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DRAFT PAPER. This is a paper I worked on as part of a project in the course Digital Civil Society in Autumn 2018. The paper was based on research that I had conducted during the quarter, and should be read as a draft, expressing an early-stage development of a line of thought, as opposed to a fully-polished, publishable work.

Restoring User-Centered Ethics in Digital Design

Designing systems based on human information is a fragile task. On the one hand, the public, shareable nature of data lends it enormous power. Sharing personal projects has led to Linux; sharing expertise has taken the form of Wikipedia; sharing one's house has led to Airbnb. On the other, lack of oversight in soliciting and using customer data threatens not only users' physical well-being but also social and democratic institutions.

For the purposes of this paper, I will focus on designing the types of digital systems that that are based upon users' willingness to share their personal information, whether that information takes the form of written posts, professional projects, or academic knowledge. This type of design creates a powerful commons, a rich natural resource: using users' attention and data, it redistributes power from a narrow, often elite, circle of experts into the hands of the common person. It expands the ability for collaboration across fields and transcends vast geographic and cultural barriers.

Central to the challenge of digital design is the tradeoff between respecting users' individual claims to their data—and, perhaps more poignantly, users' claims to their own *time*—and the need to push users to over-contribute into the commons in order for the system to function in the first place.

Previous work has established digital platforms as an analogue to physical communal resources. Bruce Sievers, citing work by Charlotte Hess and Elinor Ostrom, defines the commons as "a resource shared by a group of people that is subject to social dilemmas." Accordingly, in this commons of digital data, lack of regulation has resulted in collective action problems that create dilemmas for designers of digital tools. In this paper, I focus on the case study of the attention economy as a starting point. Framing the pool of finite user attention as a exploitable commons, I point out that platforms are increasingly structured to force users to share more than they intended—indeed, more than is actually beneficial. And I will argue that, ultimately, the self-interest of platforms ought be checked through establishing more rigorous design design principles in the digital space.

Before moving to the specifics of the case study, I will use the next section to outline a basic set of principles to be used in digital design.

THE ROLE OF DESIGNERS IN RESHAPING THE WORLD

I. Designers actively reshape the physical world.

Objects are more than static features of the environment. They are dynamic, influential, and, in many cases, political. Thus, technology is the result of conscious decisions by its designers, which in turn—consciously or subconsciously—influence subsequent decisions and shape users' discourse.

The point is better illustrated through a typical example, reframed through a design-based lens: guns. Gun-control activists frequently argue that guns should be regulated because they lead to deaths. In response, gun-rights activists quip back that "guns don't kill people; people kill people." This seeming dilemma—who ought be blamed: man or machine?—is made clearer by understanding design as actively reshaping intention: "intentionality is hardly ever a purely human affair" (Verbeek 99). Indeed, if guns truly had no effect on the resulting action, there would be the same number of deaths in a society without guns as in a equivalent, but heavily armed one. The difference lies in the object's design, in the ease and mindlessness with which a wielder can deliver a lethal blow. In this way, "agency should not be located exclusively in either the gun or the person shooting, but in the assembly of both" (98).

In a digital context, designers design *experiences* as much as they do objects, often subtly shaping users' actions. For example, UX designers can pre-determine the choices available. "They give people the illusion of free choice while architecting the menu so that they win, no matter what you choose" (Harris). Thus, the product of design is not a mere object. Rather, "the frame of the design project is ethics, not technology. …[D]esign responsibility means that designers always should be conscious of the fact that, each time they engage themselves in a design project, they somehow recreate the world" (Findeli 14).

II. Designers ought to shape the world in accordance with their users' interests.

The second, related principle is that designers occupy a particularly unique space within the product development process, and ought to have responsibilities according to their role. Digital design is powerful, and it opens numerous opportunities for abuse. The moderating factor is benevolent design.

As defined by Vannevar Bush and other early designers such as Douglas Englebart, design addresses a new "era in which the complexity and urgency of global problems were surpassing time-honored tools for dealing with problems" (Rheingold). Designers occupy the particular space between raw engineering and the users who benefit from them. Within this task, there exists an implicit mandate to do good. The average user does not understand—nor do they think much about—the technology they use. They are vulnerable to the biases and defaults set by the system itself, and it is the designer's role to strike a careful balance.

This role is further supported by the drive towards "customer-centered" design. Focusing on the customer's needs is meant to center design around solving the correct problems, and to correct for mistakes early and often through frequent iteration. In his book, *The Design of Sites,* Douglas van Duyne writes that "the primary principle of customer-centered design is *know your customers*" (69). In particular, the customers' needs should be brought to the forefront as early as possible, "while they're still inexpensive and easy to fix" (71).

Design is meant to be a process. Bryan Lawson of University of Sheffield describes the design process through an anecdote of college students who decide to build an igloo on an

unexpected snow day. They made no blueprint; they just built. In the same way, design, at its core, is a "natural unselfconscious action-based approach" (19). It holds the same regardless of the product, "whether it deals with the design of a new oil refinery, the construction of a cathedral or the writing of Dante's *Divine Comedy*" (31).

But an unselfconscious walk, taken without careful thought, poses obvious ethical problems. Design is unpredictable, amoral; designers often make "unpredictable jumps" between phases (Lawson 34). They are driven by potentially biased corporate structures and, at times, political motivations. In designing digital applications, users' interests frequently clash directly with the company's interest: for instance, companies derive positive utility from extracting more user time and data, but users receive diminishing (eventually negative) utility from spending excessive time in the application. Thus, designers, ostensibly representing the users' values but ultimately paid by the corporations, are left in a moral in-between. When the corporation's demands conflict with the designer's duty to the user, the misalignment creates a responsibility for designers to re-calibrate the design process to be more inclusive of user needs. In a way, designers are the users' last advocate. Given the weight of their role, the industry must support a stronger ethical framework for the design profession.

CASE STUDY: THE ATTENTION ECONOMY AS A TRAGEDY OF THE COMMONS

In 2013, Google Employee Tristan Harris published a slide deck that quickly became widely shared. "Never before in history," he wrote, "have the decisions of a handful of designers (mostly men, white, living in SF, age 25-35) working at 3 companies had so much impact. ...We should feel an enormous responsibility to get this right."

Harris's slide deck called out Google and other corporations for leveraging the attention economy (that is, the subset of the internet that depends upon users' attention and engagement) to deliberately facilitate technology addiction. Rather than acting as a tool for productivity, Harris argues, the user's phone becomes a "slot machine," whereby companies take advantage of base psychological impulses to lead users into overuse. The result takes a toll both mentally and physically: "We actually stop breathing when we read our email (an effect known as 'email apnea')." Even Facebook's own researchers admit that scrolling through the news feed leads to a worse mood and worsened mental health (Ginsberg and Burke).

But the notification was not initially designed nefariously; in fact, when first released for the Blackberry in 2003, users appreciated the push notification because it prevented missed emails. Apple and Google only introduced them in 2008 as a response to market competition (Pierce). However, it was not long thereafter that nearly every application and media outlet began to leverage the feature in a relentless battle for users' attention.

In other words, competitive forces shifted the target of design away from users' well-being and toward a race to the bottom. Users now check their cell phones, on average, 47 times per day. Even products initially designed to remove notifications ultimately became subsumed in the information economy: the Apple Watch was initially a tool for reducing notifications on the phone, but it instead became "yet another buzzable surface" (Pierce).

This phenomenon is a new form of the tragedy of the commons. If left unchecked, each entity—be it Facebook, Google, or the new startup your roommate built—greedily attracts an

increased share in the commons of attention. Precisely because a greater collection of personal data directly enables a wide array of profit mechanisms, from targeted advertisements to payments from selling the data itself, the market structure pressures corporations (and, in turn, individual designers) to design yet-better ways of capturing attention.

Designers need a better moral compass than gross monthly hits. And accounting for digital products' physical harm to users should be discussed not as an afterthought, as a calling-out of a shortcoming, but confronted at the beginning of the design process.

Breaking the present mold of push notifications and prolonging user stay requires a new conversation. Design, indeed, is the ideal starting point for this conversation; if the attention economy is a commons, then "the common good is...one of the constitutive elements of civil society. Strong commitment to this norm is a necessary precondition...to contribute to the solution of the problems of the commons" (Sievers). In other words, preventing a race to the bottom for grabbing attention requires a collective solution: a collective commitment to a new procedure of interacting with users. Moreover, starting such a conversation within the design community is particularly important. Design is a procedure—one whose general principles are held constant across companies—and serves as an ideal entry point for this conversation. Given the amount of cross-pollination of individual designers within the technology industry, the effects are also likely to manifest across multiple companies at once.

THREAT MODELING AS A PARADIGM FOR DESIGN

Threat modeling is a paradigm of identifying weaknesses in the system in order to prevent the exploitation of vulnerabilities. The basic idea is to decompose a system into its functional parts and "attack" the system from a potential hijacker's perspective. Under such a system, designers identify all possible threats (regardless of whether they are exploitable), rank the threats by risk level, and then fix the vulnerabilities (in descending order of risk level).

Myagmar, Lee, and Yurcik of the University of Illinois at Urbana-Champaign, who studied the effectiveness of threat modeling in computer system security, write that "[d]esigning system security is best done by utilizing a systematic engineering approach. ...Ideally, security engineering should be incorporated into the system design process as early as possible...The earlier security concerns are addressed, [the] less time consuming and costly it is to fix future security problems" (1). The language they use is surprisingly similar to van Duyne's conception of the design process. Threat modeling fits cleanly into the iteration phase of UX design, and could be modified to account for a rather different kind of threat: what if the "vulnerability" is an ethical one? Treating ethical problems as legitimate threats, using a threat modeling approach, may be able to insert ethical considerations into the design process early and often.

Similar to the regular design process, which involves prototyping and field tests rather than brainstorming within the office, "[a] threat model cannot be created by simply brainstorming an adversary's possible intentions. This approach is not systematic and is likely to leave large portions of the attack-space uninvestigated" (2). In order to approach the system from the attacker's perspective, Myagmar, et. al suggest consulting experts and asking questions such as "Who are my potential adversaries?", "What's their motivation, and what are their goals?", and "How much inside information do they have?" (3).

This method of consulting experts to identify access points can easily be combined with Jakob Nielsen's Heuristic Evaluation approach. Heuristic Evaluation is a relatively well-established method of testing user interfaces in the design process. In order to test whether a user interface is usable, Nielsen proposes "having a small set of evaluators examine the interface and judge its compliance with recognized usability principles (the "heuristics")." The result of a Heuristic Evaluation is a list of violations—elements in the interface that were not usable—along with a rating of the problem's severity and potential suggestion to fix the issue. Rather than losing money and customers after the product reaches the market, engineers and designers can resolve problems upfront based on the list of violations.

Incorporating an "ethical" threat modeling into Nielsen's methodology naturally leverages an existing framework. The expert analysis portion of threat modeling fits neatly into the similar evaluation method proposed by Nielsen. The only difference is asking evaluators to consider a different set of questions. Rather than ask, *"what is unusable about this interface?*" along with a list of usability heuristics, evaluators should be asked to consider whether the interface appropriately handles and prioritizes individuals' time and attention.

Along the same lines of the questions that Myagmar, et. al proposed, some questions for evaluators to consider could be the following:

- What are the potential *user costs* of using this product or feature?
- What is the motivation for making this product or feature, and do they prioritize the user first?
- How much does this benefit the corporation internally?

Notifications were once a welcome solution to a legitimate problem, but that the original use case (missing emails) had been corrupted along the way. Eventually, having become an accepted design pattern, they were never re-aligned with user needs. My proposal seeks to iteratively and critically examine each feature included: any new addition should meet the same demand for user-centricity as the first design. And although it is incumbent on the individual designer to conduct the evaluations properly, I envision that integrating threat modeling into the procedure of design—much as Nielsen's original proposal has been integrated into the current design process—can be an effective mechanism of identifying tensions between internal corporate motivations and legitimate user benefits.

CONCLUSION

In this paper, I argued that digital design is particularly challenging because it involves a delicate tradeoff between the user's individual claim to their data and the corporation's interest in using the data to improve the overall product. Because designers play a unique role in enabling specific incentives, I argued that design has a unique duty to shift incentives towards the users' interests. In a case study involving the attention economy, I examined the history of the push notification and noted that, although the feature was initially aligned with user needs, later iterations became detrimental via the tragedy of the commons. I proposed threat modeling as a solution, integrated into the design process via regularly-conducted Heuristic Evaluation.

Through threat-modeling based evaluation, digital design may become better aligned with user needs rather than corporate interests.

This work, of course, is not a complete picture of the story—and given the breadth of the design field—does not in any way claim to be an end-all solution. Indeed, this paper only opens up room for more work in the future. In later research, I would like to consider the following three areas: (1) the unique demographics and motivations of individual designers, and whether it would be reasonable to assume that designers would carry out the heuristic evaluation on a regular basis; (2) the frequency by which heuristic evaluations are likely to be conducted, and whether their conclusions are valued by corporations; and (3) lawsuits by which corporations' practices were shaped by the court of law, and whether legal cases can influence the design thinking process.

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