ways of life, and do so based on normative values and goals. Both approaches are imbued with a sense of optimism and materialized in conventionally recognized and skilled ways. The design prototype features themes of service, functionality, meaning, and situational fit. In contrast, the utopian narrative and societal architecture feature themes of travel, estrangement, and socio-political holism.

This utopianism can be seen in many presentations of design, both new and old. In modern technology keynote presentations, the potential benefits of new technologies and features are frequently highlighted, with a particular focus on their capacity to enhance the quality of one’s life. The advertising and marketing strategies employed by these technology companies frequently emphasize the transformative impact of the latest technological innovations. The contemporary interpretation of design as a methodology for addressing “wicked problems” (Buchanan, 1992) exemplifies the growing convergence of design thinking and utopian thinking. The solution for “wicked problems” is often a societal transformation on a grand scale, which utopian thinking promises to achieve.

This kind of design futuring is not new. At the end of the 19th and beginning of the 20th centuries, large-scale exhibitions at World’s Fairs presented divergent visions of the future. Exhibits such as Futurama began to show not just a single new product, but an idealized city, a combination of multiple interventions, objects, and inventions. The exhibit, designed by Norman Bel Geddes, and sponsored by the General Motors Corporation, was presented at the 1939 World’s Fair in New York. It presented a possible model of the world 20 years into the future [Bel Geddes, 1940]. The included not just cars or buildings, but an entire city built around a system of “automated highways”. An ideal city, built environment, and ultimately a reformed society were presented as a vision of the future. The exhibit was a resounding success, attracting over 30,000 visitors a day, and rating higher than any other exhibit at the fair. In many ways, this exhibit played a pivotal role in popularizing the concept of superhighways, which became a defining feature of 20th-century American culture.

Much of the production design process for science fiction (sci-fi) movies, shows, and video games involves this form of speculative futuring to create “realistic” imaginary worlds. The concept artists working on a production create futuristic, but plausible visions of the future; based on existing objects, but extrapolated into a future state that the work is set in. And much like Futurama, some of these conceptual objects may go on to influence the real world development or adoption of technologies, or shape people’s expectations of technological progress.

Alex McDowell, a narrative designer who has worked on a number of popular films, is responsible for popularizing the practice of world-building. In world building a world is developed “as a container for multiple narratives.” Each world is developed through cross-disciplinary collaboration and expertise, distributing broad research that culminates in multiple narratives. This helps organizations to “envision, design, and experience preferred futures” [McDowell, 2019].

One of the films that McDowell helped translate from page to screen was *Minority Report*; a Philip K. Dick novella from 1956, released as a motion picture in 2002. The world-building process was used extensively in the production of the film. It began in 1999, when director Spielberg invited fifteen experts convened by Peter Schwartz and Stewart Brand to a hotel in Santa Monica for a three-day “think tank”. He wanted to consult with the group to create a plausible “future reality” for the year 2054 as opposed to a more traditional “science fiction” setting. The experts included architect Peter Calthorpe, author Douglas Coupland, urbanist and journalist Joel Garreau, computer scientist Neil Gershenfeld, biomedical researcher Shaun Jones, computer scientist Jaron Lanier, and former MIT architecture dean William J. Mitchell. This collaboration resulted in what McDowell nicknamed the “2054 Bible”, an 80-page guide created during pre-production which listed all the aspects of the future world: architectural, socio-economic, political, and technological. Since many of the ideas were derived from the expert opinions of the those in the think tank, they were all grounded in some form of reality. As a result, (and because of the film’s success), many of the technologies shown in the film have been realized or are under development in some form. The movie itself influenced and accelerated the development of these technologies as they brought tangibility to abstract concepts which in turn fueled the development of these technologies [Harrell, 2010].

Although this kind of utopian thinking can facilitate the development of technological narratives, it is not without its shortcomings. As Bardzell goes on to state, there are two primary critiques of this form of utopian thinking:

The Fantasy Critique states that traditional utopianism ultimately amounts to fantasy, because the vision it proposes lacks any connection to present reality. Utopias are created in a single, unchanging state, by their creators, and are not born out of social processes or social discourse. By merely describing these perfect end states, completely removed from our everyday present, the creators offer no concrete social strategies or tactics for getting from here (our present state) to there (the imagined utopia). By focusing only on the utopian future, they fail to take into account the available mechanisms for change, and the social forces that resist them. As a result, utopianism becomes tied to, or a form of, escapism. Bardzell finds many similarities between this critique and the concerns raised in design research: that design, like mass media before it, peddles in “smooth surfaces and pleasant consumerism”, while masking and ultimately furthering the interests of an undesirable and unsustainable socioeconomic order.

The Totalitarian Critique states that totalizing logics and rhetoric are both unavoidable in utopian thinking, and crush dialogue, dissent, and the very possibility of growth. This fine line between utopianism and dystopianism

is a theme common to both political philosophy and dystopian fiction. Utopias propose a state of perfection, in which all particulars are unified under a single rational system. But history has repeatedly demonstrated that totalitarian states have been accompanied by the domination of, and violence towards, minorities. Analogues can be found even in modern day politics with the back-room collusion between security agencies and multinational corporations leading to a data-driven surveillance state. There is a fine line between the utopian vision of an information driven, quantified and optimized society; and a surveillance state that discriminates against those that refuse to comply and participate.

Understanding these critiques is essential in developing speculative objects and in using design as a participatory futuring activity. These narratives and visions need not represent a singular vision; rather, they can be employed to facilitate discussion and investigation of potential alternatives.

ARTIFACTS TO PROVOKE AND SPECULATE ON FUTURE WORLDS

Design methods don't always have to be used to create a commercial object. They can also be used to critique existing designs and speculate on possible futures and alternatives. The term Speculative Design was popularized by Dunne and Raby in their book *Speculative Everything* [2013]. This approach uses design to open up possibilities that can then be discussed and debated and used to collectively define a preferable future for a given group of people. The goal of speculative design is to engage stakeholders and experts in discussion, but also grant them the permission to let their imaginations flow freely.

A similar, related concept is that of "Provotypes". Wensveen and Mathews [2014] suggest the use of prototypes that provoke reactions and insights as a way of re-examining values that may be taken for granted. They suggest that this form of prototyping could be used as a form of inquiry or as a research method in its own right. These objects and methods help re-orient the design process to be more critical of what is being designed.

The goal of these forms of speculative, participatory design practices is to shift the needle away from the traditional forms of utopian thinking, in which the designer imposes their singular visions on a community, and to involve the people of that community in shaping their own future(s). This responds to the Totalitarian Critique, by both allowing for multiple differing futures as opposed to a single idealized future; and by allowing those who will be impacted by these grand visions to have a say in the process. They also seek to respond to the Fantasy Critique by helping to put in place factors that will increase the probability of more desirable futures coming to fruition.

These types of speculative and futuring projects cannot be judged by the traditional design metrics of sales and user preference. Instead, they need to be judged on how effective they are at eliciting reactions, sparking conversations, and opening up new modes of thinking. In this way, these kinds of projects and artifacts begin to act as *boundary objects*, bringing multiple different people into a conversation, often around an ambiguous topic.

BOUNDARY OBJECTS

The concept of boundary objects was introduced by Star and Griesemer in 1989:

“Boundary objects are objects that are plastic enough to adapt to the needs of differing parties, but robust enough to maintain a common identity across these different use cases. They have different meanings in different social worlds, but their structure can also act as a means of translation across these worlds.”

As the design process becomes increasingly interdisciplinary, these boundary objects become an important tool, as they work to engage multiple stakeholders. Each stakeholder may approach a prototype or concept with a different perspective, either due to the human biases associated with their lived experience, or because of the nature of their work and how it relates to that object. For example, a materials scientist may be concerned with the price to performance ratio of the material used; while a marketing specialist may be more concerned with whether the colors and finishes of the object will appeal to the target market segment. Both may be looking at the same object but have different perspectives and concerns. An effective boundary object sparks a conversation between different disciplines.

These conceptual objects can even spark ideas and conversations in unrelated fields. An interesting example comes from Pagitz & Bold (2013), and a paper on biomimetics, which was inspired by a BMW concept car. The BMW Gina Light Vision Model (or “Geometry and functions In ‘N’ Adaptions”) was created almost entirely as a thought experiment, with little consideration given to commercialization and mass production. The concept was designed by a team led by BMW’s then head of design, Chris Bangle, who says that GINA allowed his team to “challenge existing principles and conventional processes”. The result was a concept car that used spandex fabric stretched over a metal frame, as opposed to the traditional metal skin of traditional car designs [Squatriglia 2008]. As a one-off concept, it served its purpose of sparking conversations around some of the traditions that have become ingrained in the transportation design process. We haven’t seen a fabric covered car reach mass production since, but it inspired Pagitz and Bold’s research into “Shape-changing shell-like structures” in the field of biomimetics.

The GINA project shows us how these methods of conceptual, speculative design can act as boundary objects, sparking conversations and challenging existing principles and processes in multiple fields. But by studying the reactions, reviews and impressions that these projects have generated, we can start to conduct a form of research, one that is removed from the traditional conventions of user research: material speculation.

Material Speculation

Wakkary et al. have proposed the idea of “Material Speculation”, which emphasizes the material or mediating experience of specially designed artifacts in our everyday world to speculatively and critically inquire through design [Wakkary, Odom, Hauser, Hertz, & Lin, 2015]. In the same way that

speculative design draws on the idea of possible futures, material speculation looks at the idea of possible worlds. This builds on philosopher David Lewis's idea of counterfactual statements, statements that can be understood as true or false statements depending on which world the statements inhabit. This "possible worlds" theory is based on two factors:

1. That reality comprises all that we can imagine: the actual world, and all possible worlds.
2. That actual worlds, have no privilege or advantage over possible worlds.

By adopting this theory and adapting it to the world of design, Wakkary et al. hope to bring a new level of criticality to design, by shifting many of our underlying assumptions from the actual world to other possible worlds. Here speculative artifacts are replaced by counterfactual artifacts. Objects that are not from a possible future, but from another possible (present) world.

This method opens up new possibilities for us to critically explore the design process, but Wakkary et al. have been careful in how they frame this concept of material speculation. They summarize the characteristics of material speculation as follows:

1. Material speculation is the coupling of counterfactual artifacts and possible worlds. The authors frame "Material Speculation" as being the combination of a counterfactual artifact intended to be encountered in the real world, and the possible worlds it generates through encounters.
2. Counterfactual objects exist in the everyday world. Here the authors emphasize that these objects and artifacts should maintain the contradiction of being from an alternate possible world, while existing in our present, actual world.
3. Counterfactual artifacts are generators of possible worlds. These worlds include both the worlds imagined by the designers, and the worlds imagined by those who encounter or interact with a counterfactual artifact.
4. Counterfactual artifacts are specially crafted artifacts with the intent and purpose of inquiring into new possibilities.
5. Material speculation is critical inquiry: The authors make it a point to note that counterfactual artifacts inherently challenge the actual world because they are designed to occupy the boundary between the actual and the possible.

Speculative Design, Material Speculation and Participatory Design

By their very nature, these methodologies involve the participation of an audience. These may be carefully controlled (internal prototypes within a company) or left open to the public (in the form of a public art installation) but all of them require an audience to interact with, question, interpret, or use the objects in order for them to work effectively. In this respect, it may seem appropriate to use these kinds of methodologies in combination with participatory design methods. But they can be problematic for a number of reasons.

The practice of participatory design has its roots in the cooperative design movement in Scandinavia in the 1960's and 1970's. The goal was to give a voice to stakeholders who traditionally had no influence in the design process. But over time, participatory design has been appropriated in other, often corporate, contexts, and its emancipatory politics have been diluted into corporate practices of "user-centered design" (Bannon and Ehn, 2013). Light and Anderson warn us of the fact that participation alone is not enough to address the politics of design: Designers often unilaterally frame the project and invite participants in what they refer to as a "benign imposition." (Light and Anderson, 2009).

Based on these criticisms, theorists often argue for a blank slate approach to participatory design, that is, presenting a blank slate to participants, as opposed to offering options for an A/B test, as is currently the case for much of user-centered design. There are many advantages to this kind of approach: It can remove any bias that the designer may bring to the participatory design process. From a design perspective, the lack of an existing form opens up new possibilities and challenges. And from a social standpoint, it symbolizes the authority of the participants in the design process, ceding the designer's authority over a community [Condon, 2008].

But there are counter-arguments to the blank slate approach. Speculative objects can open up new conversations around ambiguous topics. Material speculation can also open up conversations through the use of counterfactuals. When facilitating participatory design with diverse groups of people, it can be challenging to establish a shared understanding and to prevent discussions from being dominated by a few individuals with personal agendas. The role of the designer as a facilitator becomes increasingly important in this form of participatory design. Fass, Lockton, Forlano and Brawley (2020), suggest the use of "thinking through things" as an alternative here. Quoting Tversky (2015), they state "when thought overwhelms the mind, the mind puts it into the world", and go on to explain how the use of drawing has been explored in such use cases more than the use of physical models. This form of physicalization of complexity, allows participants to explore and express complex ideas in a way that may not be possible through traditional conversations.

Participants may have limited exposure to new technologies and the forms they can take. It can be difficult for most people to articulate what makes one design or option preferable to another especially when working with objects or technologies that don't yet exist. A/B testing, while problematic, has become a widely used tool, because it allows for users to easily point to one option over another as a "preference", without having to explicitly state the reasons for their preference.

Designers will often point to the technical challenges of transforming user generated designs into real, functioning, mass-producible designs. There is a whole field of "design for manufacture" that bridges the concepts and prototypes that emerge from the design process with the engineering and technical processes required to mass produce an object. This encompasses a wide range of disciplines and processes, from materials science to manufacturing processes, to costing and value engineering. And today's

design process increasingly relies on computer-generated simulations to reduce the cost of manufacturing and testing large numbers of prototypes. It is evident that these activities fall outside the purview of participatory methods, as they necessitate training and technical expertise.

In this case it may be better to think of participatory design and material speculation as different parts of the same process. Where participatory design can be used to allow users to design their ideal experience and provide them with tools to “think through things”, prototyping can help to better define and craft the tangible touchpoints that make up that experience. The prototypes then, can start to become “the machine that translates our utopian visions into reality”

PROTOTYPES AND MATERIAL CULTURE

Projects such as the BMW GINA are almost akin to art pieces, delicate and irreplaceable. However, this form of research through speculative object making could also be used to create prototypes that are meant to be used, abused, and discarded. Traditionally, design prototypes are often meant to be temporary objects, with little thought given to long-term preservation, use or storage. Design prototypes often lack functionality, while engineering prototypes are used to test different part configurations and manufacturing techniques. Additionally, prototypes may also be subjected to destructive testing to understand how objects would respond to extreme situations that they may not encounter in regular use.

Using speculative objects as “usable prototypes” can help designers better understand people as a form of design anthropology. Giaccardi, Cila, Speed, & Caldwell (2016) suggest the use of a method called “Thing Ethnography” that involves the study of everyday practices from the perspective of a material object. This form of research opens up a new understanding of the relationships among people, objects and use practices that would be difficult to elicit through traditional observations and interviews alone. This form of research can also serve a larger purpose: it forces designers to de-center the human from the design process. A common criticism of the user-centered design process has been that in focusing on a single set of users, designs fail to truly understand and represent the social context within which the objects would live [Papanek, 1972]. By de-centering the human from the design process, perhaps we can begin to better understand the relationship that designed objects have with the larger system within which they live. From the initial production of raw materials to the ultimate disposal of the object, numerous interactions occur between the non-human object and humans that lie outside the “designed” interaction between the object and the user. These interactions are often overlooked and contribute to the issues described by Papanek. By combining participatory design and thing ethnography, new insights can be gained that would not have been possible with traditional forms of user research.

CONCLUSION

Design is an inherently a futuring activity, aiming to create a “better” future for a group of users. And Design Thinking shares numerous similarities with

Utopian Thinking. However, this form of utopian futuring is not without its drawbacks. Firstly, it presents a future state without considering the means to achieve it. Secondly, it can impose a viewpoint that is utopian for some, but dystopian for others.

However, certain contemporary design processes and methods permit a critical examination of both the futures presented by design, and the process (and, more importantly, the underlying assumptions) that goes into creating said futures. The speculative design approach enables us to challenge established traditions and re-examine the fundamental principles that underpin the design process. It can facilitate discourse on the potential future directions that design may take.

In contrast, material speculation, uses the same techniques to re-interpret our present, situated world, through the use of crafted counterfactuals that might inhabit alternative possible worlds. Both methodologies rely on the participation of various user groups as an essential part of the process. They both aim to facilitate the initiation of new dialogues regarding preferred states, as opposed to imposing a novel solution upon a group of users.

Both of these methods permit a critical examination of existing designs, existing design processes, and the assumptions that designers and stakeholders may hold. Through this examination, insights that would not have been possible through traditional modes of design and user research can be revealed. They also present the possibility of de-centering the human in the design research process, which in turn presents a new form of design that invites people to collectively define a preferred future and put in place the mechanisms that increase the probability of turning that future into a reality.

REFERENCES

- Bannon, Liam and Ehn, Pelle (2013). Design: Design matters in participatory design. In *Routledge International Handbook of Participatory Design*. Simonsen & Robertson (Eds), Routledge, 37–63.
- Bardzell, S. (2018). Utopias of participation: Feminism, design, and the futures. *ACM Transactions on Computer-Human Interaction (TOCHI)*, 25(1), 1–24.
- Bel Geddes, Norman (1940). "Magic Motorways". Random house.
- Buchanan, Richard. (1992) "Wicked Problems in Design Thinking." *Design Issues* 8, no. 2 (1992): 5–21. <https://doi.org/10.2307/1511637>
- Condon. (2008). *Design charrettes for sustainable communities*. Island Press.
- Fass, John and Lockton, Dan and Forlano, Laura and Brawley, Lisa (2020) *Thinking with Things: Landscapes, Connections and Performances as Modes of Building Shared Understanding*. *IEEE Computer Graphics and Applications*. ISSN 1558–1756 (In Press)
- Dunne, & Raby, F. (2013). *Speculative Everything: Design, Fiction, and Social Dreaming*. The MIT Press.
- Giaccardi, E., Cila, N., Speed, C., & Caldwell, M. (2016). Thing Ethnography: Doing Design Research with Non-Humans. In *DIS'16: Proceedings of the 2016 ACM Conference on Designing Interactive Systems* (pp. 377–387). Association for Computing Machinery (ACM). <https://doi.org/10.1145/2901790.2901905>

- Harrell, Phil (2010). The Future According To 'Minority Report' May Be Now. NPR - All Things Considered Podcast. <https://www.npr.org/templates/story/story.php?storyId=128914683>
- Light, Ann and Anderson, Theresa Dirndorfer (2009) Research project as boundary object: Negotiating the conceptual design of a tool for international development. In Proceedings of the ECSCW 2009. 21–41.
- McDowell, A. (2019). Storytelling shapes the future. *Journal of Futures Studies*, 23(3), 105–112.
- Pagitz, M., & Bold, J. (2013). Shape-changing shell-like structures. *Bioinspiration & biomimetics*, 8(1), 016010.
- Papanek, Victor J. (1972). *Design for the Real World: Human Ecology and Social Change*. [1st American ed.]. New York: Pantheon Books, 1972.
- Simon, Herbert A. (Herbert Alexander). (1969) *The Sciences of the Artificial*. Cambridge: [M. I. T. Press], 1969.
- Squatriglia, Chuck [2008]. BMW Builds a Shape-Shifting Car Out of Cloth For Wired Magazine. <https://www.wired.com/2008/06/bmw-builds-a-ca/>
- Srikanth, N. (2023). Design Anthropology and the next evolution of the design process. In: Daniel Raposo, Nuno Martins, Daniel Br and ão (eds) *Human Dynamics and Design for the Development of Contemporary Societies*. AHFE (2023) International Conference. AHFE Open Access, vol. 81. AHFE International, USA. <https://doi.org/10.54941/ahfe1003536>
- Star, Susan; Griesemer, James (1989). "Institutional Ecology, 'Translations' and Boundary Objects: Amateurs and Professionals in Berkeley's Museum of Vertebrate Zoology, 1907- 39". *Social Studies of Science*. 19 (3): 387–420. doi: 10.1177/030631289019003001.
- Tversky, B. 2015. The Cognitive Design of Tools of Thought. Re- view of Philosophy and Psychology 6, 99–116. <https://doi.org/10.1007/s13164-014-0214-3>. p. 99
- Wakkary, R., Odom, W., Hauser, S., Hertz, G., & Lin, H. (2015). Material speculation: Actual artifacts for critical inquiry. In Proceedings of The Fifth Decennial Aarhus Conference on Critical Alternatives (pp. 97–108).
- Wensveen, S., & Matthews, B. (2014). Prototypes and prototyping in design research. In *The Routledge companion to design research* (pp. 262–276).