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Restoring User-Centered Ethics When Designing for Information

“There is a new profession of trail blazers, those who find delight in the task of establishing useful trails through the enormous mass of the common record.”

---Vannevar Bush, *“As We May Think,”* July 1945

Designing systems based on human information is a fragile task. Just as humans do not leave transcripts of our inner thoughts out for the world to read, so products that promise to organize thoughts and deliver productivity must grapple with a demand for privacy. On the other hand, the public, shareable nature of data lends it enormous power. The willingness to share personal projects has led to open-source products, such as Linux; the willingness to share expertise has taken the form of Wikipedia; the willingness to share one’s house has led to Airbnb.

For the purposes of this paper, I will broadly term this specific type of design *designing for information*—that is, designing systems 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. Designing for information is a particularly powerful area of design. It redistributes resources 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. Vannevar Bush, an early thinker who envisioned personal computing during an era when computers still occupied entire buildings, wrote of miniature encyclopedias, making knowledge accessible to all. The tragedy of research, Bush argued, was that it fell on deaf ears: “Mendel's concept of the laws of genetics was lost to the world for a generation because his publication did not reach the few who were capable of grasping and extending it; and this sort of catastrophe is undoubtedly being repeated all about us.” In other words, *if a tree falling alone in a forest makes no sound, let us broadcast the video so that no one will miss it.*

Central to the challenge of designing for information 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.” In this original context, the social dilemmas are framed in the form of regulating behavior on the part of actors within the commons. Sievers discusses collective action problems—the “ruin” resulting from “each [person] pursuing his own best interest.”

My focus is to tackle the commons from the perspective of *designers*. What happens when the creators of platforms act in their own self-interest? In this paper, I focus on cases where a platform is structured to force users to share more than they intended—indeed, more than they are comfortable with—or to spend more time contributing than otherwise necessary. I will argue

that platforms are part of a larger “meta-commons” of attention, and that, ultimately, the self-interest of platforms can be checked through rigorous design.

Before discussing a more illustrative case study, I will use the next section to outline a basic set of principles to be used when designing for information.

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 common example, reframed through a design-based lens:: guns. Gun-control activists frequently argue that guns should be regulated because they lead to deaths. Gun-rights activists quip back that “guns don’t kill people; people kill people.” Peter-Paul Verbeek points out that, here, “intentionality is hardly ever a purely human affair” (99). If that were the case, there would be the same number of deaths in a society without guns as in a society with many guns. Guns are undeniably designed to make it easy—mindless, even—to press a trigger and deliver a lethal blow with blinding speed. Guns’ availability and ease of use change the resulting outcome of human action.

In this way, “a gun constitutes the person holding the gun as a potential gunman and his or her adversary as a potential lethal victim. Without denying the importance of human responsibility in any way, this example illustrates that when a person is shot, agency should not be located exclusively in either the gun or the person shooting, but in the assembly of both” (98).

Accordingly, the work of a designer fatally determines the resulting choices of users. When a person is shot, some agency, too, falls upon the person who designed the gun in this particular way.

In a digital context, designers design *experiences* as much as they do objects, often subtly shaping users' actions. For example, UX designers often 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). Navigating the interface becomes easy—mindless, even. After repeated use, users come to expect only what they know the menu bar provides, never bothering to ask what may have been left out.

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. Designing for information is powerful, and it opens numerous opportunities for abuse. The moderating factor is benevolent design.

As defined by 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 also 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).

In fact, design is meant, in some great degree, 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).

However, although design is a process—one heavily influenced by corporations that set the tone—it is also a process that involves decisions; questions; iterations. Lawson admits that “there are likely to be unpredictable jumps” between phases (34). Though there may be a process, then, it is one navigated knowingly by the designer. The question is how the designer ought navigate it.

The mandate to design benevolently has been increasingly tested in the modern information era. Decades after Bush’s writing, we have exceeded his dream. The information economy extends into every aspect of the human existence imaginable. Commercializing

information poses unique challenges in designing for information. The vast array of data available creates an enormous commons—a wealth of resources for users (people calling rides, searching for articles, reading information about their friends), but depends upon users giving up more information than they would originally have been willing to give. In this way, the corporations that curate the commons have interests that conflict with the users on the ground, leaving designers in a moral in-between.

When the corporation's demands conflict with the designer's duty to the user, the misalignment is an opportunity for designers to re-calibrate the design process to be more inclusive of user needs. In this next section, I will outline a particular case study to illustrate such a misalignment. In the following section, I will propose a new type of recalibration for the design process, drawing upon threat modeling.

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 addiction. Rather than acting as a tool for productivity, the user's phone becomes a slot machine, whereby companies take advantage of base psychological impulses to get users hooked. The result takes a toll both mentally and physically, Harris points out: “We actually stop breathing when we read our email (an effect known as “email apnea”).”

After leaving Google in 2016, Harris expanded the ideas from his slide deck into a much larger movement, known as “Time Well Spent.” The premise of Harris’s argument is that the design of technology constrains users’ choices and realigns the user’s needs—at times, nefariously—with the monetary incentives of the corporation. Within the attention economy, the problem generally takes two forms: excessive calls to attention and prolonged user stay.

Excessive calls to attention often takes the form of push notifications. The “slot machine” that Harris describes is not uniquely Google’s fault—in fact, the push notification was created in 2003 for the Blackberry. At the time, users enjoyed the feature because it prevented them from missing emails. Apple and Google both introduced push notifications in 2008, as a response to market competition (Pierce).

Notifications soon became a psychological tool. Because a junk email from Walmart makes the same sound as an urgent message from your manager, “you have to look before you can dismiss” (Pierce). The result is that people now look at their phones, on average, 47 times each day—a number that increases to 82 for younger demographics.

Prolonged user stay is a second strategy. In order to gather more data from the user (or to have more opportunities to show them advertisements), information-based platforms are incentivized to make the users stay longer than necessary. One example of this phenomenon is auto-play. Auto-play turns finite, defined tasks into an indefinite stay on the website. “Constantly forced to outperform their competitors, [technology companies] must use increasingly persuasive techniques to keep us glued” (Center for Humane Technology).

Passive consumption of materials is often a detriment to users. Facebook’s own researchers admit that scrolling through the news feed often leads to a worse mood and worsened mental health (Ginsberg and Burke).

In a world in which news feeds are monetized and notifications are the currency, design thus slowly shifts away from its alignment with user needs. Localytics, a digital marketing company, explains that “[p]ush messages serve an important role in an app’s user engagement, and there are no signs pointing to a decrease any time soon” (qtd. In Pierce). Even products initially designed to remove notifications ultimately become 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 is a new form of the tragedy of the commons. Each entity—be it Facebook, Google, or the new startup your roommate built—runs its own mini-commons of information. Each attempts to incentivize users to contribute to their commons, building up a machine that runs on data.

But there is a second commons—a “meta-commons.” The attention economy as a whole is a commons. Users, collectively have finite attention. And when each entity competes within the market of attention, they bombard users, leading to the overwhelming notifications we observe today.

Thus, although Harris initially called out the problem within Google, the race to attention is not Google’s fault. It is an industry-wide tragedy of the commons. Just as, when fishermen over-fish a pond when they know there are finite fish, so each corporation, acting in self-interest, has over-fished the attention economy.

Design is fundamental to this problem. From the history of push notifications, it is clear that what may have once been a good design for the Blackberry was never updated with the rise of new threats, and subsequent attempts to solve the problem failed to consider realistic user

experiences (for example, that buzzing a user's wrist would only further distract rather than reduce distraction).

Breaking the present mold of push notifications and prolonged 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.

Enter design. Precisely because design is a procedure—one whose general principles are held constant across companies—it is the perfect entry point for starting the conversation. Moreover, given the amount of cross-pollination of individual designers within the technology industry, once there is a new paradigm of design, the effects would manifest across multiple companies at once.

And so, it is time to redesign the use of attention.

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. 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.

Similar to the design process, which involves prototyping and field tests rather than brainstorming within the office, the authors note that “[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 threat modeling into Nielsen’s methodology is quite easy. 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 may be used to “hijack” 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?

Recall that notifications were once welcomed by users as a solution to a legitimate problem (failing to notice emails in one’s inbox). But in the spiral toward capitalizing on attention, the original user focus was lost. Subsequent products simply copied the design, even when the user need no longer existed. Heuristic evaluations likely never considered whether the feature was necessary, since it had long since become part of the menu.

I propose that a threat-modeling based heuristic evaluation be conducted upon the introduction of any new feature. 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 designing for information 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, designing for information 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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