

Scenarios as a Site for Stigmergic Commons

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Abstract

This paper proposes that scenarios are a suitable platform for situation-specific, user-generated annotations of institutional processes. Scenarios achieve this suitability by allowing participants to arbitrate between different value choices in the context of relevant narratives. Scenarios also facilitate change, as they are able to present plausible speculations juxtaposed with the existing narratives, preparing participants for shifts otherwise obscured by past results. As a result of their direct engagement with the situations of participants, scenarios also provide a meta-theoretical criteria for the applicability of various theories of change to the particular context.

Introduction

To the individual participant encountering a given institution from the outside, it usually appears that particular technologies, be they products, services, or policies, are produced or provided by a given institution with specific design affordances already in place, reinforced by a long-standing history. These affordances not only serve and condition the individual participants, they create a repeated script which guides these interactions; a script which emerges in tandem with the institutions themselves to handle recurring problems. The ongoing stream of participants and their use, misuse, abuse, uptake, rejection, success, failure, and protest shapes these interactions, but usually only slowly [Orlikowski, 1992]. Usually each participant is in some sense alone in their concerns: verbal accounts are constrained to the place and time in which that participant interacts, while written accounts are disseminated away from the sites of these encounters. In other words, there is rarely a sustained trace of the participant at the site of the activity.

Perhaps this is changing. Communications technologies may now create a commons area that is ambiently available, serving as the site for new institutional formations, emerging from and providing support to the navigation of participants through these situations as they occur. Hopefully, these formations will not only allow an 'ambient findability' [Morville, 2005], but also an 'ambient situatedness', through which the participants understand their current narrative and what the choices in front of them mean for their likely outcomes. In other words, the successful innovations facilitated by this mechanism would be accomplished through collaborative foresight among the participants, but only if the mechanisms and their supporting institutions could emerge stigmergically [Elliot, 2007]. But, what mechanisms could be appropriate for this kind of commons?

Scenarios, and their annotations, are a uniquely capable technology for this commons. Scenarios are stories about the different ways the future may turn out, and to employ a scenario methodology is to tell a variety of such

stories, where the plot is driven by different factors turning out to be the driving considerations [Schwartz, 1991]. The raw material for scenarios, the driving factors of change in a given time and context, have been identified as core to all scenarios that can be openly shared by foresight practitioners [Cascio, 2006].

In order for an open scenario platform to serve as this public guide to distributed sense-making, it must be designed to take into account multiple factors. Fortunately, these factors are intrinsic strengths of scenarios. Scenarios, by definition, are relevant stories about future conditions. Because of this, and other structural properties, scenarios are suitable bearers of value, able to hold the assessments of the participants and arbitrate between them in legible ways. Scenarios can also represent the dynamics of complex systems in an intuitively accessible way. Finally, scenarios can also represent recurring activities recursively, allowing the dynamics of the overall system to be strategically explicated.

Scenarios as Relevant Stories

To understand how scenarios effectively work as narratives, we need to take a philosophical detour. This paper does not subscribe to Latour's point of view that the appropriate framework for understanding the issues of our day has shifted from 'matters of fact' to 'matters of concern' [Latour, 2008]. Instead, both matters operate simultaneously and in an interwoven way. Concerns give the legitimate motive to operate upon and further structure a space of criteria with a structure already imposed through historical processes with physical interpretations. It is through concerns, which themselves are proper facts of human subjectivity, that people can impose an inductive frames around the dynamics of their embodied encounters. While every agent has precisely interpreted, non-contestable matters of concern, this is also not the entire story: the scenario must not only tell the stories of trajectories in their world of concern, but also must maintain a fidelity to the factual trajectory of events to the degree that this trajectory affects future concerns. In other words, not only must sense-making narratives address concerns, but it must not tell fictions about them that will later come to be inconsistent with these and other concerns.

People are the evaluators, providing the pragmatics to decide how things should be, to evaluate what parts of current life affect this position, and to instigate the changes to align their experiences with their desires. But yet, they do so as part of a broad state space fully endowed with history and constraints, limiting not only their available operations, but also the space of concerns they have come to construct.

In a more conventional reductionist explanation of philosophical concerns, we might say that first we are to understand the way things are: to break down the overall picture in front of us into its functioning mechanisms in a top-down way, and then after these mechanisms are clear, to manipulate them in the way our deliberation causes the right path to emerge from within. In summary, this view posits that at first we will know the world, and then given that knowledge, we will act on it in a way that meets our desires.

Instead, first we have desires, needs, and issues that the development of which causes us to have a proper focus upon the aspects of our environment we need to understand [Varela, 1999]. Then, we use the science of systems to piece together the way that these aspects then might behave, rendering how their behaviors fit in with these cares. Let us call this the 'analytic/deliberative framework', as reflecting the terminology used in public participatory geographic information systems. [Nyerges, 2005]

To understand the difference between Latour's view and this one, let us consider a hospital setting. It is not as though the patient should strictly prefer only an account of how various decisions will change their risk of death, levels of pain, limits in capabilities, and separation from normal life activities, without any description of how the physical realities of their present afflictions dictate those capabilities. Instead, different alternatives for medical treatment are grounded in material narratives for how the biological condition may be generated. The patient brings in their concerns and symptoms, and a physical story of their illness, and how various treatment options will move their story forward, are presented [Klein et al., 2006]. Occasionally, this explanation is as simple as the name of the illness and a single treatment regime, but nonetheless the concerns are followed by an explanation of the possible physical trajectories that are then negotiated.

Scenario platforms can be designed as an analytic/deliberative framework, where one searches for stories matching the needs and conditions, and narratives are returned that then articulate how these conditions work in a larger story. The overlapping scenarios of different stakeholders co-structure discourse, building observer-legible stories.

Scenarios as Sites of Value Arbitration

The scenario is only effective as a tool for sense-making if it addresses the concerns at hand. The user will need to evaluate how the various narratives at hand address their criteria. However, this is an activity with a fair number of multiplicities: there may be multiple concerns in conflict with each other, that then need to be arbitrated between. There are also many criteria that are used to judge how well the narratives address the concerns. In order to successfully use these scenarios for sense-making, the semantics of these criteria will need to be made incredibly clear.

'Multiple concerns in conflict with each other' describes the most basic way in which different scenarios cannot be immediately quantitatively resolved. As a medical example, one might choose to undergo a much more painful treatment in order to return to a state where one could leave the facility sooner, or vice-versa. These are different kinds of loss that can be tolerated. Engineering methods have already had to consider these questions, and offer useful tools even from a human-factors point of view [LaValle, 2006]. For example, it might be possible to elicit the first range of preferences: "Would you tolerate a very high amount of pain to reduce a long-term stay to a medium stay?", with follow up questions grounding what 'long-term' and 'medium-term' mean to them. These can then be resolved with a number of well-understood technical approaches. In any case, it is semantically correct to allow the user to resolve these operations to a single quantitative preference. However, the user's preference of trade-offs may have wider consequences than merely resolving between narratives, which we will revisit after introducing some further considerations.

Direct concerns about the consequences clearly not the only matter of consideration. The other immediate concern is that the narrative applies: that where the participant identifies themselves in the scenario corresponds to their actual state of affairs, where such factors are causally relevant to the outcome. In the terms of the Interpretive Collaborative Review (ICR) framework [Pennefather and Jones, 2009], we can say that this corresponds to the degree the conditions of the scenario are in agreement with the conditions of the user, that are both usable and useful, although it still may not be in full agreement, as it may require a method that is not

applicable (such as an unavailable medical apparatus). Other considerations include the degree to which the narrative comes from a broad range of peers, supplied in legitimate ways through verifiable channels, presented in self-consistent ways. The ICR framework also creates multi-criteria considerations to be arbitrated: should one choose a dangerous, but well-researched technique, or a nominally safer technique from a source outside of the trusted research community?

One criteria that the ICR framework did not appear to deal with was time: all of these assessments may come to change based upon new research or events. This comes in many forms, some medical research examples including: a research breakthrough may leave the current techniques obsolete, an existing research technique may be shown to be fraudulent, a new environmental factor may complicate the results, or the techniques may not have been tested on those with certain other preexisting conditions.

However, peer-driven scenarios have another set of issues to contend with: that is that these criteria are also apply beyond the applied research to the testimony of the scenario author. Different participants will form different trust relationships with each other, either through common points of narrative, or through social ties (say, for example, in support groups), and these factors will also have to be taken into consideration. Even the choice of incomparable trade-offs may be used as evidence of common values, and thus some measure of trustworthiness. The set of privacy assumptions surrounding these choices have political overtones: is a person who makes a sacrifice of personal comfort to return to the public going to be well-regarded by their similarly choosing peers no matter the differences in underlying circumstances that impacted this choice? Perhaps these kinds of privacy choices must be accepted if the system of narratives itself is to be considered trustworthy, even at the cost of these distinctions. In the framework of a scenarios between peers, time-based issues are all the more severe: there aren't yet enough experiences of new conditions to counteract all the earlier evidence.

Yet, despite these inherent new complexities, I think that there are further modes of analysis that help us navigate it. In my own previous work, I did not specify taxonomies of criteria [Cassel, 2008] [Cassel, 2009], but instead addressed the problem structurally. Here, I would also ask: when did a given criteria become an applicable modifier of a different aspect of a system of scoring, and what did it modify? We can then make more nuanced accounts of scoring, such as "this user's opinion may change the ranking of this aspect of the rating, to this degree, except for in these contexts." Working structurally also allows for internal value conflicts to be discovered, and then arbitrated: instead of finally resolving into a single totalizing score, at a given point, we might discover that the scores coming through different paths have substantial differences, and call attention to this fact.

One very fruitful possible research direction is combining taxonomies with structural accounts, to build an information architecture of assessment. Yet, I am reluctant to strictly prefer a controlled vocabulary over seeding assisting tools with suggested use, as the emergent ontology preferences of the users may themselves be illustrative[Shirky, 2005]. Therefore, the information architecture resulting from combining structural and taxonomic modes of analysis is a recommendation for further research, not for practitioners.

Another research question that this introduces is the appropriate use of regret. To what degree does protagonist of the scenario holding the same preferences of the participant, at a corresponding point in the scenario, only to later come to wish they had taken a different path, suggested by different trade-offs, play a role? Although there is perhaps a social catastrophe awaiting when one pits one's actual behavior against one's

professed preferences, perhaps it is different when rendered as the trajectory of others.

However, the most pressing research issue may be handling change over time in peer-driven scenario systems. It is clear that what is most appropriate is a kind of clearly delimited statistical projection, filling in the structural assessments where there is not enough evidence to do so. Even though it may be statistically tractable, it is yet unclear how these projections could come to be adopted. One potential way that these projected results could be made palatable is through an existing foresight practice. Then, there are two sources of expertise: not only do these new practices come from the research, but also to fill the expectations of foresight professionals watching the field.

Scenarios as Explanations of Strategic Dynamics

Given the necessity for foresight to introduce the possibility of change, I would now like to look beyond the capabilities of scenarios to explain via histories ('previous futures') and to the particular advantages scenarios have as foresight tools for understanding broader dynamics.

One great advantage is that scenarios can also represent the dynamics of complex-system physics in an intuitively accessible way. The standard scenario methodology works by, for each potential outcome, articulating different driving factors, and the 'weak signals' these are the core driving factors at play [Schwartz, 1991]. The correspondence between 'weak signals' and bifurcation points, and between 'core drivers' and positive feedback effects, indicates that there is at least a metaphorical connection between the scenario methodology and systems physics. By making a metaphor between changes in production and communication as changes in physical state, one can model such systems using the analytical systems of network physics. For example, one can speak of the phase transition to connectivity when a new telecommunications platform is successful, or the sudden reduction in some flows if transaction costs are increased. On the other hand, it is entirely possible that these are not metaphors, and that the institutional behavior is actually dependent on upon historical states that have clear physical interpretations when considered at the appropriate scale [DeLanda, 1997]. In any case, it is appropriate to steal the mathematical power of such formulations where it is only a metaphor, and to directly appropriate the physics where the key drivers are physical (as in climate science).

Proponents of multi-ontology sense making [Snowden, 2005] are right to critique mathematical complexity and complex-systems theory as making too drastic of simplifying assumptions if they are attempting to address human dynamics, but not for the reasons that they give: the problem is not rules, but multiplicity. When looking to the biological stigmergy of ants and the like, we see that complicated behavior resembling certain social interactions, it is tempting to lose sight of a larger picture and remember it is not ants we are trying to model, but people, the thinking of whom is determined through competitive dynamics across a broad range of chemical transmitters, unlike the cooperate dynamics of common chemical trails. This is why the scenario methodology is effective: it requires that multiple possible dominant factors be thought through together, in competition, replicating the multi-modal dynamics of the world people experience. The best experts in understanding the dynamics of politics and the economy have incorporated this insight, seeing the world as a mixture of non-dominant dynamic effects [Tetlock, 2005].

Given this, it would be a very powerful usage of scenarios to represent transitions between these states. That

is to say, if we can understand a particular characterization of recurring histories as corresponding to a particular institutional state, then we can understand transitions in the overall characterization of the state itself. Scenario systems that can represent their own state recursively may have this kind of explanatory power.

Theories that have causal implications, either positively or negatively, may already be usable within a scenario framework in exactly this way. This leads to a meta-theoretical question to theorists: is it desirable for your theory to be embedded in scenario work, either as a structuring meta-scenario with dynamics, or as a design guide for what kinds of scenarios and scenario analysis are appropriate or inappropriate for a given community?

Here are some meta-theoretical questions to apply to a given theory. Does the theory apply to any concerns worth caring about? Does it then give the criteria to distinguish between states where these concerns are being met, versus where it is not? If so, does it then also give descriptions of how these states are transformed? If the theory does not meet any of these accounts, does it give an explanation of why these factors cannot or should not be met? Causal theories also care about the predictive tightness in terms of entropy [Shalizi and Crutchfield, 2001], and therefore all relevant differences to these transitions, and only the relevant differences, should be included within the states of the model. Under these criteria, we might say a situationally embeddable theory is causally structured according to the universe of cares.

There are many fine theories that attempt to answer, or at least raise, some of these questions of causal dynamics for different concerns: innovation [Christensen and Raynor, 2003], institutional technology [Orlikowski, 1992], and organizational values [Jones, 2007]. It would be a worthwhile exercise to see if these theories could then be transformed into meta-scenarios or scenario criteria.

Overall, the exact advantage in this kind of understanding is unclear. Is there a momentary advantage in understanding, for example, a higher-order game theory, in which low-cost moves, such as white papers in industry journals, can trigger retaliatory moves that reveal particular structures of concern? At this point, it is hard to say. One point is clear: if an institution's participants are using such technologies to arbitrate their concerns for themselves, the institution in question would be wise to pay attention.

Conclusion

Throughout this paper, I've talked primarily about health care applications. However, this is primarily an example, and I think that the broader deployment of scenario technology could affect many other fields, including retail, waste management, and research practices (library and information science).

In conclusion, I've shown that scenarios have many appropriate traits for being the mechanism to arbitrate emerging institutional commons. Scenarios carry narrative in a way that we can truly use to help make sense of the world. Scenarios can be annotated with our value judgments in a way that helps us arbitrate them. Scenarios also provide us with the appropriate instinct for understanding the mechanics of complex systems. Finally, the interaction with scenarios of other theories, through the meta-criteria of how situationally embeddable a given theory is, helps us ask critical questions about the usefulness and clarity of our theories to their intended context.

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