Values in Technological Social Systems

Introduction:

Software is eating the world. This is according to Marc Andreesen (Andreessen 1), who is one of the biggest software investors in the world with a portfolio of companies such as Facebook, Pinterest, and Twitter. In particular, software that builds a "technological social system" with addicting principles of "persuasive technology" have had a leeching impact on the attention and time of their human users. The negative consequences of these platforms have come to the forefront recently, as activists and former industry professionals have raised the alarm about the future outlook of our technological society. While these individuals have successfully laid the groundwork for change to occur, we must further analyze the values at play within this ecosystem, using literature from the philosophy of science. From this analysis, it will be argued that this field of technology has had a disproportionate priority of industry "constitutive" values, iteratively refining them while neglecting to evolve the standard of "contextual" values. The field of technology must prioritize the input of well-defined and reflective contextual values, otherwise risk over-optimizing for a future of moral failure.

Issues in Today's Technological Innovation:

In June of 2019, Tristan Harris, the Co-Founder and President of the Center for Humane Technology, testified to Congress on the topic "Optimizing for Engagement: Understanding the Use of Persuasive Technology on Internet Platforms" (Harris 1). As an ex-Google design ethicist and a graduate of the Stanford Persuasive Technology Lab, Harris was identified as an expert on technological architectural design who could advise Congress on the impact that many platforms were having on the world. This Congressional testimony was an important milestone in the

movement for more "human-centered" technology (led by Harris and many others who had been in the industry) and provided a strong argument for the re-alignment of values in the field. Today, this testimony stands as a pivotal moment that served as a wake-up call for many across society, influencing the way they perceived their relationship with technology.

In his testimony, Harris introduced the issue to Congress by illustrating the gripping power that this technology has over society. He said that social platforms shape "where 2 billion people place their attention on a daily basis shaping what we believe is true, our relationships, our social comparison and the development of children" (Harris 1). With his expertise, Harris illustrated how technology "hacks human weaknesses" attempting to influence "people's attitudes, beliefs and behaviors" (Harris 1) through its designed structure. From the UI perspective, Harris cited specific components such as pull down to refresh, infinite scroll, likes, and followers that can start to addict the user. Beyond this, the algorithms behind the applications themselves mine the user's attention by "calculating the perfect thing that will keep us there longer– the perfect YouTube video to autoplay or news feed post to show next" (Harris 1). Thus, the combination of these UI components and expertly designed algorithms creates a well-oiled machine that holds a grip over the user's time while extracting their data.

These products are all part of the overall "attention economy," a term used to describe the business model that monetizes the user's time and data to sell back to advertisers. The more time that the users spend on the application, they allow the algorithms to gain deeper insight into their beliefs, biases and preferences. With this insight, a psychological profile of the user is built, or a "voodoo doll" as Harris likes to call it. The psychological analysis is then sold to advertisers, who can then target specific types of users in their campaigns. These new ads and posts would captivate the user's attention even more, allowing additional data to be collected and the

psychological profile to be crafted to an increasingly accurate precision. This continued progression would iterate on itself, becoming extremely beneficial for corporate data analysis but at the cost of user agency, privacy, and time. Harris raises deep concerns over this development, recognizing the "increasing asymmetry between the power of technology and the limits of human nature" (Harris 2) where our human attention and energy are drained by these corporations. He notes how many issues such as misinformation youth mental health have been magnified by these platforms, asking what our future may hold "if we've downgraded our attention spans, downgraded our capacity for complexity and nuance, downgraded our shared truth," and "downgraded our beliefs into conspiracy theory thinking" (Harris 2).

Such concerns will help dictate how we as a society approach our relationship with technology in the coming years. Those familiar to the industry, such as Harris, have been integral in raising the alarm with the current alignment of principles that have been oriented away from the human users. As illustrated by Harris's testimony, it can be seen how the interests of the stakeholders in the technology companies have been put over those of the users. This has led to a number of harmful consequences for the user that have been cited by Harris and others, including widespread misinformation, lowered attention spans, and rising mental health rates.

Expanding Harris's Value Ecosystem

While Harris does an excellent job spotlighting how many of the values in the technology industry are dictated by the financial stakeholders, he does not address the full ecosystem of values in place with the development of these advanced social systems. Instead, Harris focuses on a subset of these values: ones that are based on the moral incentives of humans. Inside this

limited definition of values, the current technological industry is definitely slanted toward the best interests of these stakeholders and away from human users.

But values are much more than just these human interests of stakeholders and users, which Harris does not address in his testimony. Beyond this, there are also values intrinsic to the field of design, engineering, or management themselves that influence the way that technology is built and run. These values define how these specific fields may be well-practiced in their methods. As Harris's testimony has effectively pushed the public, technologists, and lawmakers to be introduced to the prospect of these human moral values in technology, the values intrinsic to the field must also be identified so that their input can be properly analyzed and weighed.

Technology and the Philosophy of Science

An investigation into this type of value ecosystem has been undertaken before within the *philosophy of science*, which can then be applied to the field of "persuasive technology" and the development of social systems. In this literature, philosophers of science have examined how values influence the way scientific problems are approached and how new theories are accepted in the community.

At first, one may be uncomfortable with this value-laden approach to science, understanding science to be a value-free and objective methodology. But many philosophers of science argue that this is a naive assumption, as the scientist must rely upon many types of values that determine the way that they research. For instance, before a scientist even begins their research, they must somehow come to a decision about the type of field they will spend time studying. This determination is largely driven by their personal experience and social environment, inspiring them to tackle a certain problem in their interests. During the research

itself, a scientist holds themself to a strict methodology, a standard that is set by the values of their specific field. Finally, even after their research is completed, the way that their newly published theory is applied and accepted into the community is held to the values included within the system of peer review and academic social acceptance. Overall, a plethora of values will influence a scientific study from ideation, to the methodology, to its final acceptance.

Like science, the development of persuasive technology is by no means a value-free and objective practice. The way that philosophers have examined this interplay of values in a scientific field is incredibly useful to the identification and analysis of values in the development of technological systems. Fields involved in this development have an ecosystem that runs in parallel with the field of science, with an industry professional and scientist experiencing similar types of ecosystems. Like a scientist, a designer, engineer or manager would have to come to a decision about the specific field that they would pursue. Upon entering this field, they would be trained in a certain methodology that is set by the industry values and experts. Finally, the way that their new product is accepted into the wider society depends on the values present in their customers or stakeholders.

Longino's Constitutive and Contextual Values

One such philosopher of science, Helen Longino, argues that scientific values can be divided into *constitutive* and *contextual* values. Constitutive values drive the "source of the rules determining what constitutes acceptable scientific practice or scientific method" (Longino 4). These can include ideas such as simplicity, generalizability, and accuracy of a theory along with the replicable methods of the research itself. On the other hand, contextual values encompass the "personal, social, and cultural values, those group or individual preferences about what ought to

be" as they belong to the "social and cultural environment in which science is done" (Longino 4). The broader social and cultural environment includes the moral values or ingrained infrastructure of a society which can drive the scientific progression along a certain route. Once these types of values are adequately defined, one can begin to see their interplay and debate how they should interact with one another.

Within the field of science, *constitutive values* have a great influence in the research methodology itself along with the way in which the theory is accepted. During the research, a scientific climate model may be determined to be extremely accurate to a specific environment. However, this specificity may prohibit the model from being generalizable to other environments across the world, restricting its wider impact. Because of this, the scientific community may be less willing to accept this study as an acclaimed publication due to its limited scope. Therefore, a scientist may value generalizability to broader environments over specific accuracy in this case, illustrating how they may prioritize one constitutive value over another. This will alter the way in which this scientist carries out their research in the field, altering their methodology. They may start integrating new data points from a variety of geographic areas, or create new mathematical inferences that will prevent overfitting on specific environments. Certainly, there are cases where the opposite may be true, and the researcher may value specific accuracy over generalizability to greatly impact a more precise problem. The prioritized values depend on the purpose of the study.

Contextual values will also play a large role throughout this scientific process. Before a scientist begins to research, they have already built an entire value system from their upbringing, which is largely dependent on the social and cultural moral beliefs that they have previously experienced. Initially, this system will have a substantial impact on how a scientist is inspired to

pursue their research interests, similar to how one may decide to pursue a career as an engineer, doctor or lawyer. These roles in society are greatly valued in the United States, which can also be exhibited through their high salary. Financial compensation, such as these salaries, can be seen as a surface-level indicator of the deeply rooted societal values. Regardless of their ethical legitimacy, these contextual values will drive human behavior toward certain decisions with these economic incentives. In the field of science, financial indicators can take the form of grant funding for research, which would drive scientists toward certain areas so that they could get their research funded.

However, contextual values can have a great impact even when not tied to economic incentives, such as the social respect for those pursuing certain career paths. A young child may aspire to be a doctor growing up because they wish to obtain the respect that doctors receive when they positively impact the life of a patient. Similarly, a scientist may decide to push certain research questions because the imprint of their contextual upbringing has driven them to this specific field. Overall, the input of these contextual values are essential for one to consider when studying the research environment of science.

Constitutive and Contextual Values in Technology

This distinction between constitutive and contextual values can be applied to the field of "persuasive technology" to further analyze the values present in its development. Compared to other theories in the philosophy of science, Longino's mapping is particularly useful to the field of technology as it can be adequately used to separate the values intrinsic to the process of product development and the contextual environment. The intrinsic values of technology would comprise the values that are present in what entails good design, engineering, or management.

These values would be mapped to Longino's *constitutive* values as they relate to the acceptable practices and methodology of the field itself. Longino's *contextual* values can remain in a similar role as they did in the philosophy of science, as contained within the larger social and cultural environment that inspire technological development along certain lines.

  The constitutive values of technology are largely based upon the practices that expert technologists have learned about in their schooling to develop the skills necessary to build and launch a successful product. For designers, these would include principles of *empathetic and emotional design*, allowing their products to effectively connect and engage with a human user. As cognitive scientist Don Norman argues in his book *Emotional Design,* "the emotional side of design may be more critical to a product's success than its practical elements" (Norman 5). While emotions can be manipulative, they are an essential part in our lives and we find much joy in using products that can empathetically relate to our human feelings. Beyond just emotions, designers must build for the value of simplicity with complex actions. In another book called *Living with Complexity,* Norman analyzes the way in which designers build products that are simple to understand, yet have complex capabilities to them. He writes that "good design can provide a desirable, pleasurable sense of empowerment" and the real challenge is "to tame the complexity that life requires" with the software (Norman 10-11). With this in mind, designers must strive to build in this complex capability within a streamlined interface that empowers the user to achieve difficult actions.

  Beyond designers, engineers are also held to similar types of values in their development of the software and algorithms. One such important constitutive value is that of *optimized efficiency*. Within the software, it is of the utmost importance that the code can execute in a way that is precisely optimized for its time and memory constraints. One of the greatest strengths of

software is its ability to rely upon these replicabaple algorithms that allow certain actions to be

automated or quickly completed in an optimized manner. Perhaps most importantly, algorithms

must heavily rely upon the constitutive value of *accuracy*, performing their function with a high

precision. If they were unable to accomplish a task without this high accuracy, there would be a

limited use case for them in the real world. But ultimately, the debate surrounding this accurate

measurement becomes another important question which relies on input from contextual values.

Similar to engineers, managers are held to similar constitutive values of *optimization* in

regards to their metrics and deliverables. As team facilitators, these individuals must reference

their performance metrics and deliver results in a manner that is cost and time efficient.

Additionally, they may be pushed to optimize their team toward certain metrics as well, such as

maximizing stock price or user retention rates. But the debate surrounding the decision

surrounding the type of metrics can depend on other extrinsic factors as well.

The contextual values in the technological ecosystem relate to the moral and political

values surrounding the environment of development and innovation. These types of values are

what Harris seems to be most effectively addressing in his testimony to Congress in 2019. At the

present moment, he notes how the values seem to lie in the best interest of the financial

stakeholders. Beyond their immediate economic gains, Harris argues that these executives must

have a greater moral consideration for users across the broader society. He proposes a

renaissance that will "protect and care for human wellbeing and the social fabric upon which

these technologies are built" while strengthening "society and human empowerment" (Harris 8).

While these goals are visionary, how would industry professionals tangible integrate them within

their specialties?.

These professionals are expertly trained to use their skills to fulfill goal metrics that have been established for them, and defining concrete project timelines with ambiguous deliverables is a struggle. Targeting user engagement metrics, designers can fall back on their *constitutive* values of emotional and simple design, engaging the user in a way that empathetically draws them into the platform to the point of manipulation. With the established goal of optimization, engineers can develop streamlined software that can precisely form psychological profiles of the user, predicting the most engaging content. Fulfilling the defined project deliverables, managers conduct their teams in a manner that emphasizes efficiency, delivering results quickly and effectively. Industry professionals are trained experts in their respective methodologies, but the ambiguity of these new contextual values introduce a whole new dimension that would redefine how their work is completed.

An Overemphasis on Constitutive Values

Without an established vision of contextual values that relates to the moral good in their life, *many technologists have seemed to fall back on the constitutive values of their fields to provide this direction*. For example, Microsoft has been lauded for their mission to "empower every person and every organization on the planet to achieve more" (Microsoft). Yet, the question is, *more to do what*? Achieving "more" speaks to the constitutive value of optimization that is integral to the field of engineering, management, and any other data associated field. Yet, optimization is far from a human moral value. No human is completely inspired to just do more, finding life meaning in this ability to complete more tasks. Optimization is a regulated behavior, best left to the dead electronic pulse of AI and machine learning algorithms.

But due to an existential void of sorts within the technology industry, professionals have continued to rely upon technological progress within their fields as bare sustenance for moral value. As a result, the methodologies and constitutive values within the field have become increasingly refined. In design, the effectiveness of persuasive design practices, latching onto vulnerabilities in human psychology, have greatly increased. Engineered algorithmic solutions have become much more accurate and generalizable across wide datasets across the world. Management tactics can now be implemented across flat technical organizations, where teams perform quick-iterating "sprints" that allow for fast deliverables and more flexibility to pivot. The institutional machine evolves and grows, yet without a human heart.

Unethical Implications of a Narrow Constitutive Focus

With this narrow focus on constitutive values, the effectiveness of the design of these systems has reached the point of user manipulation. Because of how significantly the field has evolved, we know the vulnerabilities in our psychology that enable us to create UX patterns that nudge human users toward certain decisions. These behavioral nuances are called "dark patterns" (Gray, et al.) and are commonly identified throughout platforms today. However, the line between manipulation and empathetic design is very ambiguous. For instance, it is commonly argued that our emotions such as happiness and anger are manipulated through dark patterns. But these emotions can also be designed for in a way that is applauded in the field of design, since empathy and emotional engagement are core constitutive values in design.

To use a real-world example, incredible orators also effectively use emotions and empathy to convey powerful messages to the public. Yet, at what point is an orator being manipulative in the way they express their speech, and when are they being empowering? While

this line is definitely a murky one, an ethical and unethical orator would be distinguished by the *amount of agency they allow to the listening public*. For the ethical orator, an individual would still have agency if they are able to weigh the points of an argument in a level-headed manner that allows them to think for themselves, instead of emotionally reacting to an argument. They must still have the power over themselves in these circumstances and cannot be under the pure control of the orator. However, an unethical orator would use their rhetorical skill as effectively as they could to sway the user in the direction of their argument, without regard for their agency. In the same way, an empathetic UX crosses the line into a manipulative UX when the agency of the user is infringed upon. This occurs when the user starts to lack the ability to pull themselves away from the app, finding their emotions to be out of their control and being dictated by the UX system.

These unethical practices are a result of the blind pursuit to iterate technological progress without the consideration of a vulnerable human user. When this occurs, technologists in the field have become overly-obsessed with the constitutive values of the field without taking a step back to consider the contextual circumstances. In this case, a designer may become so focused on creating an effective UX that can connect with user emotions that the tool becomes disproportionately powerful. When these new UX design patterns and AI recommender systems are released onto these technological systems, they have a widespread impact throughout the world, altering the behavior of billions. Because of the level of effectiveness, releasing these updates would be similar to programming the world's most powerful (and personalized) orator and placing them in the pocket of every technology user in the western world, controlling the way they think and behave. Yet the orator itself would have no human moral value system, effectively manipulating an audience toward a viewpoint dictated by whoever controls it.

Similar to the invention of the atomic bomb, an innovation of this magnitude redefines the way our lives operate. Yet, unlike the atomic bomb, weaponizing this powerful technology in technological social systems is left largely unchecked. The AI recommender systems within this technology only get more powerful as time goes on. The data that they have access to continues to grow as users spend more of their time on the platform, enabling deeper insights to be made about them. Thus, the AI systems are able to recommend more engaging content to the user, optimizing for their addiction. This is what Harris describes as the "increasing asymmetry between the power of technology and the limits of human nature" (Harris 2) which creates a "checkmate on humanity" (Harris 11) due to the accumulating knowledge of the AI recommender.

Therefore, we must establish a limit to the effectiveness of these systems to protect human agency. Similar to the policies surrounding nuclear disarmament, just because we have the potential to build such a technology does not mean that we deploy it in the real world context. The technology within these systems have evolved to a dangerous capacity to disrupt the human lifestyle and manipulate their vulnerabilities to a mathematical precision. Due to the powerful ability, we must be careful in how we choose to deploy it (if at all), carefully considering the contextual environment that it is being used in. This process requires extensive deliberation over the contextual values of those impacted by the technology. As a result, the field of technology must carefully build up their contextual value system to match the advanced state of technological innovation.

Refocusing on Contextual Values

Since constitutive values lack the depth of human moral values that define our everyday lives, technologists must create a new foundation of contextual values that are distinct from what has previously been the standard. As Harris notes, it is obvious that the current contextual values need to be changed, orienting away from profit. But what should replace these values? We have established that these values need to be more "humane" and "user-centered," but what does this truly mean, and who knows what is best for a given user? Discovering a strong set of contextual values to follow is no easy task, especially for trained technologists who are most familiar with their existing set of constitutive values. In his testimony, Harris proposes how we might catalyze a contextual value system of more "Humane Technology" that can help us find human goodness in our own lives. He argues that technologists must "approach innovation and design with an awareness of protecting the ways we're manipulated as human beings" understanding with "more sophistication about what protects and heals human nature and social systems" (Harris 11-12). Instead of creating products that have a parasitic relationship to us, we must build systems that act "in our interest by making them fiduciaries to our values" (Harris 12). Through this, we can "create a race to the top to align our lives with our values instead to the bottom of the brain stem" (Harris 12).

With this proposal, it is clear that we must be conscious of the line between manipulation and empowerment with our technology. We must limit the effectiveness of our systems to respect the agency of the human, which may come at a cost to the quick pace of technological development. But beyond this, Harris argues for the creation of systems that are respectful of our human values. This statement refers to the need for systems to be built with the consideration of the contextual value ecosystem, examining the product's user base and the broader social circumstances.

But how can such a proposal be implemented, when the diversity of contextual values is so vast? Across a democratic society like the United States, there are an endless number of differing ideologies and value systems, with individuals constantly at odds within the political climate. Combined with the infinite amount of situational circumstances in which one must make a value-based decision, creating a system that has universally perfect behavior is impossible. In a Congressional hearing after Harris's, Stephen Wolfram (researcher and founder of WolframAlpha) admits this, saying that "there's no finite set of principles that can completely define any reasonable, practical system of ethics" (Wolfram 8). Because of this, Wolfram proposes solutions that are centered around user choice, allowing the user the ability to dictate how the system algorithms feed them content. He suggests systems that allow for final ranking or constraint providers to be determined by the user themselves (Wolfram 11), instead of being left in the hands of the designers.

While this sort of system would be non-manipulative in its approach, the technological system itself would conform to whatever value system the user desires. A user can decide to only be fed the sort of content that promotes their own worldview and value system, which would still lead to the widespread issues of political division that Harris discusses. Technologists cannot simply hope to build an extremely powerful tool, then dropping it into the hands of the user. They must do more to facilitate the relationship between technology and the human, while understanding the contextual value system of those they are impacting. So how might they better consider the contextual values in the creation of these systems?

A New Structure for Technological Values

Drawing from Harris's proposals and Longino's scientific value system, a new structure for technological values can be proposed. This structure would include the following steps:

1. *Secondary emphasis on Constitutive Values*

2. *Democratized input of Contextual Values*

3. *Designing for Reflective Self-Examination instead of Self-Determination*

For step 1, technologists can no longer prioritize the innovative progress in their field above all else. Their over-emphasis on their constitutive values, including emotional design and optimization, creates a dangerous asymmetric power dynamic between technology and the human. Without the proper focus on a human contextual value system behind this development, tools are created without a moral foundation establishing their proper use. Thus, these tools are wielded in manners that lack sensitivity to the moral good in our own lives.

This leads into step 2, which requires the democratized input of contextual values to establish an awareness and consideration of the human lives impacted by the system. While non-technologists may not be experts on the methods or constitutive values of the field itself, they have their own principles of a good life that must be considered. Industry professionals make up a very small percentage of the broader population, and will not have a comprehensive understanding of the differing value systems across society as a result. But these industry professionals will be creating a product that has an impact across most of these parts of society. Therefore, they must learn about the value systems of their human users to properly understand how they may build a tool that is more "humane" and user-centered. As Wolfram points out, building a perfect system with universal ethical principles is an impossibility. But the focus of this democratized input would be for *education* of the technologists and *deliberation* over their influence on the development of the technological product. This input is integral, and may lead

to a reconsideration of how a product is built for one population, realizing that the same tool cannot be universally applied. Additionally, weighing these contextual values must take priority over the possibility of technological innovation, to prevent applications of powerful tools to be used for purposes that are misaligned with the human values of those impacted.

Finally, after weighing these values, industry professionals must design for the purpose of reflective self-examination rather than self-determination. Such a purpose is argued for by philosopher Shannon Vallor, in her book *Technology and the Virtues*. A given user, when only exposed to their own value system, may make any sort of decision based on what confirms their own beliefs since they lack a broader societal perspective. Additionally, this user may not fully understand the extent in which the tool can impact their beliefs, lacking the technical knowledge. As the developers of these systems, these technologists will have the best understanding of its functional capacities. Additionally, they must properly weigh the contextual values of a certain user with the other contextual values across society when making their design decisions. They should not solely create tools for self-determinism, allowing the user the choice on how to utilize the system. Instead, they must cultivate reflective self-examination, allowing the user to understand the good in their own lives, while still acknowledging their place in society. This requires an effective exposure to different value systems of others, allowing the user to have the agency to consider and reflect on those who are different from them. With these steps, we can hope to cultivate a future of technology that is less focused on innovative progress and more aligned toward humanity.

Conclusion

Today, these technological social systems are an integral part of our lives. While much of the power in these systems have had nefarious consequences, there is cause for hope in the future of the field. Driven by advocates such as Harris, corporations and industry professionals have started to shift the culture of the ecosystem with a renewed mindset. In order for a better technosocial future, we must allow the contextual moral values of society to be forefront in our minds. Innovation in of itself will never be enough in our pursuit of moral goodness and will only result in *purposeless progress*. Therefore, we must turn to our broader society to learn how others cultivate this goodness in themselves. In this way, technologists can be better educated on how to design for reflection and purpose in the lives of their users, building tools for a future of "Humane Technology."

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