

Ideational Drawing as a Foresight Method in Designing Future States of Objects

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Abstract

This paper examines how artists and product designers could develop objects in a technological social era by using foresight and ideational drawing as a method of inquiry and anticipated development. It examines methods how artists and designers can consider future states of objects that bridge social engagement between users. It also provides a framework for design considerations of how objects may outgrow its technological value over time. The methodology of foresight and ideational drawing aids in understanding how designers can approach and create an understanding how the object could operate in various future world states and its possible comingling.

This paper examines how a nested framework process informs how product designers and the designing of objects are interrelated to techno-social experiences. A nested framework process is a series of applied research methods used in combination to approach a complex problem. It argues for the inclusion of ideational drawing as a method to be included in the Popper diamond.

Foresight as Method

Foresight horizon scanning and matrix development are used in this research as a method to develop possible futures of objects.

As a research method, foresight can be used to create insights, learn demands of new markets, and develop implications for action in complex territories. By using foresight methods to develop new products, a context is created to directly enable creativity within the constraints and frameworks in design. The generative phase of foresight is the foundation for a process of inquiry. It consists of gathering, analyzing and synthesizing of existing knowledge, in order to codify knowledge into a new vision of the future. Rafael Popper indicates three main stages of this generative phase: Exploration, Analysis and Anticipation. [1]

Exploration provides an understanding of main issues, trends and drivers. A driver is the understanding of what is propelling the trend. Analysis is an understanding how the main issues; trends and drivers influence each other. Anticipation examines previous considerations and aims to develop possible futures.

Ideational Drawing as Method

To consider adding ideational drawing as a research method, one must understand how drawing is used in the ideation and research phase. Bill Buxton writes in "Sketching User Experiences", that even if the designer laboured for hours, or days over a drawing, the rendering

style is intended to convey the opposite, by conveying it was done in minutes a sketch indicates "I am disposable, so don't worry about telling me what you really think, especially since I am not sure about this myself". [2] Buxton further qualifies sketching adds to the design process by indicating that it is quick, timely, inexpensive, disposable, plentiful, and provides a distinct gesture with minimal detail. This type of 'thinking drawing' provides an appropriate degree of refinement that corresponds to the designer's level of certainty in the designers mind, and asks to suggest and explore a subject rather than to confirm with providing a level of ambiguity that will be able to be interpreted in different ways. [3] This incompleteness of a drawing, providing a vague description, allows the outcome to be discussed and iterated in the reading of image, which is integral to the design process. Buxton identifies and classifies drawing into five categories: sketch, memory drawing, presentation drawing, technical drawing and description drawing. Sketching, is articulated as a type of thinking drawing, memory drawing is a render made to record and capture ideas, presentation drawing is a type made for a customer and may be more refined, technical drawing as type of drawing to use for a fabrication and description drawing which is intended explain something such as an illustration for an emergency exit. [4] Buxton clearly delineates the use of sketching and its role in the design process from that of prototype. A prototype has different properties than drawing. It must be didactic, describe, refine, answer, test, resolve, be specific and act a depiction. [5]

Buxton argues that the act of drawing is integral to the user experience design process as both ideation and conversation based tools are used in technical user design processes. Deanna Petherbridge articulates additional examples how drawing is used is for dialogue purposes by architects, engineers planners and designers. Defined as such, she refers to drawing that is used mainly in three capacities: as a medium for communication, a medium for design and as a medium for analysis specifically as a means of knowledge and understanding. [6] For the purposes of this paper, sketching or drawing is examined as a process of knowledge and understanding to think through concepts.

Petherbridge refers to the research work of Kathryn Henderson, who claims "Sketches are at the heart of design work". They serve as thinking tools to capture fleeting ideas on paper where they can be better understood, further analyzed and refined and

negotiated". [7] Henderson further articulates and refers to sketching as "Messy Practice", or hand sketching and a "mixed practice" of computer graphics. In this study the notion of drawing as Petherbridge describes as a "boundary object", and its ability to be a "holding ground and negotiation space for both explicit and yet to be made explicit knowledge" and its potential for a tool of communication. [8]

In this process, sketching as ideational drawing is used to think through problems, and create new ones, as part of the problem framing process. Drawing a user's experience with a potential new object presents a context for product designers to think about how to draw objects of experience that may be networked in a way not previously conceived. Petherbridge introduces this as a "boundary object", however it can also be considered as a proof of concept, and a method to describe and illustrate a potential new problem to solve.

Terry Rosenberg refers to ideational drawing as an act of raw thinking, specifically "thinking-in-action and action-as-thinking". He refers to ideation drawing as thinking space, where space is thinking and is presented as artifact, and makes the clear distinguished point that ideation drawing is "thinking" and not "thought." Drawing is used to ideate as a present activity and the "immediacy of the thinking-act". [9] Rosenberg cites the examples of the work of John Rhys Newman, a senior Design manager of Nokia Design's Insight and Innovation team. Newman describes the process of his drawings in meetings and conference calls where he is "half listening, half drawing" and the semi-preciousness and semi-focus of the drawing and the accidents that occur as his focus drifts. Part of his process is to date stamp the drawing, and place the drawings in a set of manila envelopes to file, as an effort of producing the drawing itself as a relinquishing of a hold on thinking, to see what happens as a leap of thought through drawing. Rosenberg further articulates Newman's drawings into three categories: "Fictions", "In Sight and Mind", and "Generative Drawings". All drawings are done in pencil on copier paper and identified with a date stamp.

Fiction Drawings as classified by Newman are "musings or doodles" as they are not illustrative of anything specific and are more reflective a thinking act. In 2006, a series of fictional drawings involved issues of flooding, in particular influenced by global warming and the floods in New Orleans. The drawings show objects stacked high, using chairs to levitate boats and atypical awkward gathered objects, absent of water. The objects drawn in this space construct an imagine space as a result of a flood. This disruptive act of the flooding can change how objects are normally viewed and used in its designed space. It is in this misuse of objects that new shapes begin to form, and through the act of drawn repetition new ideas can emerge from shapes that erupt from a semi-illustration of an imagined flood.

In the category of "In Sight and Mind" Newman's drawings show a few identifiable objects, illustrating the artifacts he uses as drawing aids (pencils, paper, paper clip, eyeglasses etc.). The drawings start as observation

drawings, a pair of glasses is drawn in a meeting for example and is built upon, as Rosenberg describes "a world of alternative logic". [10] These drawings typically are derived by what is in front of him on his desk. They are semi-observational, as the drawing practice tends to be interrupted with other activities such as being on the phone, or in a meeting. Objects are layered on top of each other, and this tracing of objects on a desk, observed and have imagined in distraction, form new types of objects that are not typically depicted from pure representational drawing. These examples offer valuable insight into how designers can use drawings in various ways in the creative process and speak to the importance of generative and ideation drawing because it permits a non-language based method to build new products.

The third category of Newman's drawings, are generative drawings. In these drawings Newman poses an exploratory question, for example "Why do we build sandcastles?" Some of these drawings are as a result of conversations; some identify key elements of building sandcastles such as buckets and shovels. In some of Newman's drawing the material and scale shift the buckets from industrial to playthings. Again, repetition is used here to ideate and replicate the act of building a sand castle. By posing questions, Newman has introduced constraints on his drawing, and is using drawing as point to answer a question non-verbally through shape and form. In shifting scale and scale shift he begins to change *what is a sand castle*, and how could it be re-imagined. In drawing these new playful shapes, they act as a record to be considered when addressing a new design problem and how to approach a new form of a new object that does not yet exist.

Ideation, generation and fiction are significant to this research because it articulates how designers are already using drawing as a method of inquiry as it allows ideas to build quickly in an action based way.

Ideational Drawing as Foresight Method

Buxton, Henderson and Rosenberg research argues, that ideational drawing is integral to the generative design process. This paper argues that ideational drawing should be included as method in the Popper diamond, as a method of semi-conscious brainstorming as part of the ideation process of design. The diamond demonstrates a practical framework of thirty-three methods articulated by Popper. As shown in the modified diamond, ideational drawing should situate in the creative polarity of the diamond as a research method for design. Ideational drawing is closest to the essay or scenario writing as a research method, as it suggests a narrative or reasoning. While several approaches have been used as my methodology, their pedagogical similarities offer a complimentary approach and its divergence create greater understandings of this method as a specific creative based foresight method.

Developing a Matrix Approach

Kees Van Der Heijden states a matrix approach is appropriate in situations of considerable uncertainty. [11] In terms of understanding inter-relationships of driving forces, typically a two by two matrix of critical uncertainties generates several plausible scenarios for plausible worlds. The cube model, developed with three individual axes looked at the polarities in function, ownership and technology in product design to act as grounding points of considerations for product designers. A cube can examine the three axes of polarities to create eight possible future world scenarios, which are to act as a guide of reimagining the product through different lenses. These scenarios are valuable because they present a well-rounded view of the possible world the objects are designed for. A cube model is not typical of the foresight process, perhaps as Heijden elaborates, the matrix model maximizes the range of scenario outcomes and the potential impact. However, the cube model can participate in the foresight process in a significant way by allowing elaborated worlds and maximize outcomes. The nature of the choice for scenario dimensions are what is high impact and highly uncertain for a large range of possible impacts. [12] The choice to investigate the cube model was to elaborate on possible futures with a stable framework. Trends texture and develop the world design to create future uncertainty as stated, additional criteria are implemented through a variable set of trends. These design criteria allow us to imagine objects in new ways from its origin and predicting its future. Ideational drawings are generative in nature and inform questions as to how objects are constructed in this world. This criterion acts as a guide in ideation for a designer to contemplate how to think about approaching an object's complexity in the future through a creative process.

The Double Diamond approach [13] elaborates the "Discover, Define, Develop and Design" cycle as a method for designers to consider when developing products. The double diamond model is a well-considered product design mode. It articulates a method of expanding and funneling the design process. Ideational drawing for example could be part of the discovery process when brainstorming possible solutions and feasibility of the product. What the double diamond model does not incorporate an on going service based model for products engaged with a community. It also does not articulate the designer's responsibility to consider post-delivery of the product. The Stanford University ME310 Design Innovation Process was developed as part of a curriculum for a project-based engineering design course at Stanford University. [14]

The cycle considers a five-phase approach that: define the problem by observing the needs of the intended users; benchmarks what technologies exist to identify design opportunities; brainstorm to develop new ideas; prototype to create a proof of concept and Test and iterate to improve the design.

The second it can be assumed that a variety of methods can be used between the brainstorm and

prototype process prior to the model stage. Ideational drawing for example would be used as method to think through concepts, and generate ideas on how to approach the problem. Ideational drawing as a primary generative method to the brainstorming process considers new scenarios for the future. It is proposed that once the problem is defined, and benchmarking phase has been completed, setting a time frame would be an important next step for designers to consider developing products. A time frame could be cast to a point where conceived technologies have radically shift, however it suggested time horizon could be no more than ten years for products with a reasonable intention to reach a marketplace. Beyond a ten-year horizon drawings may be considered as a design fiction.

A STEEP V process can inform the brainstorming process. To develop a broad set of trends signals will need to be identified and clustered. These can be categorized under Social, Technology, Economy, Environment, Political, and Value based trends. Widening the scope of the trend index beyond only one category (such as technology) allows for a greater possible range of implications to consider. Having identified three to five trends per category naming trends is important. It will also be important to note what drives this trend. Trends were categorized identifying implication of Function, Ownership and Technology axis polarities. This step will allow trends to texture the world design, as the formation of eight possible worlds to consider.

Now with eight possible worlds as a source for potential future for objects to inhabit this allows for a rich basis to ideate and brainstorm possible objects for the identified problem. It is important to note, that if an intended problem is focused on only one polarity (i.e.: single owner, one function) all worlds may not need to be explored.

Ideational generative drawing is a suggested method of brainstorming where ideas can free flow and be articulate in a visual way.

As the perimeters of the worlds are firmly set, additional questions can be asked to start the drawing purpose. As part of this research paper, these were part of the questions ask prior to drawing:

- What does this world look like? Who lives here?
- What would the identified person(s) use in this world?
- What common objects might not exist in projected time frame?
- How will an object change in the projected time frame?
- How do trends identified influence this world and affect objects?
- What new problems are suggested by the drawing?

The purpose of the drawings would be to generate a volume of ideas in a rapid way. Sharing ideas is an important part of this phase with visual examples to

support conversation and collaboration, especially when working in cross-disciplinary teams.

When moving to a prototyping phase, it is an important to keep in mind the adapted Norman Model incorporating Green's Context proposition. This model will help guide questions on the object's relationship to its intended audience, and its context and activity within a community. Dreyfuss' approach to consider utility and safety, maintenance, cost, sales appeal and appearance may occur in the final prototype and testing phases. [15] This among other reasons, may reframe the problem initiated and may need to be further iterated and refined.

Conclusion and areas for further inquiry

Developing a trend deck of current signals in the changing ground of social, technology, ecology, economic and value factors challenge both the object and its design in the future. By developing eight world scenarios, although it allowed a certain complexity in how to consider an object, it creates difficulties and problematizes the parameters in the design idea process.

Although Heijden elaborates that this model to maximize the range of scenario outcomes and potential impact, its complexity is often difficult to navigate and differentiate when in the moment of creation of design ideas through ideational drawing itself. One concern presented using the model itself is that it does not factor in the possibility of waste. If an ideational drawing is developed using this framework, and if an ideational drawing did not fit the specific criteria, where does it go? This research has boldly taken on these questions in order to illuminate insight on the future of product design process and considers the impact towards incorporating contextual value of products while firmly understanding both limitations on utility and ownership.

In a scenario design with extreme perimeters it was difficult to contemplate drawings within an absolute plausible future and started to move into design fiction. The extreme reveals the potentiality of objects if pushed to its limits.

Although ideational drawing was a strong research method to iterate and ideate it has its limitations to convey what the object was or how it worked possible in its complexity in a network. It should be noted, that handwriting was an interesting by product to the ideational drawing. With difficulty drawing techno-social aspects to the object handwriting became a notation to self, illustrating what the object was and how it functioned. This iteration became part of the drawing. The scrawling of the notion became a record of a thought in the moment.

In closing, the marriage of foresight and ideational drawing leads to a new language construct in how designers can approach object design in the complexity of a techno-social age.

This research has taken an innovative approach by developing a nested framework and adds significantly to design discourse through the analysis of the ideation process for product design and the incorporation of new

methods to contemplate how products can design new objects for the future. Although ideational drawing was a strong tool to iterate and ideate it has its limitations to convey what the object was or how it worked possible in its complexity in a network.

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