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ON SELLING OUT

How the conditions of technological design perpetuate the status quo.

Abstract

The history of technology is a history rich in bold claims about the potential of particular technologies to lead to dramatic improvements in human life. Technologies rarely live up to their Utopian promise — but why? Prior work in science, technology and society studies has focused on the role of diffusion and the technical properties of new technologies in their success or failure. However, less attention has been payed to the affective negotiation between designers and their institutional contexts. Technological design does not happen in a vacuum — designers operate within institutional constraints that influence the outcome of their design work. These constraints include constraints arising from funding, research warrants, and institutional ethics and law. Through the iterative processes of design and diffusion, technologies are modified by existing social structures and become embedded with social values which can reduce their disruptive potential. In this paper, I will discuss the ways that technologies embed values, the ways that social structures persist and change, and the ways that institutional constraints of designers' contexts impact those processes.

Contents

1

Introduction: The promise of technology

> We who are close to developments find reasons to believe that we are on the threshold of a new age ... which widens the prospects of world peace. The aircraft, with the wireless telegraph and the telephone, are the factors which promise to humanize the world. They promise to bring about the complete annihilation of space and distance, and in their prospective developed state — which has been approaching in rapid strides ... uniting people and unifying their interests, making the whole world practically a world nation. [America, 1916]

The history of technology is accompanied by a history of high-flying claims about the potential Utopian result of the wide adoption of that technology. From the enlightenment's dreams of a society of pure reason, to the industrial revolution's vision of a society free of scarcity, through to the claims that mobile phone or Internet technology can topple authoritarian regimes, the introduction of new technologies has always been accompanied by grand social narratives that situate that technology in a drama of human betterment. [Pfaffenberger, 1992]

But these dramatic promises don't tend to pan out. A hundred years after the above passage from the Aero Club America's 1916 manifesto, aviation is beset by the most draconian of security regimes. Rather than ushering in world peace, the airplane has become a symbol of destructive power and cultural discord in a line of increasing amplitude from the dog fights of World War I, the atomic bombers of World War II, spy planes of the cold war, the attacks on the World Trade Center of September 11, 2001, and the remote-controlled military drones of modern occupational combat. Rather than striving to reinforce an ideal of brotherhood and shared humanity, modern airlines instead strive to reinforce class differentiation through "elite" statuses, first and business class cabins, and loyalty programs.

Why do so many technologies fail to fulfill the most Utopian visions of their conceivers? The first obvious reason is that the techno-Utopian dreams accompanying new technologies are too simplistic, and lack grounding in a far more complicated and messy social reality. A new technology *alone* could never be sufficient to cause the changes supposed — larger social changes that are not determined by the technology are also required. Even if mobile phones succeed in dramatically improving the ability of people all over the world to communicate, to go from there to a global brotherhood with shared cultural understanding, an end of poverty, or any of the other grand narratives about the technology's influence, we need much more ambitious set of social changes — perhaps different cultural attitudes toward nationalism, reductions in income disparities and improved access to resources, reductions in tribalism and religious fundamentalism, or any number of other foundational shifts in the way people relate to each other. The lackluster performance of the One Laptop Per Child's attempt to transform education in the third world by distributing cheap laptops has been criticized on these grounds:

> Diffusion of IT innovation does not depend only on the nature of the innovation itself. Often, more important is the social and cultural environment in which it will operate. Information technologies are not standalone innovations but system innovations, the value of which depends largely on an ecosystem that includes hardware applications, peripherals, network infrastructure, and services (such as installation, training, repair, and technical support). Deployment involves training teachers, creating software and digital content, delivering maintenance and support, and sustaining long-term commitment. Such capabilities are in short supply in developing countries, and OLPC simply never had the resources to provide them. [Kraemer et al., 2009]

This criticism is one common to failed technological innovations within the field of Science, and Technology Society studies (STS). For example, Bijker and Law [1994] discuss how Thomas Edison's failure to successfully commercialize motion pictures can be attributed to his failure to develop a working social model for its use, conceiving of it as a business tool rather than a tool for popular entertainment.

However, a less often discussed constraint effecting the outcome of technological design which is perhaps as important as the context of its diffusion is the interests, affect and institutional situation of the designers. In some cases, this situation might explain some of the blindness to messy social reality their visions exhibit. A designer may be an employee working in industry, an entrepreneur, an academic,

or an independent freelancer — whatever the context, institutional constraints will limit their ability to produce disruptive designs. The limitations may affect the resources available to the designer, the scope of reasoning they use to conceive the work, the type of critical feedback they receive, and more.

The purpose of this essay is to begin the work of mapping the territory of this type of institutional constraint, *from the perspective of a designer*. This is a perspective that is missing in most prior writing in science and technology studies. This prior work includes:

- Abundant prior work in Science, Technology and Society (STS) describes the large-scale outcomes of socio-technical systems. For example, Bijker and Law [1994] discusses the interplay of social actors and technology in topics ranging from aircraft construction, the patent system, the diffusion of fluorescent lighting, to clinical budgeting.

- Analysis of technology from Philosophy considers what is essentially 'technological' about technology, and how this inter- acts with systems of control (as in Heidegger [2003], Marcuse [2010], Feenberg [2002], and Thomson [2003]).

- Histories of technology produce descriptive and ethnographic accounts of technical systems in their social context (e.g. Cut- cliffe [1989]).

- Sociological analyses of technology propose structural models to explain how technologies and the organizations that support them rise and fall — including actor network theory [Law and Hassard, 1999], social constructivism [Bijker, 1997], and feminist deconstruction [Haraway, 1997].

- Technical design and engineering texts tend to focus on techni- cal artifacts, without an eye to their social contexts.

Where these analyses treat individual designers at all, they tend to do so with a behavioristic or descriptive-historical approach that neither grants the designer prospective agency in their design work, nor captures the affective concerns of the designer and their personal ambitions, be they for social change or career advancement. Despite being essential to their ability to produce disruptive work, the messy, often political negotiations that designers must undertake to allow them to produce their work is rarely discussed.

Is it possible to have a "science" which concerns the practical ne- gotiation of institutional constraints involved in design for social

change? Giddens's theory of structuration [Giddens, 1984] provides a useful starting point with its refined conception of the interplay between agency and social constructs (this is discussed further below). However, Giddens' work remains at a high level of theoretical description, and does not provide practical considerations of how one can use one's agency to alter social structures. Currently, such practical concerns remain as "arts" or "professions" — they are what entrepreneurs, businesses, activists, and individual designers *do*, but without guiding theoretical principle.

There remains a disconnect between "scientific" (theoretical) and "professional" (practical) pursuits. [Schon, 1984] Epistemologists have long discredited strict positivism, which would hold that only rigorous empirical analysis through controlled experiments can have any truth value, and that everything else (including professions, skills, interpretations, descriptions, arts, poetry) would have no meaning. Despite this position being out of favor in studies of knowledge, practitioners of science often continue to conceive of their work as arising from positivist principles. If a study is not backed by rigorous experimentation, it is given less credence. Even among social sciences which permit descriptive and interpretive methodologies, the tendency is to strive for the theoretical at the expense of the actionable.

"Professions", by contrast, consist of learned skills of art that are often less rigorously articulated. For example, skills like a doctor establishing rapport with a patient, or an architect negotiating with a client, are regarded as lesser areas of knowledge, even if they carry tremendous practical benefit. Schools of engineering do teach practical design skills at the level of creating functioning technical artifacts (indeed, this is what makes engineering a "lower" form of knowledge than science to some). Students may learn some of what is required for the practical diffusion of a technology into social contexts through internships or practicums, but there students only enter a temporary and predetermined relationship with an institution that offers little insight in the negotiation between ideals and institutional contexts. A designer attempting to acquire funding, advance personal career interests, and pursue goals for social change is left to learn the skill of negotiating these constraints on their own.

Nevertheless, it is possible to describe techniques used by practitioners through interpretive description of the processes of learning, discovery and iteration. Such interpretation can inform other practitioners of potential strategies, provide the groundwork necessary for later theoretical analysis, and produce generative metaphors that help guide further exploration. Furthermore, the process of reflec-

tion itself can be essential to a designer's ability to create effective work. [Schon, 1984] Critical reflection can take the form of process description, problem framing, and speculative reasoning — but an essential ingredient is the first-person perspective. It is necessary to deconstruct the standard "lie" presented by research papers which gloss over the messy, iterative and fumbling trajectories of research in their effort to present a tight story of a controlled experiment. This messy iterative process is precisely the process which determines the success, failure, or cooption of a design for social change; it is the space in which principles give way to practical concessions — that is, where the designer sells out.

Design as activism thus has a different scope than traditional design. Where traditional designers might limit the scope of critical reflection on their work to the production of technical artifacts, designer activists must also consider the social context into which their work is entering, and the social context in which the work is produced. Designer activists must avoid the temptation to act as "hired guns" for established institutions that they seek to change, even if those institutions continue to pay the bills — they must design the conditions that allow them to continue to produce work in accordance with their ideals. A designer activist's evaluation of their work must include an evaluation of the success of their work in resisting cooption by constraining institutions, as well as its success in contributing to social change.

In the sections that follow, I will discuss the ways that technologies become embedded with values, the theory of structuration as it applies to social change, and an overview of three institutional constraints that can lead to a designer selling out: funding, research warrants, and institutional ethics. I will discuss what the implication of these constraints is on the scope of a designer's work, and close with some brief descriptions of cases of contestational design projects and the institutional negotiations they required.

2

Artifacts and Politics

Engineers and designers often repeat variants of the following maxim, when pressed about the ethical implications of their work:

> *I'm just a designer. I'm just creating technology; and technology is neutral — any technology can be used for good or ill. I don't need to concern myself with politics; I'm just contributing to basic knowledge.*

If this sentiment were true, it would cast doubt on the idea that technological designers can contribute to social change through their design work, for good or ill. No particular technology (mobile phones, the Internet, airplanes) would have any Utopian potential — any social change would exist apart from the technical design. On the other hand, we often encounter the opposite sentiment, where the same engineers extol their designs' ethical virtues — bold claims that introducing a new technology will usher in lasting meaningful change, with the technical artifact regarded as possessing an almost magical inevitability.

Working past these folk theories to identify the role of politics in technology is important to understanding design for social change — and this has received wide attention in sociology and STS. In his widely cited 1980 article "Do Artifacts have Politics?", Langdon Winner discusses the idea that artifacts themselves might have political qualities:

> In controversies about technology and society, there is no idea more provocative than the notion that technical things have political qualities. At issue is the claim that the machines, structures, and systems of modern material culture can be accurately judged . . . for the ways in which they can embody specific forms of power and authority. [Winner, 1980]

The discussion of the political leanings of particular technologies concerns two primary questions:

1. Do technologies in themselves embed political properties? That is, are there cultural values embedded in the structure of some artifacts?

2. Is the production of technology itself driven by political processes, or by some other logic?

Feenberg argues that the opposing answers to these two questions have produced four major types of theories of politics in technology: Determinism, Substantivism, Instrumentalism and Critical Theory.

Technology is:	Autonomous	Humanly Controlled
Neutral (complete separation of means and ends)	Determinism (e.g. traditional Marxism)	Instrumentalism (liberal faith in progress)
Value-laden (means form a way of life that includes ends)	Substantivism (means and ends linked in systems)	Critical Theory (choice of alternative means-ends systems)

Figure 2.1: Andrew Feenberg's simplified summary of historical varieties of theories of technological change.[Feenberg, 2002, p 9]

- **Determinist** theories hold that technologies in themselves are neutral (not value-laden), and their design is autonomous (not driven by political processes). Kevin Kelly's "What Technology Wants" [Kelly, 2010] and Kurzweil's views of the inevitable singularity [Kurzweil, 2000] are all determinist positions — they hold that any "values" present in technology are not social or political in character, but based entirely on natural laws. Determinist positions are characterized by a sense of inevitability

about technological development, but no fear that the progress limits human capability — it is just the natural progression of the laws of nature and evolution.

- **Substantivist** theories hold that technology is value-laden, but technological progress remains outside of human control. Heidegger's perspective in the "Question Concerning Technology", as well as dystopian views with respect to technology such as Theodore Kaczynski's "Unabomber Manifesto" ["F.C.", 1995] are substantivist perspectives. Substantivists argue that technology causes particular and regrettable social changes because of the political values it embeds. Nevertheless, we are powerless to stop its advance, aside from ceasing the production of technology.

- **Instrumentalist** theories hold that technology is value-neutral, but that it is ultimately socially controlled (and thus we are able to direct its design toward positive outcomes). This constitutes, as Feenberg puts it, a "liberal faith in progress". In this perspective, there is never a danger in designing new technologies, as this work is "just science" and "just engineering" — after all, any technology can be equally used for good or ill. This is the naïve engineer's perspective described above.

- **Critical Theory** holds that technology does embed intrinsic political values, but that social systems ultimately can control the direction and design of technology to choose different social outcomes. The progress of technology is not inevitable, but depending on the choices we make, we can create beneficial or harmful technology.

Feenberg, along with most recent sociologists and STS theorists, take a view that fits more closely under the 'Critical Theory' rubric. Feenberg describes technology as derived from, and ultimately helping to constitute, social systems. Further, its progress isn't purely driven by technical or economic grounds.

> The choice between alternatives ultimately depends neither on technical nor economic efficiency, but on the "fit" between devices and the interests and beliefs of the various social groups that influence the design process.[Feenberg, 2002, 79]

Other science and technology theorists echo this perspective. Cutcliffe and Post's introduction to their first volume of the 1984 "Research in Technology Studies" opens with: "Technology is today recognized as an integral component of social change. Furthermore, it

is increasingly acknowledged that technology cannot be understood outside its social context." Bijker and Law's introduction to "Shaping Technology / Building Society" asserts: *They might have been otherwise*: this is the key to our interest and concern with technologies. Technologies do not, we suggest, evolve under the impetus of some necessary inner technological or scientific logic."[Bijker and Law, 1994, p 3] (Emphasis in original). This position makes it possible for technology designers to contribute to social change. If technological progress is not inevitable, but is driven by conscious choices of designers, and these designs can contribute meaningfully to social change, a designer is empowered to either contribute to change or the status quo by making design choices.

This notion of 'fit' or 'suitability' of a technology to particular social structures helps to avoid falling into either the trap of techno-fetishism (that artifacts can contain political power irrespective of social context), or the trap of social-determinism (that artifacts are entirely socially constructed, and do no embed particular affordances in their material structure). Between these two extermes lies the idea that technology is produced by its context, but that it reflexively contributes to future contexts.

Pfaffenberger argues against the techno-fetishist position with the example of Victorian hallway benches: in the context of the Victorian era society where they were designed, this austere, uncomfortable, but nevertheless ornate furniture was used as a way of enforcing class differentiation between a servant class who were made to wait uncomfortably in the hallway, and the upper classes who were admitted in to the main house immediately. Today, outside of the Victorian social context, the antique benches no longer act as class differentiators in the same way — the protocols of servant classes visiting upper classes have gone away, and those class distinctions are not, after all, embedded in the wood of the object. A technology must be accompanied by a shared cultural understanding of its meaning and use to express its politics.

Similarly, a strong social-determinist position that ascribes no intrinsic affordances to the materiality of an object goes too far in the other direction. While it is technically true that "guns don't kill people; people with guns kill people" (excluding autonomous robotic guns [Lin et al., 2008]), guns happen to be well optimized for killing people, just as Victorian hallway benches were well optimized for discomfort. Technologies can certainly be appropriated for different uses; a technology designed for "evil" could also be used for "good" and vice versa. One could, for example, dig a hole with a gun, just as one could kill someone with a shovel. But each is clearly better

suited to the opposite task[1]. The technology itself, its structure and materiality, are important components of a technology's suitability, along with its social context. In the case of Victorian hallway benches, the disutility of the benches for comfortable seating causes them to remain as symbols of conspicuous consumption, even if they are no longer used to seat the lower classes.

This 'suitability' or 'fit' of an artifact to a particular political context underlies the way a technology constructs and reinforces politics; and ultimately, underscores what is disruptive about disruptive designs. One should not expect a design for social change to have a perfect fit to every structure in its context; if it did, it would not be contributing to change. Socio-technical interventions that do not fit the status quo, but nevertheless achieve widespread diffusion, will contribute to social change.

[1] This example comes from lectures given by Chris Csikszentmihályi

3
Theories of Change

What does "social change" mean? The phrase implies that there is
some structure or institution (the "social" part) which exists and has
properties or expressions, and that those properties or expressions
can be altered. In common parlance, social change would be "chang-
ing the way people do things" — a simple notion which nevertheless
implies some important theoretical concepts: first, that people behave
according to norms, rules, or conventions, whether they are aware
of those conventions or not. Second, that through some intervention,
it is possible to alter the way people behave in order to upset and
ultimately alter the convention.

   In outlining a theory of how technology designers can cause social
change (and how the contexts of their design practice can inhibit
their efforts), it is helpful to develop a framework for understanding
what these "conventions" or social structures are and how they can
change. At issue is an interplay between the *agency* of designers
and users of a technology (how it is that they can cause change),
the role of *structures* in constraining or influencing behavior, and
what role technologies play in this dynamic. Structuration theory
(from Giddens [1984]), especially as developed by Sewell [1992] and
Orlikowski [2008] provides an insightful framework with which to
guide these questions.

   Structuration, coined as a neologism by Anthony Giddens [Sewell,
1992, p 4] but now in wide use, is a theory that social structures are
born of a "duality": they are "both the medium and the outcome of
the practices which constitute [social] systems" [Giddens, 1979, p 69].
Social structures have no existence outside of people's performance
of them, except as "memory traces" left behind in the participants
of the performance. Social systems are continually reproduced and
reenacted by individuals, and the system of structures that are en-
acted by people in turn influence people's choices of how to act.
When we think of someone behaving according to accepted norms
(tipping a taxi driver, for example), the behavior is a reperformance

of the memory trace of how one behaves in such situations. To fail to tip adequately would be to repudiate the existing social structure. If enough people did so, the social structure would ultimately change — but the entrenched expectations of large numbers of participants makes changing such a structure difficult.

People are knowledgeable; they have awareness of social conventions, roles, and expectations, and this knowledge is critical to their ability to recreate social structures. Giddens describes each individual actor in a society is being a de-facto social theorist:

> All competent members of society are vastly skilled in the practical accomplishments of social activities and are expert 'sociologists'. The knowledge they possess is not incidental to the persistent patterning of social life but is integral to it. [Giddens, 1984, p 26]

This proves to be a useful frame for thinking about how social change happens: social structures don't exist as things in the world, to be battled — rather, structures are constant re-enactments by knowledgeable agents in the world. Thus, to change a structure requires changing the conditions of re-performance of that structure. Some structures persist much longer than others through constant re-performance; Giddens calls long-lived structures *institutions*. While these structures will be harder to change, it is not due to agency of the institution itself: "Power within social systems which enjoy some continuity over time and space presumes regularized relations of autonomy and dependence between actors or collectivities in contexts of social interaction." [Giddens, 1984, p 16] Institutions and structures have power because people grant them power in a reflexive process of reenactment which reinforces that power. But they are not immune to dissent.

Giddens describes structures as composed of *rules* (or *schemas*[1]) and *resources*. In Sewell's account, resources act as anything that can serve as a source of power in social interactions — this includes human and nonhuman entities. The resources are the products of the rules[2] — they are configurations of matter or ideas that are the result of people's continued performance of rules over time. The form that these resources take will carry affordances based on the rules that produced them. For example, the products of a factory — composed of real matter, and existing in the world — still take a form that has a fit appropriate to the social structures for which they were built: "the extent and kinds of resources generated by a factory will depend on whether it is owned by an individual capitalist or by a workers' cooperative." [Sewell, 1992, p 12] This description of resources is a close match to STS theorists conception of value-laden artifacts — where Feenberg would say that an artifact has a 'fit' to a

[1] Sewell prefers the term *schemas* to rules, to avoid confusion with formally stated prescriptions – the "rules" in question are often "informal and not always conscious schemas, metaphors, or assumptions"[Sewell, 1992, p 8].

[2] Giddens refers to resources as the "medium" of structures.

particular social context, Giddens might say that an artifact affords the re-performance of the social structures by which it was molded.

An organization, such as a business, is a system of many overlapping and potentially opposing structures — including relationships between bosses and employees, expected codes of conduct, standards of behavior at the water cooler and at the Friday barbecue, but also deeper and longer-lived structures such as beliefs in the value of money. Actors who are unable or unwilling to perform their expected structural role might be regarded as "inconsiderate", "rude", "irresponsible", or other markers of social incompetence, unless their peers can identify with the alternative structure being enacted by the deviant. Those behaviors that violate structural norms demand explanation; whereas those behaviors that are in accordance with dominant institutions are not questioned. A designer attempting to change or transcend the structural expectations of their position in an organization may need to develop an alternative structural role that better affords their goals. To do so successfully, a structural role will have to be designed which other agents can appreciate, but which is still in accordance with the designer's ideals.

Technologies take on a form which is influenced by the context of systems of social structures in which they were designed, because the designer consciously constructs them to match those structures. A designer works with particular users and uses of the technology in mind, and will thus embed structural values into the materiality of artifacts they design which they believe will be a good fit. As resources, the designed artifacts will be better suited to particular tasks or social arrangements, and thus contribute to the re-performance of particular structures. It is not possible for a designer to create value-neutral technology — a designer who operates without the intentional selection of use cases, affordances, and structures will instill the values of the context of production in the work.

Despite this, as Orlikowsky argues, the artifacts are not by themselves a performance of structure — they only gain social meaning when they are used; and in use, structures are applied to them which may be more or less consonant with the initial intentions and goals of the designer. Technologies can be appropriated to other ends:

> While a technology can be seen to have been constructed with particular materials and inscribed with developers' assumptions and knowledge about the world at a point in time, it is only when . . . repeatedly drawn on in use that technological properties become constituted by users as particular rules and resources that shape their action. [Orlikowski, 2008, p 5]

The process is reflexive as well: as users adapt their use of technology, the shared understanding of the affordances and meaning of the

technology to both users and designers influences future design.

Structures have a strong reproductive bias — that is, a structure will be likely to persist only if it is constantly re-performed; and once constantly performed, it is both more common and harder to avoid performances of it. As Sewell describes, "mutually reinforcing rule-resource sets constitute human subjects with particular sorts of knowledge and dispositions." [Sewell, 1992, p 16] However, change is still possible: actors often behave in ways that are not consonant with existing structures, and many structures fail to get re-performed. In particular, Sewell offers descriptions of five key mechanisms by which agents can change structural arrangements:

- *The multiplicity of structures*: With many different structures existing simultaneously, even within the same domain, it is possible for an agent to pick and choose between them.

- *The transposability of schemas*: Schemas taken from one domain can be applied to another domain. Analogical and metaphorical reasoning can create new possibilities.

- *The unpredictability of resource accumulation*: The reenactment of schemas does not always produce the same material consequences — sometimes resources run out, or a particular strategy doesn't work the same in different contexts. This can lead to the variability in the success and failure of various structures, with variable popularity.

- *The polysemy of resources*: Resources can be taken to have different meanings and uses. They can be appropriated by different groups for different means. Even if a resource carries the imprint of the enactment of a particular structure, other structures may fit. Depending on how these meanings are understood or related, different emphasis will result in different structural reenactments.

- *The intersection of structures*: Where complexes of multiple structures interact, it is possible to take on different roles within those structures.

The theory of structuration provides two lessons important to sociotechnical designers: the first is that in order to create designs that contribute to intended social change, it is necessary to consider the ways in which these designs will embed the values consonant with desired social structures. In other words, designers must be critical theorists about the social context and political affordances of their designs, and the ways they contribute to resistance against the status

quo. Designers should also expect that their designs will be appropriated and changed through use, and design appropriately to minimize unintended harmful uses. The effectiveness of the designs in contributing to social change will be a function of their effectiveness in contributing to an alteration of the schemas people enact. Social change is, after all, social — an artifact alone changes nothing.

The second important lesson is that designers are themselves enmeshed in structural systems — whether as payed contractors designing for clients, as academics seeking career advancement, or as individual entrepreneurs working against the dynamics of the market. The choices that designers have available to them are limited by the resources and schemas at their disposal. The tendency of social structures is reproduction and stasis; creating change is likely to meet resistance. A designer who goes against the expected (status quo) structures by refusing to re-perform them, or by choosing different structures to enact, may be viewed as being irresponsible, uncooperative, overly idealistic, antagonistic, etc. One might be chastised for mixing politics with business, or invoke the wrath of bureaucratic structures which protect the institution from insurrection. One is likely to be asked to explain why it is acceptable to do this type of work. Thus, to be effective as a socio-technical designer, it may be necessary to include the structural properties of designer's own context in the scope of their design work in addition to the target domain's context. Doing so, a designer might be able to create the institutional circumstances for design for social change. Failing to do so, a designer risks being coopted by those institutions (selling out), or being disempowered (fired, chastised, exiled).

The framework is also highly consonant with aphorisms from activism — which we can now reformulate, replacing pith with theoretical precision:

- "Be the change you want to see" (attributed to Mahatma Gandhi):
  Perform those structures you want to gain institutional status and not those you wish to be less frequently reenacted.

- "One who condones evils is just as guilty as the one who perpetrates it" (Martin Luther King):
  Rewarding the enactment of a structure contributes to the production of schemas and resources which increase the likelihood of that structure being enacted again.

- "Under conditions of tyranny it is far easier to act than think" (Hannah Arendt):
  Interlocking systems of schemas and resources afford actions which

recreate them. Opposition to enmeshed structures requires explana-
tion, where consonance with them is unquestioned.

Structuration is useful in explaining why some types of social change are extremely difficult; at the same time, it explains how it can still be possible. While this theoretical framing is useful as a tool for ideation and contextualization of approaches, it still provides too high-level a perspective for most practical efforts at positive design. For that, we must zoom in more specifically on the practice of design and the way different perspectives on design can motivate change. Broadly, we can call practices of design for social change *design activism*. A full discussion of these design approaches is left as valuable future work; the present paper is concerned more specifically with the institutional context of a designer activist. Starting points to research might include these references: [Constanza-Chock, 2003], [Hirsch, 2008], [Ensemble, 1996], [N5M, 2003], and [Hands, 2011].

4
Selling Out

How do Utopian design ideas for social change get transformed into technologies which instead support the status quo?

Over-simplified narratives about the Utopian potential of the technology may mask challenges to the design, allowing its development without properties necessary for its suitability to the problem domain. The design and diffusion of new technologies is always an iterative process — and the institutional context of the designer is a key component of this iteration. The funders, supervisors, and advisers to the designer are critical actors in the design's evaluation, and through critique and selective support make the technology more consonant with those institutions' interests. In order to obtain buy-in for the product, the designer or the designer's institutions may develop a narrative of the technology which oversimplifies the problem domain, and overstates the potential. The narrative then acts as a vehicle for obtaining buy-in for the diffusion of technologies which may not be beneficial to all stakeholders [Pfaffenberger, 1992], and may not fulfill the original ideals for social change.

For example, the widespread diffusion of mobile phones requires a vibrant semi-conductor industry and its concomitant energy and water consumption, toxic industrial processes to produce batteries and other electrical components, a world-wide network of cellular towers which occupy land and require ongoing maintenance, a steady supply of electricity to charge batteries and maintain backhaul networks, the accumulation of electronic waste from discarded hand sets, and much more — including, as currently implemented, a centralized operational infrastructure which limits the medium as an effective conduit for free speech. Continued maintenance and operation of this huge array of technologies depends on the continued coordination of governments and economic actors to support it — all of which draw from and contribute to existing systems of hegemony [Staudenmaier, 1989]. Designers need the utopia to sell the idea to funders; funders need the utopia to sell it to the public; the public needs the utopia to

mollify their concerns about externalities. The designers are not immune: designers may well delude themselves about the ethical purity of their work; rationalizing away the structural constraints that drive them to particular design choices which ultimately work against their Utopian ideals.

The practical necessities involved in deploying a new technology can take precedence over the purer ideals of its Utopian drama. The iterative processes of development will tend to "de-fang" disruptive innovations to be more palatable to the systems on which they depend. For example, a decentralized communication network, which could be more resistant to authoritarian ingress, might not have the wealth-accumulating potential of a centralized network. If the designer required funding from investors who seek a maximal return on their capital investment, she might feel pressured to alter the design to make its function more centralized. This dynamic can be witnessed in the recent changes to Twitter's terms of service, which limit participation by third-party developers, as Twitter seeks to further monetize its service [Paul, 2011]. A designer wishing to prevent such dilution of her vision for social change would need to be able to successfully negotiate other ways for the technology to succeed. This might involve strategies such as establishing a clear ideology that backs the technology (as with the free software movement), finding benefactors that support the goals of social change, or reducing the need the technology has for capital investment. However, where the designer believes that these strategies or factors are external to her design work (e.g. "I'm just an engineer"), she may not resist the momentum of a shift in priorities.

Designers working in an academic context are not shielded from these dynamics. While academic designers may be free from many of the market-based constraints industrial or entrepreneurial designers face, those constraints are replaced by additional constraints in the form of grant requirements, standards of research validity, institutional standards for ethics, and personal professional goals (such as attaining degrees or tenure). Student and faculty designer activists must navigate these institutional constraints within the limits of their personal capacity and professional ambitions. A student attempting to complete a thesis which incorporates technology for social change will need to frame the work in a way that satisfies the university's and funders' requirements, within the timescales available in their course of study — time scales that are likely to be too short if successful social change is among the evaluation criteria.

In what ways do the institutional constraints operate? The following three broad categories, while not comprehensive nor mutually exclusive, identify major ways that institutions constrain disruptive

design: funding, research warrants, and institutional ethics and law.

Funding

> *Cancer the great teacher has been opening schools*
> *Down stream from every factory: Now everywhere fools*
> *Are staring into microscopes, researching cells*
> *Trying to figure out a way we can all live in hell*
> —Ani Difranco, *Decree* [Difranco, 2006]

In 2011, MIT opened the David H. Koch Institute for Integrative Cancer Research. The center immediately faced criticism from people who were concerned about the political implications of a major center for research funded by the controversial libertarian and Tea Party backer David Koch [Cooper, 2011].

Is it reasonable to claim that David Koch's contributions to a cancer research center will influence the research done by independent scientists working in the center? The potential "funding bias" influencing the outcome of research has been widely studied, and the consensus from multiple meta-studies is that the funder *does* affect research outcomes.[1] "Funding bias" is now a widely accepted source of inaccuracy in scientific results, and both journals and ethics boards require researchers to disclose the sources of any funding they receive.

When it comes to the design of new technology, the results of bias can be more profound than subtle differences in the rigor of statistical analysis — designed artifacts embed the value schemas of the designers, leading to a higher likelihood that those schemas will be re-performed in the future. Funding bias in technological design can construct new socio-technological configurations which will influence how we construct our lived experience. The constraints of funders can have dramatic effects on the direction that technological research takes.

David Koch's funding of the Institute for Integrative Cancer Research at MIT has been criticized due to the fact that Koch's source of wealth — Koch Industries — is a major producer of industrial pollution, including cancer-causing pollutants such as benzene [USDOJ, 2000]. Despite the Koch center's stated mission of an "integrative" and interdisciplinarity approach[2], it is notably focused exclusively on the treatment of cancer at the cellular level, rather than preventing it through the elimination of industrial pollutants of the type that Koch Industries produces. While the disease-oriented approach to the study of cancer is a *compatible* approach to the interests of many researchers in fighting cancer, it is not the *only* approach — the choice of approach is influenced by the source of funding for the institute,

[1] See Djulbegovic et al. [2000] and Lexchin et al. [2003] for bias in the pharmaceutical industry, Huss et al. [2008] for bias in studies of health implications of cell phone use, and Wade et al. [2010] for bias in the environmental impacts of military use of sonar technology.

[2] From the Koch Institute's statement of purpose: "Our success will rely on engaging individuals from a broad range of expertise—both within this building and through our partners beyond these walls— in genuine collaboration. The Koch Institute includes over 40 laboratories and more than 500 researchers located at our headquarters and across the MIT campus. This group includes cancer biologists, genome scientists, chemists, engineers, and computer scientists, all dedicated to bringing the most advanced science and technology to bear in the fight against cancer." [Jacks, 2011]

and will in part determine the technologies it develops. An alternative approach to fighting cancer that threatens the funders' bottom line would face more social resistance, whether or not it would ultimately save more lives.

An activist designer who is offered funds to study cancer under these conditions may still find it worthwhile — even if that designer believes that the environmental harm perpetuated by Koch Industries is problematic. However, by doing so, the designer may end up resisting social change that would prevent companies like Koch Industries from continuing to have strong institutional persistence in our culture. Since the systems of critique and feedback under such a funding regime will be structured to be consonant with the funders, designs which are disruptive to them will tend to be altered in the course of their development. Again, we should return to the mantra from Bijker: *it might have been different*. Rather than tackling cancer with the introduction of mass-produced nano-technology, one might address it by improving forest cover.

Research warrants

At a presentation by Manfred Clynes (neurophysiologist, neuroscientist, musician, and originator of the concept of a "cyborg") at Harvard University in 2009, I was surprised when Clynes started his presentation with a lengthy poem (poetry rendered in large yellow-on-blue type on successive power-point slides was particularly jarring). Clynes is already noted for his interdisciplinary merger of music and neuroscience; but to regard a poem as an appropriate conveyor of knowledge to a formal, science-oriented audience immediately cast doubt on his presentation. Could it be that at 84, he was growing a little past his prime of intellectual rigor? But why should this question arise? Is poetry not an acceptable medium for the conveyance of insights about the world, at least as much as powerpoint bullets? Had Clynes given this presentation to a forum of poets, it's likely that the later parts of the presentation which discussed the quantitative results of controlled experiments would have inspired indifference or distrust.

Rather obviously, different genres of research have different criteria for what constitutes acceptable work and acceptable forms of knowledge in that field — a student of oil painting will find dramatically different expectations for their work than a student of physics. These differences in evaluation and justification criteria which define what is valid work for a given field are its *warrants*.

Interdisciplinarity is, rightfully, an increasingly popular and sought after idea. The success of design models such as MIT's Rad

Lab, which made great strides in the development of information technology and cybernetic control systems following World War II, can be explained in part by the open format of the lab which combined researchers from diverse backgrounds in one space [Turner, 2006]. This configuration increased the likelihood of creating structural changes such as those outlined by Sewell — including multiplicities of structures, transposability of schemas, polysemy of resources, etc. Latour describes how it is not the purification of disciplines, but rather their hybridization, which is the most productive in doing the work of science and technology [Latour, 1993]; and by combining disparate research disciplines in one concentrated work environment, the likelihood of hybridization increases.

Despite these advantages, when a researcher attempts to cross disciplinary boundaries and bring in work from other fields, they are met with a host of challenges:

- The standards of rigor and even epistemological groundings for different fields vary — for example, a study design appropriate to the field of Human Computer Interaction may be woefully inadequate for sociology. Even within disciplines, there is great variation: within the field of sociology, there are as many as seven different meanings of the term "theory", each of which holds different clout depending on the subfield [Abend, 2008].

- The evaluation criteria may be unknown. Evaluators or supervisors from one field will have difficulty assessing the correctness or novelty of work imported from another field. Woe to the naïve physicist who quotes Freud to a psychologist.

- It is difficult to achieve expertise in multiple fields — one risks becoming a "jack of all trades, master of none". The maintenance of deep technical skill in a given field may leave little time left over for forays into others.

- Standards of performance and evaluation that emphasize individual rather than collaborative work make it harder for researchers in different fields to support each others' efforts. A student can't take on co-authors for a dissertation or thesis, and a lack of first-authored papers reflects poorly on a pre-tenure professor's record.

Just as a member of an organization who fails to correctly re-perform that organization's structures may be chastised as irresponsible or deviant and would expect to have their behavior questioned, a researcher who strays into other domains risks having the validity of their work questioned. While research structures that support interdisciplinarity exist, the tension between purification of discipline and

hybridization of other disciplines is continuous and ongoing — inter-disciplinary institutions risk genrification if they don't intentionally seek to support novel and risky collaborations. Professional evaluations such as promotions, degrees, tenure, and so on will tend to be based on criteria familiar to the institution's existing contexts, rather than hybridized criteria. All of these constraints can lead a designer to seek safer, less disruptive courses of research.

Individual researchers may also succumb to the temptation to denigrate or minimize the contributions of other fields: scientists and critical theorists may regard the others as lacking in epistemological rigor — and they may do so vociferously, as the so-called "science wars" of the 1990's illustrate [Gross and Levitt, 1997, Parsons, 2003]. No one has yet succeeded in developing a universally accepted demarcation principle which could distinguish valid scientific practices from invalid, despite efforts going back hundreds of years (including logical positivism [Uebel, 2006], eliminationism [Popper, 2002], and frameworks of paradigms and revolutions [Kuhn, 1996]); but researchers who disregard the contributions of the philosophy of science may believe otherwise, latching on to a naïve or poorly developed personal demarcation principle with which to dismiss other fields. And no one but poets seem to take poetry seriously. A researcher's tendency to minimize the contributions of other fields decreases the likelihood that she will make ground-breaking contributions in her own, as the theoretical ground in which she operates will already be well-trodden.

This paper combines research from the fields of STS, sociology, design and social activism; and its intention is to elucidate subjects usually relegated to "practice" rather than "theory". Thus, the choice of language and emphasis is challenging. An audience of STS researchers would likely be unfamiliar with the theories of structuration. Sociologists familiar with structuration may be unfamiliar with the concepts from the critical theory of technology in society. Both groups may be unfamiliar with the language of design and the processes of iteration. Engineers and practitioners may prefer an emphasis on more practical language that skips the theoretical framing. Theoreticians may disagree with the matter-of-fact framing and under-developed case studies, which are more typical of pop-professional business literature such as Godin [2008] than social science. It remains possible that this paper is of poor quality; but by what criteria is that determination made? My hope as author is that the content of this paper would positively influence the future development of technology design as activism. But this is a criterion less likely to find traction in the context of the academic environment in which it was written.

Institutional ethics and law

What are ethics? A typical common-sense definition would be "a system of rules by which one ought to behave." But this definition is manifestly circular — the "ought" raises the question of what the source for this normativity would be, if not some additional system of ethics. Thinkers from the earliest Greek philosophers to the present day have grappled with this question, variously invoking God (e.g. Spinoza), Reason (e.g. Kant), Calculative Rationality (e.g. Rawls), Evolution (e.g. Joyce [2006]), and more in an effort to establish some external grounds by which we might feel justified in imposing rules of behavior on ourselves and others. Many philosophers have given up hope in finding any external source of ethical normativity, instead regarding ethics as an emergent phenomenon of our psychology or social experience which lacks any external justification.[3] Most people have still not given up a sense of right and wrong; even if they are unable when pressed to justify moral impulses in rational terms.

In social groups, personal moral opinions are negotiated into shared norms and expectations for behavior, regulating how members of the group behave. These moral senses function as a form of social structure, and as such both constrain and are derived from shared experience, and change over time. As an example, three hundred years ago, slavery was considered morally acceptable by many North Americans; today it is almost universally condemned.[4] Today, a basic set of shared moral principles might include things like refraining from murdering, stealing, lying, or committing incest; though in each case there may be justifiable exceptions, and some people would disagree to varying degrees with the common assessment.

In contrast to these vague and often emotional and negotiable personal and shared senses of morality, institutional ethics consists of principles that have been officially codified by professional societies or governments, and bring explicit forms of coercion to bear in their enforcement, such as imprisonment, fines, or expulsion from practice. Professional ethics differs from law in that the professional societies that codify ethical principles typically are not empowered to use violence to enforce their codes, and must instead resort to economic or reputational tactics for enforcement such as firing or blacklisting violators. Violators of law, on the other hand, may face punishments as severe as execution or imprisonment. In practice, however, the distinction between law and profession is not so clean. Over time, many professions (such as medicine) have gained a monopoly control over their practice, and laws have been passed which enforce professional

[3] Based on emperical studies of moral decision making, Haidt [2007] has posited the existence of five distinct "spheres" of moral reasoning, which different cultures express in varying degrees: harm, fairness, community, authority and purity. What moral justification would amount to, then, is a rationalization of an emotional sense of rightness or wrongness in terms of those spheres of moral reasoning most agreeable to the judge.

[4] Paradoxically, a report for the US Department of Navy, Office of Naval Research on the ethics of autonomous military robotics advances a theory that such robots could be ethically justifiable only if they are considered to be slaves, and as such lack free agency independent of their creators and operators, who would inherit all moral consequences of the robots' actions.[Lin et al., 2008]

codes and require licensing from professional societies. For example, one cannot practice medicine without a license in the US without the threat of criminal penalties — but professional societies, not governments, bestow the licenses; thus professional medical societies are empowered to wield the force of law. Other professions may lack such specific licensing requirements, but still fall under the purview of laws governing standards of quality or liability for practitioners.

While professional monopolies in practice may serve to protect people from malpractice or incompetence, they also decrease the freedom that practitioners have to develop, improve, or alter their practice. In his manuscript "Tools for Conviviality", Ivan Illich argues that the development of a practice into a profession inevitably entails two "watershed moments", in which a profession is first standardized (improving quality and efficiency), and then monopolized and made escoteric (increasing cost beyond a point of diminishing returns). In the first watershed moment, through the refinement and codification of best practices and the introduction of scientific principles, the quality of work produced by a profession improves beyond the capabilities of lay people.

> The year 1913 marks a watershed in the history of modern medicine. Around that year a patient began to have more than a fifty-fifty chance that a graduate of a medical school would provide him with a specifically effective treatment (if, of course, he was suffering from one of the standard diseases recognized by the medical science of the time). Many shamans and herb doctors familiar with local diseases and remedies and trusted by their clients had always had equal or better results.... The Westernized public learned to demand effective medical practice as defined by the progress of medical science. For the first time in history doctors could measure their efficiency against scales which they themselves had devised. [Illich, 2000]

However, as a result of this achievement, the profession gained a monopoly status on the acceptable practice of the profession, restricting the ability of lay practitioners to participate in the practice. This restriction led to the second watershed moment: the cost of becoming an official practitioner of the profession, as well as the cost of receiving services, increased past a point of diminishing returns.

> The exclusion of mothers, aunts, and other nonprofessionals from the care of their pregnant, abnormal, hurt, sick, or dying relatives and friends resulted in new demands for medical services at a much faster rate than the medical establishment could deliver.... At the time of the second watershed, preservation of the sick life of medically dependent people in an unhealthy environment became the principal business of the medical profession... Access to specialists, prestigious hospitals, and life-machines goes preferentially to those people who live in large

cities, where the cost of basic disease prevention, as of water treatment and pollution control, is already exceptionally high. [Illich, 2000]

Illich argues that this pattern repeats itself across many areas of professional practice, including architecture (preventing small-scale construction or repair of buildings by lay practitioners, such as barn raising), education (demanding extremely costly universities rather than more informal systems of learning), and even burial (requiring participation by licensed undertakers in any funeral).

Professionalization leads to the creation of power discrepancies between professionals and non-professionals. As William F. May, a researcher of medical ethics, points out:

> [The professional] had better be virtuous. Few may be in a position to discredit him. The knowledge explosion is also an ignorance explosion; if knowledge is power, then ignorance is powerlessness. [Harris et al., 2009, p 24]

Given such power, it is incumbent upon professions to ensure that the power is used ethically; and thus most professions have an associated code of ethics by which members of professional associations agree to abide. The codes of ethics are formulated by practitioners of the profession, and thus codify the personal and shared ethical opinions of the already empowered professionals, potentially at the expense of lay people or the otherwise disempowered.

This institutionalization of ethics can directly limit design for social change. A technology which counteracts existing professions (for example, by providing laypeople the tools to do the work that an institutionalized profession monopolizes), or violates a profession's norms in its design or production, could result in both legal and professional consequences for the designer. Below, I will describe in more detail three particular areas of institutionalized ethics, and some example conflicts that they entail for designs for social change: engineering ethics, research ethics, and law.

Engineering ethics

Engineering ethics, like most professions, are governed by statements of professional associations of which many or most practitioners are members. The National Society of Professional Engineers is one such association, has the following preamble to its code of ethics:

> Engineering is an important and learned profession. As members of this profession, engineers are expected to exhibit the highest standards of honesty and integrity. Engineering has a direct and vital impact on the quality of life for all people. Accordingly, the services provided by engineers require honesty,

> impartiality, fairness, and equity, and must be dedicated to the
> protection of the public health, safety, and welfare. Engineers
> must perform under a standard of professional behavior that
> requires adherence to the highest principles of ethical conduct.
>
> [NSPE Code of Ethics: http://www.nspe.org/Ethics/CodeofEthics/
> index.html]

As Harris et al. [2009] observe, this preamble is a normative state-
ment: it expresses what the association believes engineers *should*
do; but it (and the code of ethics that follows it) leaves a substan-
tial burden on engineers to interpret and perform according to the
highest aspirations of the code. Harris cites multiple impediments to
such responsible action which engineers might encounter — includ-
ing conflicts arising from the engineers' self interest, unintentional
self deception, fear of retribution, ignorance, egocentricity, narrow-
ness of vision, an uncritical acceptance of authority, and groupthink.
It is particularly the last two that present the highest potential for
dissonance: according to Harris et al. [2009], it is necessary when
interpreting codes of ethics that authority and common practice be
challenged — and we might posit that this critical attitude might
apply equally to the code of ethics itself. Professional ethics may be
at odds with one's personal ethics, and unless practitioners are will-
ing to challenge the assumptions that go into codes for professional
ethics, the professional standards may remain stagnant.

Given the wide range of potential interpretations of ethical codes
and the weight that they place on personal responsibility and judg-
ment, it's easy to reach a conclusion that the codes are neither suf-
ficient for demarcating ethical conduct (condoned actions may be
unethical), nor necessary for it (forbidden actions may be ethical).
An example of a clear case where personal and professional codes
of ethics may differ is in the code of ethics for the Association for
Computing Machinery, which includes a prohibition on violations of
copyrights and patents:

> 1.5 Honor property rights including copyrights and patent.
>
> Violation of copyrights, patents, trade secrets and the terms of
> license agreements is prohibited by law in most circumstances.
> Even when software is not so protected, such violations are
> contrary to professional behavior. Copies of software should be
> made only with proper authorization. Unauthorized duplication
> of materials must not be condoned.
>
> [ACM Code of ethics, https://www.acm.org/about/code-of-ethics]

The prohibition of patent violations goes against the personal ethics
of software professionals who disagree with the moral acceptability
of software patents — especially as formulated by the ACM code,

which forbids violations of patents even where condoned by law. Thus, a designer of a disruptive technology that, for example, facilitates violations of copyrights or patents, would risk banishment from the ACM for their work, making it impossible for them to represent the work in major ACM journals or conferences, to the detriment of the designer's career advancement.

Research ethics

Following a sordid history of researcher abuse of human subjects, the National Research Act in 1974 was signed into law in the United States [UNLV, 2011]. The act established requirements for US-based universities to establish Institutional Review Boards which would oversee and approve or demand modifications to research protocols. While clear examples of egregious abuse by researchers such as intentionally denying treatment to patients with syphilis (the Tuskagee Syphilis Study), or creating psychologically damaging conditions for students (the Stanford Prison Experiment or Milgrim's experiments on Obedience and Authority), the codification of principles of ethics into institutional and legal policy is limited in its efficacy. Based on the principles of structuration theory, we would expect such a codification to reflect the values of those who designed the legal code — and in this case, that means white males in the 1970's who believed in a strong separation between the roles of researcher and "subjects". The policies were written first to reflect the practice of biomedical research, and then modified to encompass social science research. In some institutions such as MIT, the review board classifies social science research as "Non-Biomedical Research", a classification through exclusion which betrays the mindset with which the policies were formulated.

These codified policies, as it turns out, are fundamentally incompatible with approaches to research that reject the traditional dichotomy between researcher and subject as a unproductive power dynamic, despite the fact that researchers attempting to undermine such dynamics believe their work to be on stronger ethical footing than "traditional" research. Participatory Action Research (PAR), a set of research practices which grew out of a desire for an emancipatory practice — a "social process of collaborative learning realized by groups of people who join together in changing the practices through which they interact in a shared social world" [Kemmis and McTaggart, 2005] — attempts to take research participants and researchers on a shared journey of growth and social change as co-researchers. Rather than "researchers" and "subjects", PAR consists of participants in a strong sense — the research subjects and researchers take

shared control of the research questions, data, and process. It is also intentionally reflexive. Kemmis and McTaggart [2005] refers to the research process as a continuous spiral of planning, acting and observing, reflecting, and then revising the plan and beginning again. Some practitioners of PAR criticize the standard practices of social science analytical frameworks as perpetuating social problems that they might seek to study:

> These analytical frameworks stress the impact of the larger political economy on institutions and ideologies, including those of the academy. From this perspective, the principle function of universities is the reproduction of social class differences through teaching, research, and the provision of new generations with access to key positions of power within the class system. [Greenwood and Levin, 2005]

When participatory action researchers attempt to engage with the Internal Review Board processes for social science research, they must translate the language of participation into a language of subjects and principle investigators (complete with consent forms that reiterate and reify the dichotomy), and translate a reflexive research protocol with shared control between researcher and participants into a predetermined protocol controlled solely by the principle investigator. This bending of purpose breaks down if problems in the research are encountered: though a PAR practitioner may intend to give participants full shared control over research data and process, the review board may deny the investigator the ability to share the data if the approved research protocol is suspended for whatever reason. PAR practitioners are left to either risk submitting to the review board's policies, and striving to bend the codified frameworks to their practice, or to eschew the review board with potential consequences on their institutional status.

Law

Even in cases where practitioners act entirely within the law, cultural resistance can provoke reactionary investigators to abuse the law in an effort to stifle the practice. Steve Kurtz, widely acclaimed artist and professor at the State University of New York in Buffalo, was arrested in 2004 on suspicion of bioterrorism. Kurtz had been working with the Critical Art Ensemble developing and showing exhibits critical of the biomedical field, which involved basic biological laboratory equipment and harmless bacteria samples. Despite the harmlessness of his work and equipment and the lack of evidence against him, Kurtz was embroiled in a 4 year legal battle, facing up to 20 years in prison if convicted, which finally ended with a finding that the case

against him was insufficient on its face (i.e., even if he had done exactly what the prosecution claimed, it would not constitute a crime) [Ensemble, 2008]. Kurtz now warns students who are working for social change that they should expect that eventually, if they continue to agitate, they too may be persecuted — as he explained in a lecture on cultural resistance:

> We started with two really bad assumptions. We were believers that we had these things called "rights". And that was our first mistake... all you really have is ... struggle. We also thought that if you stay in the legal sphere — how would you ever get in trouble? ... We realized that anyone can get arrested at any time.... An officer could come in right now and arrest any one of us.[Kurtz, 2011]

Due to the vast number of laws that exist, and the wide variability of interpretation of these laws, people unwittingly 'break' the law all the time. Civil liberties lawyer Harvey Silverglate estimates that the average US Citizen commits three felonies every day [Silverglate, 2011]. In this legal environment, designers who are seen as antagonistic to the status quo can attract persecution. Indeed, former Kurtz colleague Ricardo Dominguez, professor at the University of Santa Cruz, attracted his own FBI investigation in 2010 following a "virtual-sit-in" action by students of his class on electronic civil disobedience. This investigation, too, was eventually dropped. [Dominguez, 2010] Designers may find they lose the will to fight for social change when faced with the stress and uncertainty of protracted legal battles and long prison sentences if convicted, even if they do not believe they are breaking any laws.

As a designer who attracted unwanted attention from the FBI for a project I worked on, I can attest that the prospect of prosecution, even though I believed I had done nothing illegal, placed tremendous psychic strain on me. As a student making a low wage I was forced to expend social capital and a great deal of time and energy finding legal representation that I could afford. The strain of scrutiny from law acts as a significant reduction in the amount of space and clarity of one's thoughts; a substantial obstacle that saps energy and decreases efficacy in other spaces. I experienced paranoid thoughts about the possibility of being watched in public spaces while I did things like type the password to log on to my laptop, as well as fear that if I continued working in the contested space I would inevitably face greater and more severe scrutiny. A designer who does not bend under this kind of pressure and somehow continues to work on controversial projects is only able to do so due to the tremendous support offered by peers and colleagues. In the absence of this support, one couldn't fault the designer for capitulating and stopping work.

5
The Designer Activist's Scope

Given the complexity and uncertainty facing a designer seeking to disrupt the status quo, it can be tempting to compartmentalize roles and distinguish one's professional design work from one's activism, or to avoid contentious spaces in general. But doing so does not make one's work apolitical — it merely tacitly chooses the status quo, complete with any structural inequity and harmful power relations, as the politics one's work supports. It cedes control of the structural outcome of one's design work to other agents who are creating the structural conditions for design. By doing design at all, one is organizing resources in a manner which will afford particular cultural outcomes.

How then, is a designer to navigate the myriad requirements — technical requirements of the problem domain, professional requirements of the designer's institutions, legal threats, and economics? The answer lies in a question of scope: technical designers already succeed in negotiating difficult technical challenges in their problem domains. What is needed is an expansion of scope in the designer's practice which takes into account the designer's situation in addition to the design work itself.

Chris Argyris and Donald Schon have studied the way professional practitioners perform their own roles of expertise, and scope the critical reflection of their practice. They describe two "theories of action" which they believe describe two common approaches to negotiating one's role in one's practice. Imaginatively named "Model I" and "Model II", the models encapsulate both a set of personal values and a set of strategies the practitioners use to fulfill those values. The values for Model I include:

- Achieve the task (as I define it)
- In win/lose interactions with others, try to win and avoid losing
- Avoid negative feelings, such as anger and resentment

- Be rational, in the sense of "Keep cool, be persuasive, use rational argument."

Strategies include:

- Control the task unilaterally
- Protect yourself unilaterally, without testing to see whether you need to do so
- Protect the other unilaterally, without testing to see whether he wishes to be protected. [Schon, 1984, pp 226-227]

A Model I theory of action results in cagey performance in which the practitioner avoids contention, sticks to pre-defined roles, and seeks to maintain a personal status as "expert" with prescribed boundaries. By contrast, a Model II theory of action involves a second loop of reflection in which the practitioner incorporates their role as part of the domain of critical introspection — and consequently, results in a theory of action which opens the designer's own state to the domain of inquiry. Values include:

- Give and get valid information
- Seek out and provide others with directly observable data. . .
- Create the conditions for free and informed choice
- Try to create, for oneself and for others, awareness of the values at stake in the decision, awareness of the limits of one's capacities, and awareness of the zones of experience free of defense mechanisms beyond one's control.
- Increase the likelihood of internal commitment to decisions made.
- Try to create conditions, for oneself and for others, in which the individual is committed to an action because it is intrinsically satisfying — not, as in the case of Model I, because it is accompanied by external rewards or punishments.

The strategies for Model II include:

- Make designing and managing the environment a bilateral task, so that the several parties to the situation can work toward freedom of choice and internal commitment.
- Make protection of self or other a joint operation, so that one does not withhold negative information from the other without testing the attribution that underlies the decision to withhold.
- Speak in directly observable categories, providing the data from which one's inferences are drawn and thereby opening them to disconfirmation.
- Surface private dilemmas, so as to encourage the public testing of the assumptions on which such dilemmas depend.[Schon, 1984, pp 232-233]

A technical designer who adopts a Model II theory of action may work with their colleagues and supervisors to develop structural conditions that are consonant with their desires for social change. They may negotiate alternate arrangements for funding, develop new shared criteria with which to be evaluated, and develop support networks necessary to survive entanglements with the law. They will avoid taking on their work as a private struggle, and remain open to questions about their basic assumptions. The struggle for social change becomes a shared and public. If a designer and their supervisor both engage in Model II negotiation, a shared solution which satisfies the needs of both may be reachable.

This should not be read as an endorsement of deliberative, consensus oriented methodology as a solution to all contested spaces. As noted by Chantal Mouffe, there are limits to the efficacy of deliberation — some political struggles are inherently contestational [Mouffe, 2000]. Drawing on Mouffe's principle of agonistic pluralism, Tad Hirsch describes an approach to *contestational design* in which designers act as partisans engaged in political activism with the goal of winning.

> By contestational design, I refer to design activities that engage in advocacy work in collaboration and/or on behalf of particular players in adversarial political processes. Contestational design ... is an openly partisan activity that advances a particular set of interests, often at the expense of another. [Hirsch, 2008, p 11]

Legal threats to a designer, for example, are unlikely to be solvable using deliberative and cooperative principles. The prosecution won't join your struggle to construct a novel legal solution that allows disruptive work to continue unimpeded. However, contestation has its limits. A global principle of contestation in which every individual agent acts independently of every other describes a world in which only Model I theories of action prevail. Even within the contestational practice that Hirsch describes, designers engage in collaborative and cooperative work with activists — as Hirsch describes:

> In my first years at the [MIT Media Lab], I collaborated with peace activists, community development organizations, and environmental rights groups. [Hirsch, 2008, p 10]

Groups of partisan activists also collaborate with each other where their interests overlap, using their shared strength to achieve greater results. And students or professionals engaged in political design work do so within the context of existing institutions for employment and study. An employed designer who takes an overtly contestational approach to their employment context may quickly find themselves out of a job, and no longer able to support their work

for social change. If instead the designer can include the situation of their employment in the scope of their design work and deliberatively construct the conditions for their design activism to continue, they may be more effective in contributing to social change.

There are, of course, limits to one's capacity — the expansion of a designer's scope beyond their technical domain to include the myriad roles that are required for successful social change may limit the depth of skill the designer is able to achieve. As the Critical Art Ensemble noted in *Electronic Civil Disobedience*:

> Hacking requires a continuous technical education in order to keep skills up to date and razor sharp. This educational need has two consequences: First, it is time-consuming, leaving little or no leisure time for collecting information about specific political causes, building critical perspective, or designating contestational sites. Without such information, hacker politics will continue to be extraordinarily vague. Second, continuous reeducation keeps hackers tied into their own hermetically-sealed classroom. [Ensemble, 1996, p 19]

However, if a designer is able to recognize the limitations of their own expertise, trust the insights of other fields, and to find committed practitioners in other fields who share interests in social change with whom to collaborate, the deficiencies can be mitigated. A crucial first step is to make both the private dilemmas encountered in the struggle to engage in disruptive work as well as values and ideals public, so as to engage collaborators.

Formulated this way, the grand failed Utopian dramas that accompany a technology can be read as a misguided expression of Model I "expertise": they are aspirational statements of possibility which fail to surface the private struggle of technical failures and externalities that accompany the technology's diffusion, with a narrative stuck in a unilateral simplification of the problem domain, focused on "winning" by convincing others that it is true. Rather than placing one's hope in grand Utopian visions, one may find better success by taking a stronger principled stance in the values and ideals motivating goals for social change, accompanied by a realistic humility about any work's contribution to the struggle. A focus on the artifact and its power can be shifted to a focus on principle and its applicability.

6
Cases

To motivate points introduced in this paper, I will now discuss several example cases of technology projects which required institutional negotiation with respect to funding, research warrants, and institutional ethics. The questions that the reader might ask for each of these cases include:

- In what way did institutional constraints impact the process of design, and the designed artifacts?

- In what way did the designer negotiate these constraints to either change the framing or content of the designed artifact?

- How successful was the negotiated design in achieving its initial objectives for social change?

The answer to these questions is never simple and straight-forward, as the process of negotiating a design within an institutional context is one which happens gradually and with subtly changing objectives. The initial objectives a designer has in mind may not be easily knowable, as documentation typically begins after the negotiation is well under way. Further, we can only speculate about how outcomes might have been different if the designer's institutional negotiations proceeded differently. Still, it is a useful exercise to call attention to how the institutional interaction in these cases proceeds.

Funding constraints

There are overt cases where funding has been pulled from contestational work on ideological grounds — for example, the National Endowment for the Arts' elimination of funding for individual artists in response to transgressive artwork in the early 1990's. [Phelan, 1990] However, the usual case is less overt: a designer will subtly shift objectives and framing in order to make a work more palatable to

funders. If a designer is unable to conceive of a way to fund a contestational work, it is likely that it will not get past the drawing board. On the other hand, if it's clear that funding would become available if the designer makes minor changes in framing or execution, they would be likely to do so.

Identifying these cases can be more challenging, as designers typically describe their work after these shifts have already taken place; or contest whether or not any ideological shift has actually occurred. For example, Nicholas Negroponte insists that the One Laptop Per Child project did not shift direction with his decision to abandon the open source Linux operating system's contstructivist-inspired "Sugar" user interface in favor of Microsoft Windows' commercial operating system; but colleague and former OLPC president Walter Bender left the project over the decision, alleging that it had lost sight of its goals. [Walsh, 2008] Whether this disagreement constitutes a legitimate abandonment in goals for social change or a practical and compatible shift in strategy that is responding appropriately to economic reality is debatable.

Where design work is overtly contestational, the work is often by necessity funded by individuals or donors who leave no strings attached to the work. The Yes Men, who produce media spectacles impersonating high level officials from major corporations, are explicitly funded only by individuals, which leaves them free from institutional persuasion (or liability) over their work:

> As for the money. . . . it came from our mailing list, to which we sent calls asking for help. Today, a fundraising platform like Kickstarter could do pretty much the same thing. http://theyesmen.org/faq

But in some cases, even in the absence of any institutional funding, entrenched institutions can still exert financial power. The WikiLeaks organization, which offers whistleblowers a platform for the dissemination of secret documents, is funded entirely by individuals.[1] Despite this relative independence, transaction processing services PayPal, Visa, MasterCard and Bank of America froze WikiLeaks' accounts and refused to process further donations for them, and Amazon, who had provided web hosting services for WikiLeaks, terminated their service. [Daly, 2011] This episode demonstrates how strong a commitment to ideology an organization may need in order to continue contestational work against organized, entrenched power.

For perhaps a more typical case, I will discuss a project of my own. The first person analysis is valuable as it allows me to reflect on my original intentions and how outcomes differed; this perspective is one to which an analyst typically does not have access through

[1] WikiLeaks applied for a grant from the Knight Foundation News Challenge in 2009, and despite reports from inside sources that they garnered the most support from an advisory board which recommends grant recipients to the staff, the board did not award a grant, potentially calling into question the ideological consistency of the Knight Foundation itself. [Cohen, 2010]

literature review, which often perpetuates the illusion that the compromised outcome was the original intention.

In 2009, I developed a mobile phone application called "Merry Miser" which used its users' financial histories and location as context to provide interventions intended to help the users make financial choices — originally, the intention was to help its users to resist the persuasive power of advertisements. [DeTar, 2009] I developed this application as part of a master's thesis at the MIT Media Lab; consequently, the funding for the work, like most of the Media Lab's work, came from the MIT Media Lab's consortium sponsorship model. Under this funding model, companies purchase sponsorships of the lab, and in return are offered an equal share in the intellectual property that the lab produces, and the opportunity to regularly tour the lab and view "demos" and presentations of the research conducted at the lab. While completing this work, I was also the recipient of a fellowship from the Center for Future Banking, a subset of the Media Lab which was funded entirely by Bank of America.

As a result of this context for work, I regularly presented the work to bank executives and other financial industry employees. These presentations would typically consist of my offering a presentation of the key ideas and motivations of the work for five to ten minutes, followed by questions and feedback from the sponsors. As a result of this, from early on in the development of the project, I regularly had an opportunity to practice presenting the work in language that would be palatable to financial industry employees. Through this dynamic, a subtle shift in the framing of the project occurred which I didn't notice until I reflected on the work after the fact. Rather than focusing on the negative impacts of advertisement and identifying ways to resist advertisement, the focus shifted to the fiscal irresponsibility of users which had to be combated with persuasive tactics. This shift in target from the negative impacts of advertising to the negative impacts of personal choices made the work more suitable to those from whom I received the most direct feedback. Even though the content of the work remained substantially compatible with my original intention, it altered many small choices in the design and the theoretical frameworks I drew upon to contextualize the work.

This subtle shift is perhaps more typical of the how financial influence impacts the development of work: the framing of work which is most palatable to funders is the framing that will win; and this framing will subtly shift the topic in ways that can remove the work's revolutionary potential.

Research warrants

In 2004, together with a coolition of activists, Tad Hirsch developed a mobile SMS-broadcast system called "TXTMob" to assist with mobilizations during the 2004 Democratic and Republican National Conventions. The application enabled protesters to coordinate their movements, communicate about the actions of police, and thus successfully disrupt the conventions. [Hirsch, 2008] What is of interest for the purposes of this paper is not the tool itself and its successful deployment — but rather, the way that Hirsch contextualized the work for the purposes of his PhD dissertation.

Hirsch incorporated TXTMob, as well "Dialup Radio", a service for audio information delivery in Zimbabwe, into his dissertation entitled "Contestational Design". While the dissertation discusses the details and implementation of the systems, the framing of the dissertation's contribution is not about the technology itself nor their contribution to social change, but rather a proposed new category of design practice — contestational design.

> The defining characteristic of contestational design is a willingness to take sides in contentious social issues. This is a radical departure from approaches to design and social change one finds in design scholarship that cling to notions of objectivity and neutrality. It also sets contestational design apart from other forms of "alternative" design that acknowledge design advocacy but don't account for opposition. [Hirsch, 2008, p 121]

By framing his work as a contribution to design theory, and arguing for the validity of overtly partisan design work, Hirsch was able to escape the critique that his work failed to adhere to the traditional role of designers as supposedly neutral or objective. In effect, Hirsch designed a framework that established a research warrant which granted partisan design work validity, and motivated this framework with reference to his design projects.

Had Hirsch simply attempted to frame his design projects within established contexts of design, or as work in an established subdiscipline such as Human Computer Interaction or Computer Supported Collaborative Work, it is less likely that he would have been able to justify them as novel or valid contributions to the field. Instead, to meet his personal objectives of achieving his doctoral degree, it was necessary to define a new set of research warrants by which to evaluate his work.

Institutional ethics and law

As an example representing a collision with institutional ethics, I will return to a personal project. Between the Bars[2] is a blogging platform for prisoners that I and Benjamin Mako Hill started at MIT in 2010. The project enables people in prison to blog using traditional paper mail as the medium. As prisoners traditionally are denied access to the Internet and any other form of broadcast media, the service allows a unique opportunity for writers in prison to reach a wider audience. Initially, the project was started as both a service project and a research project. The service was intended to allow people to blog, while the research project was intended to analyze the success of the service in improving the lives of participants.

[2] http://betweenthebars.org

Research involving prisoners is highly regulated. Prisoners, along with children and students (where the participation in research could impact grading) are in a class of protected research subjects as identified by federal law. Institutional Review Boards, which supervise all research involving humans at universities, give extra scrutiny and stricter review requirements to research projects that involve subjects from these protected classes. We underwent a two year process of preparation and negotiation of our protocol in order to obtain permission to proceed with the project from MIT's review board. The review board also consulted with the MIT General Counsel to ensure that our work would not be in violation of the law.

Despite this preparation and approval of our protocol, after two months in operation, we received a letter from the New York Department of Corrections informing us that our research project was not in compliance with New York regulations for research involving prisoners — in addition to review by MIT's board, we needed to have the project approved by New York's Department of Corrections review board. After researching this, we discovered that most prison jurisdictions at the state and federal level had additional review boards which would also need to be consulted prior to any research. Given this, MIT's Institutional Review Board shut down the project, and we had to take the site offline, until we could be in compliance with all jurisdictions.

The logistical hurdles involved in obtaining review board approval in as many as 51 separate jurisdictions, some of which had mutually exclusive criteria for approval, made it clear that we would be unable to obtain this authorization. Instead, we decided to cancel the research component of the project, and continue with the project as a pure service with no research. MIT's mission includes three broad categories of activity — research, education, and service; and thus a pure service project seemed valid work for MIT to engage in.

However, this decision required further negotiations with the MIT general counsel, the review board, and the MIT Public Service Center. We encountered conflicting messages from these various sources: the general counsel initially told us that MIT was not an institution which engaged in service (something which the Public Service Center disagreed with) — it was necessary to hold a joint meeting with representatives from each office to iron out the conflict of perception. The review board also told us that we could not "use the data" which had been "collected" during the first two months of operation. Under the review board's conception of the project as research, the interaction between us (the "investigators") and the writers in prison (the "subjects") was one in which we collected and extracted data from them, and that any use of this data (including publishing it on the Internet) was an improper use if the data collection was not authorized, even where the subjects explicitly requested that their writing remain online. The research "subjects" were not granted agency to determine how their data would be used.

We were ultimately able to restart the service, after obtaining reauthorization from every writer to continue publishing their material, though doing so required 4 months of negotiations with multiple offices at MIT, and carefully redefining the project to meet the institutional requirements. We learned that it was important when beginning a contestational project in a university context to very carefully choose the framing of the project — be it service, education, or research. Each frame carries different institutional and legal requirements; in our case, the frame as "research" proved impractical for the continuation of the project. As a service project without a research component, it is no longer possible for us to study or write about the interaction that people in prison have with the system in any journal. The project itself cannot be the subject of any student's dissertation or thesis (it is only possible to include the project here because we omit any discussion of the project's results or operation, instead focusing only on motivations and institutional context).

Though the reframing of the project as service and its continued operation at MIT constitutes a minor victory in our institutional negotiations, this framing may still be at odds with the goals of the project: while we do intend to provide a service to people in prison, our ambition is for social change which would make the service unnecessary. Kivel [2007] proposes a distinction between social service and social change which emphasizes the role that pure services can play in maintaining the status quo:

> *Social service work* addresses the needs of individuals reeling from the personal and devastating impact of institutional systems of exploitation and voilence. *Social change work* challenges

> the root causes of the exploitation and violence.... Many social
> service agencies may be intentionally or inadvertently working
> to maintain the status quo.... It provides jobs; it provides oppor-
> tunities for professional development. It enables those who do
> the work to feel good about what we do and about our ability to
> help individuals survive in the system. [Kivel, 2007]

A challenge that we must grapple with as we continue the Between
the Bars project is to avoid losing sight of our goals for social change.
As we secure funding and offer employment to people working on
the project, as we build the organization and expand its reach, we
risk a realignment of our interests with maintaining the organization
rather than focusing on the goal of changing society's approach to
incarceration. The institutional support provided by MIT is valuable
for us to have the funds and technical resources necessary for the
project to continue; but the project should remain a means to the end
of our goals for social change rather than an end in itself. We must
remain critical of the institutional context and our role in it.

7
Conclusion

Theoretical descriptions of of technology design should avoid reducing the role of designers to mere behaviorism — designers are agents who have personal aspirations, desires, intentions, and contexts of work, and these features influence the outcome of their work. Technologies embed values derived from the conditions of their iterative design and diffusion, including values from the institutional context of design as well as values derived from the structures into which the technology is deployed. Whether or not a designer takes a principled stance on the technology they produce, their work will embed political values — it's up to the designer to negotiate the values that will inform their work. This negotiation may require the designer to include the conditions of their own work in the scope of design. Utopian visions for social change betray us with an oversimplification of the work of social change, and ultimately may work against goals for social change through their shadowing of the externalities involved in the diffusion of new technologies. By taking a more principled stance that emphasizes the values, ideals, and goals for social change, and adopting a theory of action which shares the struggle for social change rather than relegating it to the domain of experts, a designer can be more effective in producing designs for social change.

Selling out rarely happens obviously, suddenly, and overtly. More typically, it is the product of a process of reasonable negotiation with real constraints. The challenge facing designers interested in social change is to not lose sight of their goals and analysis when constructing the conditions that make their work possible, lest they inadvertently neuter their work by falling in step behind the logic of the very systems they seek to alter. Rather than accepting limitations on funding and institutional acceptance, designers can strive to creatively alter their institutional position in order to support their goals.

8
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