Designing for Aesthetic Disruption: Altering Mental Models in Social Systems through Designerly Practices

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Abstract: Amid all the excitement about transforming social systems through design, there remains a lack of understanding about what design can uniquely offer to support this change. This conceptual paper contributes to the discussion by integrating research on design and systems thinking to develop the concept of aesthetic disruption, highlighting its connection to the alteration of mental models in social systems. With support from empirical illustrations of aesthetic disruption in the context of healthcare, we identify four core components of designing for aesthetic disruption: engagement of the senses, experience of dissensus, exposed assumptions, and reflexive actors. In doing so, we bring aesthetic knowledge to the fore of what design can contribute to social systems transformation and lay the foundation for further research and practice related to aesthetic disruption.

Keywords: aesthetic disruption, mental models, social systems, designerly practices

1. Introduction

“In a single individual it can happen in a millisecond. All it takes is a click in the mind, a falling of scales from the eyes, a new way of seeing.” (Meadows, 2009, pp. 163–164)

How design can support the transformation of social systems has been a topic of growing interest and research in the last decade (Metcalf, 2014). Researchers have highlighted both the transformative potential of design (Sangiorgi, 2011) as well as the challenges of designing for change amid complex social systems (Norman and Stappers, 2015). Despite all the excitement, there remains a lack of understanding about what design can uniquely offer to support such complex systemic transformations. While design is increasingly being employed with transformative intentions, the process by which designerly practices can spark such a change in social systems has not been fully articulated within design research. In this paper, we propose that designing for aesthetic disruption...
offers a hopeful approach to initiating change in complex social systems. The aim of this paper is to further develop the concept of aesthetic disruption proposed by Markussen (2013) in the context of social systems with a specific focus on actors' mental models.

To understand the effect of aesthetic disruption in social systems, we draw on design discourse and systems thinking literature. To begin, we highlight the important role of mental models in social systems and social systems transformation. We then develop the concept of aesthetic disruption, which involves engaging actors' senses through tangible and experiential design interventions to unearth and undermine underlying mental models. We contextualize the concept of aesthetic disruption using empirical illustrations from designerly practices within healthcare systems in three different countries. Next, we articulate four core components of designing for aesthetic disruption and summarize our main contributions to design literature. The paper ends by discussing the implications of this research and highlighting opportunities for future research in this area.

2. The Role of Mental Models in Social Systems

First, it is essential to understand the role of mental models in social systems. Mental models are actors' internal representations of the outside world through which their experiences are filtered (Senge, 1990). These representations play a critical role in informing system behavior and enabling system transformation. Actors' mental models determine not only how they make sense of the world, but how they act in it (Senge, 1990). Systems thinking literature reinforces that actors' mental models form the basis of shared social agreements about the nature of reality, which then informs the goals, structures, flows and ultimately the behavior of social systems (Meadows, 2008). As such, mental models can be seen as sources of behavior in social systems.

While mental models are valuable in guiding action and informing system dynamics, none of these models are accurate and complete depictions of the real world (Meadows, 2008). Still, these mental models persist because actors tend to filter away information that doesn’t fit their existing representation of the way the world works. Actors trap themselves in "defensive routines" that protect their mental models from scrutiny (Argyris, 1985). These internal images then limit actors to familiar ways of thinking and acting. Systems research suggests that one of the main issues is that these mental models are generally tacit - existing below the level of awareness (Senge, 1990).

However, making mental models explicit can generate debate and enable change in system structures and behavior (Forrester, 1995). Meadows (2008) suggests that changing mental models is one of the leverage points, or points of power, with the greatest transformative potential in systems. In addition, she argues that staying flexible and acknowledging that no mental models are true is fundamental in our understanding of systems.

Thus, as the field of design looks to contribute to social system transformation, it becomes critical to understand how designerly practices can aid in making mental models explicit and encouraging actors to understand their fallibility. We suggest that aesthetic disruption is a key mechanism in designerly practices for exposing and altering mental models.

3. Aesthetic Disruption through Designerly Practices

While it is often ignored in the literature, a number of design researchers have recently argued that aesthetics and aesthetic knowledge are central to designerly practices (Folkmann, 2010; Stephens & Boland, 2014; Tonkinwise, 2011). Aesthetic knowledge is “what we know about ... a situation through
our bodily senses of sight, sound, taste, touch, and smell” (Stephens and Boland, 2014: pp. 2). Previously, it has been noted in design research, that engaging actors’ sensory faculties sparks emotions for the experiencer (McCarthy and Wright, 2004). While designers may hold professional competencies related to how to activate and leverage aesthetic knowledge, all actors engaged in designerly practices learn through their senses. Aesthetic knowledge is instrumental in understanding and changing a situation based on experience. For example, when prototyping a new product or service, actors often use tangible materials to understand issues through their senses and reflect on their experiences (Blomkvist, 2012). This immersive learning process aids actors in appreciating situations through other perspectives with a rich understanding of context.

Markussen (2013) emphasizes that designerly practices can disrupt consensus, revealing a gap between what people do and what people feel, in effect causing aesthetic disruption. By engaging actors’ senses through tangible and experiential design interventions, such as alternative streetscapes or role play activities, aesthetic disruption reveals and challenges underlying assumptions. Markussen suggests that aesthetic disruption “makes the relationship between people’s doing and feelings malleable for renegotiation” (2013, pp.39). This research builds off of the work of Ranceire (2011) who characterizes an aesthetic act as introducing heterogeneous objects and ways of doing and making into the social field of perception. In doing so, aesthetic acts can create disensus: “a fissure in the sensible order by confronting the established framework of perception, thought, and action with the ‘inadmissible’” (2011, pp.89). Markussen’s conceptualization brings the aesthetic enabler for realizing change to the centre, but he does not fully articulate the importance of the senses in this process, nor does he explicitly suggest applicability beyond the urban experience. We argue that that engaging actors’ senses through embodied experiences is key to unlocking the disruptive potential of designerly practices, with implications for change in social systems more generally.

4. Altering Mental Models by Aesthetic Disruption

The work of Markussen (2013) on disruptive aesthetics starts to conceptualize how designerly practices might contribute to change. Markussen argues that a designerly way of intervening can disrupt existing systems of power by raising awareness through actors’ interaction with aesthetics. Here disruption is suggested as a central mechanism by which design can alter existing ways of interpreting the world. Based on this research, we articulate how aesthetic disruption through designerly practices can support altering actors’ mental models in social systems. By bringing forward heterogeneous objects and ways of doing, designerly practices can engage actors’ senses, triggering related emotions and shedding light on previously latent and taken for granted mental models. Through aesthetic disruption, design can provoke actors’ reflexivity that is at the core of enabling change in social systems. Aligned with Archer (2010), we understand reflexivity as different from reflection in that reflection can involve an actor examining an object, whereas reflexivity is an internal conversation where an embodied actor in a social context bends their thoughts back on themselves.

By prompting actors through physical stimuli to reflect on the fundamental assumptions of a system, aesthetic disruption engages actors in the double loop learning (Argyris and Schôn, 1978) that is necessary for realizing transformative aims through design (Sangiorgi, 2011). Connected to the concept of reflexivity, Arygris & Schon (1978) describe double loop learning as inquiry that is not just focused on effective performance, but on the very norms and assumptions which define effective performance. Similarly, Sangiorgi (2011) builds on the work of Levy (1986) to suggest that design catalyzes transformation by changing the “metarules” (the rules of the rules) of the system. It is by
uncovering and questioning core assumptions and worldviews, that design creates this type of paradigmatic change. However, design research has not fully fleshed out how designerly practices support this transformation (Sangiorgi, 2011). We argue here, that aesthetic disruption is one way designerly practices can stimulate actors’ reflexivity in social systems to catalyze transformation.

As such aesthetic disruption works at one of the most powerful leverage points for systems change, by calling into question existing mental models within a social system. By opening up discussion and supporting the examination of underlying mental models through aesthetic disruption, designerly practices can enable actors to rethink other elements of system structure and behavior that are intimately linked to shared mental models.

5. Empirical Illustrations of Aesthetic Disruption from Healthcare Contexts

To contextualize the concept of aesthetic disruption and illustrate its applicability and relevance beyond the space of urban activism, we highlight three examples from health care contexts. In these examples, aesthetic disruption was orchestrated by designerly practices which included materialization, visualization, and enactments. Health care systems are a valuable context to demonstrate broad applicability in social systems, in part because of their difference in relation to urban experiences (the focus of Markussen’s research), the complexity of these systems, the closeness to human bodies and experiences, and the entrenched mental models at play.

The first example (shown in Figure 1) is a design intervention conducted within a primary care unit in Eskilstuna, Sweden. Master level design student, Felicia Nilsson, created a double stethoscope that healthcare staff felt, listened to, and played with together. Engaging in this very sensual interaction with a heterogeneous artefact exposed latent mental models about power dynamics between providers and patients. By reshaping a central symbol in medicine and placing this new artefact within the existing primary care context, the design process exposed established frameworks of perception, cultivated emotional reactions through the senses, and provoked reflexivity among participating actors in relation to the structure and hierarchy of the existing primary care unit.

![Figure 1: Interacting with the double stethoscope prompted healthcare staff to question current mental models of power dynamics between providers and patients](image-url)
The second example (shown in Figure 2) is a designed experience that immersed actors in unsettling healthcare scenarios to inform system innovation efforts in Oslo, Norway. The “experimentarium event” was designed for the Center for Connected Care (C3) by masters-level service design students (taught by Natalia Agudelo and Jonathan Romm) at Oslo School of Architecture and Design. During this event, healthcare stakeholders played out roles in future scenarios that leveraged technical advancements to enable new types of services. Through a fully embodied experience in the various services within detailed futuristic environments, actors’ emotions were triggered, often unexpectedly sparking reflection on existing mental models of healthcare. For example, the service scenario depicted in Figure 2 of a genome consultation triggered feelings of being overwhelmed and caused participants’ to be confronted with their own internal images of decision-making and expertise related to health.

![Figure 2: Engaging healthcare stakeholders in future scenarios illuminated existing mental models actors had about patient decision-making](image)

The third example (shown in Figure 3) is of a one-day event co-hosted by MaRS and the Centre for Addiction and Mental Health in Toronto, Canada (co-organized by the first author of this paper). During this event, a group of system stakeholders, service providers and individuals with lived experience of mental health needs worked together to build medicine cabinets from the future, inspired by the reverse archeology method coined by Stuart Candy (2013). Actors worked with their hands using simple materials like construction paper, popsicle sticks and plasticine to design future medicine cabinets, including ones with monitoring devices linked to peer support and bio-feedback toothbrushes. By engaging in this different way of making and interacting with low-fidelity objects that were simultaneously inspiring and eerie, actors had bodily reactions to what was created, challenging their mental models related to mental health.
Together these examples reveal how aesthetic disruption can take shape through designerly practices in healthcare systems. By fully engaging actors in new and often uncomfortable ways of doing and making, design can ignite individual reflections on mental models and provoke reflexive discussions among actors. The above examples have in various ways used designerly tools and methods to engage the participants’ senses, leveraging their aesthetic knowledge to alter their understanding about a specific situation. In these situations, staged and constructed through design knowledge, participants form new disruptive experiences sparked by the disconnect between their existing and the proposed mental models directing their actions.

6. Core Components of Designing for Aesthetic Disruption

To further detail the concept of aesthetic disruption, we articulate four core components of designing for aesthetic disruption. These core components are intended to help strengthen the conceptualization of aesthetic disruption by highlighting the necessary elements for realizing change in social systems - despite the variety of forms aesthetic disruption might take on and contexts it may work within.

1. *Engagement of the senses* – Fundamental to aesthetic disruption is the sensual, embodied experience of actors. It is the knowledge that actors gain and the emotions triggered by seeing, hearing, tasting, touching and smelling within a situation that sparks change through designerly practices (Stephens and Boland, 2014). This can be seen in the example of the double stethoscope where actors place the double stethoscope in their ears and listen to each other’s heart together, handling and examining this foreign object.

2. *Experience of disensus* – By engaging with heterogeneous artefacts and ways of doing and making – especially those which are inadmissible – actors are confronted with their established frameworks of perception (Ranceire, 2011). This often feels uneasy and awkward for participating actors, but it is particularly these feelings that allow
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actors to illuminate previously taken for granted models they hold about how the world works. For example, at the experimentarium event, actors were engaged in future service scenarios that caused the participants discomfort because they were being asked to engage in experiences that did not align with their current frameworks for how healthcare services should work.

3. Exposed assumptions – By explicitly working to surface and test actors’ assumptions, designerly practices can support actors in understanding and re-shaping system behaviours (Senge, 1990). By recognizing the beliefs driving current system dynamics, and understanding them not as truths, but as social constructions, actors can tap into a powerful leverage point for change in social systems (Meadows, 2008). In the reverse archeology process of creating medicine cabinets from the future, participants created objects to support mental health that radically challenged existing assumptions associated with stigma and isolation, which then sparked reactions and conversations about these beliefs among participants.

4. Reflexive actors – The link between actors’ experience and their detachment from existing mental models requires reflexivity. By intentionally creating space and time for individual and collective reflexivity, designerly practices can aid in supporting the paradigmatic shifts necessary for transformation in social systems (Sangiorgi, 2011). While reflexivity is central in all of the three empirical examples, this is also perhaps the component that requires more intentional execution, such as through facilitating explicit conversations about actors’ experiences, underlying mental models, and the fallibility of those models.

These core components are not separate entities, but entangled, interdependent elements of the creative process of aesthetic disruption. These core components are the mechanisms by which aesthetic disruption contributes to altering actors’ mental models. By articulating these core components, we aim to aid in building a foundation for future research and practice related to aesthetic disruption within diverse social system contexts.

7. Discussion

Through this research we reinforce the central, but often neglected, role of aesthetics and aesthetic knowledge in designerly practices (Tonkinwise, 2011; Stephens and Boland, 2014). This core aspect of design has been particularly absent in previous conversations related to design in social systems (Banathy, 1996; Metcalf, 2014). We also contribute to previous design research highlighting the role of reflection and reflexivity in creating change (Ewenstein and Whyte, 2007; Sangiorgi, 2011; Schön, 1992) by articulating one tangible way that this can be catalyzed through designerly practices. By linking aesthetic disruption to the alteration of mental models and social systems change, we contribute to literature on designing for systems transformation by pointing to changes in mental models as a key mechanism for transforming social systems through design.

It is important to clarify the difference in how we have positioned aesthetic disruption in comparison to that which was first articulated by Markussen. Markussen (2013) sees aesthetic disruption as design activism, whereas this research situates it as a regular part of designerly practices. This is not to say that we see aesthetic disruption as any less powerful or political, but that we recognize the inherit political nature of designerly practices more generally. In addition, Markussen (2013) generally uses the term “disruptive aesthetics”, which emphasizes the materials that provoke actors.
In contrast, our focus here is on the process and effect of this change that we discuss using the term “aesthetic disruption”. By repositioning this concept, we open it up for broader discussion and applicability.

We argue that the concept of aesthetic disruption has relevance well beyond the space of urban design activism that was previously articulated by Markussen (2013). We suggest that aesthetic disruption can be understood as a core competency in design, particularly in relation to its ambition to support the transformation of social systems. By highlighting situations of aesthetic disruption in healthcare contexts and identifying four core components of aesthetic disruption from our research, our work helps to extend the understanding and relevance of the concept of aesthetic disruption. All social systems, whether in the context of healthcare or urban experiences, have inherent mental models. Thus, while the situations we present are highly particular, by building on system thinking research, we position aesthetic disruption for broader recognition and applicability in social systems. It is also important to note that while this research focuses on aesthetic disruption as an intimate individual experience and a conversation between actors, there is also work to be done to understand its scalability and the translation of these experiences between actors to disrupt shared mental models more widely.

As this is a conceptual article with empirical illustrations, further empirical research would help to test the generalizability and refine the core components of aesthetic disruption that we have articulated. Furthermore, a deeper understanding of the link between aesthetic disruption and the alteration of mental models could be developed through intentional research using design experiments that incorporate aesthetic disruption and creatively evaluate its effect on the mental models of participating actors. In addition, related questions for future research that could aid in moving this area of design research forward include: How can designerly practices more explicitly cultivate reflexivity through aesthetic disruption? How can the effects of aesthetic disruption be scaled in social systems to support transformation? Where in social systems should aesthetic disruptions be positioned to optimize their impact? How do we best educate designers and other actors to build competencies around designing for aesthetic disruption, especially as it relates to the power and politics involved?

8. Conclusion
In light of this conceptual development, we argue that aesthetic disruption is a core competency in design, particularly in relation to the transformation of social systems. By placing the concept of aesthetic disruption in the context of social systems, and contextualizing this through empirical illustrations in healthcare systems, we show that the concept first articulated by Markussen has exciting potential systemic impact and broad applicability. By bringing focus on the important role of mental models in the process of aesthetic disruption in social systems, this research helps design practitioners to create more intentional and impactful interventions. The core components identified can also act as a guide for design practitioners interested in employing aesthetic disruption to help realize their transformative aims in diverse social systems. This research also reinforces and builds on previous studies that have called out the central role of aesthetic knowledge in designerly practices, drawing these findings into conversations at the intersection of design and social systems. While this was a conceptual article, with only empirical illustrations, this paper lays the foundation for future research that can empirically study the process of designing for aesthetic disruption and its effect on mental models in the context of social systems. This work also offers insights for design practitioners interested in experimenting further with aesthetic disruption.
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