**Chapter 3**

In Chapter 2, we claimed that the critique of social media is often misdirected at the nature of the medium, whereas the changes that can amend the states problems are often alternate design choices. One common wisdom of human computer interaction that seemingly challenging software issues can generally be solved by improving the design architecture. Using this methodology, we argued that theorists' critique of social media, alongside being accurate, can be solved through tweaks in design, and we pointed to what these improvements can look like.

We considered the critique in three parts: Notification settings, structure of posted content, and optimization for engagement. In return, we made system-wide recommendations such as specific enhancements to notification settings, the ability to vary, group and tag posted content to allow for more differentiation, and cost functions that optimize more complex notions of user satisfaction than pure engagement. In this chapter, we articulate on what criticism we anticipate, and respond to possible counter arguments against each recommendation we have posited. Some of these arguments are targeted at a specific claim, whereas others target multiple claims in general, or even the overarching argument that the design social media platforms could or should be altered.

The main system-wide counter argument that advocates of change in social media face is that any alternative conception of a platform is unrealistic, since companies will always put their own interests ahead of those of the users. In many fields, this criticism undermines productive dialog as to how a system can be improved by rejecting the possibility of change unconditionally. Tufekci, in her aptly named article named *Yes, Big Platforms Could Change Their Business Models,* simulates this argument with the following lines:

There’s simply no plausible alternative, the platforms say. People will never pay to use platforms, we are told. Plus, dissidents and activists in the developing world rely on these free services to get their word out. How can we abandon them? And anyway, the platforms say, we can’t provide the fundamental features that our users value without all this data collection. It’s simply too late to change. (28)

Vaidhyanathan concludes his analysis on a similarly pessimistic note. Explaining that his critique of Facebook is mostly in vain, he says: "Facebook itself has no incentives to reform" (Antisocial Media, 17). Indeed, one of the theoretical underpinnings of techno-pessimism is that companies won't change simply because their customers demand it.

In reality, the question of incentives does not have an all-inclusive answer; what a company considers as incentive heavily depends on who it sees as its customer. Especially in ad-based platforms, it is an especially challenging problem to determine who a company should take to be its users. In the example of Facebook, some may claim that Facebook is a platform that is designed for the benefit of the advertisers, and therefore users' dissatisfaction is not unavoidable; it is just not a priority. Of course, in this scenario, Facebook risks the possibility of losing large number of users over time. Similarly, if Facebook were to see its users as its only customers, then we could assume that advertisers would not be satisfied with the platform, and once again, Facebook would be risking losing the business of its advertisers. Therefore, without knowing the strategic development decisions that go into any proprietary platform, we can assume that it would be beneficial for them to consider both the users and the advertisers as their customers, since without either of the two, the platform is not profitable. Hence, the question of business model is not a stand-alone; it only makes sense coupled with the question of customer base.

There is empirical evidence to support the theoretical claim that platforms should care about user satisfaction. In an interview, Mark Zuckerberg summarizes the main reason for this as such:

I think one of the key principles is that we’re trying to run this company for the long term. And I think that people think that a lot of things that– if you were just trying to optimize the profits for next quarter or something like that, you might want to do things that people might like in the near term, but over the long term will come to resent. But if you actually care about [...] building the company for the long term, I think you’re just much more aligned [with customers] than people often think companies are. (23)

Of course, Vaidhyanathan or any techno-pessimist can point out that words are free. However, failing to respond to user demand is not. An example of radical change in business models that is relevant today is the rise of what is called "fast-casual" food, and the fast adaptation of the largest fast-food chains to join the trend. In the last couple of years, McDonald's removed problematic ingredients from its menu, such as certain artificial preservatives; Taco Bell made a claim to become one of the healthiest fast-food chains (29); and the whole industry reduced the average calories of a menu item by 12% in one year (30). The drastic changes, contrasted with earlier models that fast-food chains have incorporated, are hard to explain without considering the rise of a health-conscious customer base.

Numerous studies that are replicated frequently, including those from CMU and Stanford, showcase the significantly negative social and psychological effects of social media use as it is experienced today. (Dreyfus, *On the Internet*) It is not unreasonable to assume that a platform that allows its users' social lives to flourish as well as entertain them will more likely be adopted in the long run, and that the public perception will catch up eventually. The fast food industry, after decades of making food more chemically-developed, more tasty but unhealthy, finally went through this change as the tremendous increase in diabetes rates finally caught the public eye.

Today, existing social media platforms have already started to see this backlash from users and shareholders. Facebook ended a scandal-ridden 2018 with a 20% drop in its stock price, the lowest it has been in nearly two years (31). Therefore, an alternative design is not only realistic, but perhaps also reasonable. How a platform (or even a new medium) started need not govern how it develops. As Tufekci reminds us, seatbelts became mandatory in the US many decades after cars were popularized and were an indispensable part of life, following much controversy that argued that it was unreasonable to demand that car manufacturers design all cars with this invariant.

Another counter argument we anticipate is one that pertains to a number of the claims we have posited. In Chapter 2, we claimed that social media platforms inadvertently favor and encourage radical content, while discouraging nuanced or calculated content. We suggested many root causes for this problem, such as the invariant structure of posts that causes users to give brief and shallow attention to any given post, the infinite scroll-feed that gives the user no natural stopping point, cost functions that optimize for engagement and encourage users to provoke their audiences, etc. Since this claim grounded many of the problems and suggestions for which we argued, we anticipate a counter argument that trivializes our claim that the dissipation of radical content is a legitimate problem.

In short, we anticipate the argument that radical posts make up a small portion of social media posts. It might suggest that perhaps radical posts are "louder", but they are problematic in effect only because they are brought under the spotlight by media outlets or other critics. In this way, perhaps radical posts are only as big as a problem as we make of them, and if we left them alone, they would be contained in a small area of social media platforms from which one can easily distance herself.

Although this account is definitely optimistic and convenient, it is nonetheless not based on truth. First of all, even if the number of radical posts is small compared to moderate posts, they systematically pique users' interest. In an interview mentioned in the beginning of the chapter, Mark Zuckerberg explains:

One of the findings that has been quite interesting is, [...] there’s this question about whether social media in general [...] makes it so that sensationalist content gets the most distribution. [...] And what we found is that generally within whatever rules you set up [for what content is allowed], as content approaches the line of what is allowed, it often gets more distribution.

In other words, no matter how the content regulation rules are set up, users tend towards posts that are on the edge of the regulations. From Zuckerberg's perspective, this is not a property of the system, but a property of human beings. Indeed, there is a vast body of research that supports Zuckerberg's claim that humans are attracted to the sensationalist, edgy and radical content. Even directly concerning news content, studies show that the prioritization of the sensational is nothing that began with Facebook. A study that examines front pages stories of newspapers from eight countries published between the years 1700-2001 shows that the "sensational news" have made the front cover significantly more frequently than others (39). Studies also show that attraction to gossip, scandals, and other types of content that create emotional response has been invariant throughout human history; some even suggest that gossiping about the scandalous is an evolutionary trait that humans have developed to enhance social bonding through dialog (40). Therefore, in the case of human communication in general, and of social media content in specific, we can safely assume that regardless of its size, whatever content sparks emotional response will get more attention. Unfortunately, we cannot avoid the problem of edgy content by simply trivializing its size.

Actually, the radical content must be problematized in another prospect as well. Due to the network-like structure of social media, the issue of the prevalence of radical content is exacerbated even further: First, radical posts get unproportionate engagement due to users' inherent interest in them, and second, their distribution increases non-linearly due to what is called the "network effect". Metcalfe's law, which has been used to explain the network effect in many areas, states that the growth of an item in a network is in the order of the square of the number of nodes in the network that use that item (41). In other words, things grow in networks at a higher rate than outside of networks. The network's effect is that it enhances the growth of its content.

In the case of social media, Metcalfe's law says that whatever gains attention will gain even more attention. This is a crude conceptual ground for why content gaining early recognition more frequently "goes viral" than content that doesn't catch an early wind. If a post successfully beings an initial dissipation, it is more likely to spread similar to a virus. Indeed, the spread of virus itself is object to a network effect as well, since human cells, and computers, are connected through network systems. Metcalfe defines his law in terms of "value" and claims that a network's value is non-linear in its size. However, in the case of radical posts in social media, we claim that the non-linear dissipation is not added value but added stress to the system. Therefore, the social media platform must be sensitive to the network effect and given our claim that the dissipation of radical content hurts the system, alter its algorithm to ameliorate the network effect radical content enjoys.

A following counter argument we anticipate is that social media platforms naturally optimize for most engagement, so it is technically unsound to claim that they have a way of ameliorating the network effect. However, this argument assumes that algorithms can be "generally optimized", whereas in reality, the optimization of an algorithm is optimization for a certain type of result. An optimization algorithm seeks to minimize a given definition of a cost, but it is up to the programmer to determine what the parameter to be reduced is. Then, the cost function attempts to minimize the difference between the expected value of a parameter and the empirical value of that parameter. Perhaps engagement is a convenient parameter to optimize, but as we have shown, it is not necessarily the correct parameter, and it is decisively not a unique parameter.

Furthermore, current social media platforms have been updating and developing their cost functions to mediate some of the very problems we have described. In January 2019, YouTube has released a statement explaining how they have been combatting videos that have sensational titles but low-quality content, known as "clickbait":

You might remember that a few years ago, viewers were getting frustrated with clickbaity videos with misleading titles and descriptions (“You won’t believe what happens next!”). We responded by updating our system to focus on viewer satisfaction instead of views, including measuring likes, dislikes, surveys, and time well spent, all while recommending clickbait videos less often. (32)

Admittedly, given that Youtube's algorithm is proprietary, we do not have access to the exact nature of this change. However, the declaration at least shows an understanding from Youtube's part that simple parameters such as views do not result in the best user experience, and cost functions generally need to incorporate a set of distinct parameters to combat issues of radical content and model the complex criterion of "viewer satisfaction".

Another counter argument that is connected to the claim on cost functions suggests that it is unproductive to expect social media platforms to simply produce "fairer" algorithms and fix problems of content moderation and unfair ad targeting completely. It will become clear later that this argument is one that we agree with whole-heartedly, and our recommendations are ones devised precisely out of this concern. However, we will begin by detailing the argument.

In their paper *Inherent Trade-Offs in the Fair Determination of Risk Scores,* Kleinberg et al show that the numerous definitions of "fairness" used while discussing the pros and cons of ML algorithms are mostly incompatible with one another, except for rare specialized cases (21). This means that even if developers make a conscious attempt to fulfill a fairness condition while implementing an algorithm, they are bound to be criticized by others who hold another definition of fairness. Of course, one could argue that the paper might have chosen one or more of the notions of fairness to be unreasonable ones, which makes the finding ineffective, even if accurate. However, the authors suggest and cite cases in which all three of the properties have been used as significant in judging an AI system's fairness. Furthermore, when we consider the three properties, we can see that they go hand in hand with our intuitive understanding of fairness and don't seem to contradict one another from the outset. The three properties, in short, say: (1) Scores (outputs) of the algorithm should have the same meaning regardless group, (2) The "negative class" should not be targeted in a way that is unwarranted by the properties of the class, (3) The "positive class" should not be awarded in a way that is unwarranted by the properties of the class.

Although the paper is written mainly for risk assessment systems, we can extrapolate what these "classes" would correspond to in news ranking or targeted ads. One such example from Chapter 2 is Tufekci's argument that an individual with onset of a mania period might be targeted because he is more likely to make impulsive purchases. Since she finds this unfair, we can say in this situation that this individual would be in the "negative class". Similarly, we can make such groupings for individuals with certain political affiliations, racial groups, etc. Therefore, their conclusion that these properties of a fair result cannot be simultaneously guaranteed is a powerful conclusion. Indeed, in social discourse, we generally take an agreement on definitions to be a necessary, if not sufficient, requirement in having a productive discussion. What the authors demonstrate here is that we do not yet have a common ground understanding of what fairness is, and in fact, we have definitions that yield incompatible results.

Discussing issues of fairness in a theoretical framework might require that we compare AI decision-making to an ideal. However, from a design framework, all that we have to work with is the in-practice status quo, which in the case of decision making, is human beings. Therefore, we must question how reliable humans are as judges when making claims about AI judgment. In *Extraneous Factors in Judicial Decisions,* Danziger et al show statistically significant differences in ruling depending on whether a judge took a food break before a hearing or not. In the paper, they extrapolate that numerous extraneous factors that should be irrelevant to the case make significant changes in courts of law, where the cost of being impartial is probably much higher than in a social media recommendation algorithm. Similarly, the National Bureau of Economic Research shows evidence that asylum judges, loan officers and baseball umpires consistently fall into "gambler's fallacy", which is the misconception that an outcome of a number of independent trials that has been produced few times is more likely to be produced in the next trial (25). Finally, numerous studies tell us that in many fields, AI decision making is more unbiased than human decision making (26). Therefore, from a design point of view, the argument for ideal algorithms may be too high of a bar, when the status quo is not that ideal to begin with.

In Chapter 2, we suggested that there are problems of disempowerment due to the lack of understanding and control users have over ML algorithms used in social media platforms, mostly in news ranking and recommendation systems. However, it seems that an approach to make algorithms fairer is unproductive, since fairness is admittedly not a well-defined term, and comparing fairness of algorithms with that of our ideal does not hold, since human judgement, which is the incumbent judge in making decisions about how the platform should look to users, are infamously biased in all areas of life, making the comparison to ideals an unrealistic one. That being said, we cannot use this critique to deem the problem impossible and settle with the status quo. The recommendation that users have more control over and understanding of the algorithms that govern them does not necessitate that software engineers be mandated to develop unflawed code. Even if making uncontested progress in ML-judgement is difficult, we can still create platforms that are more explainable so that users can be aware of the considerations that go into the decision-making process, and even have a way of influencing the algorithms by changing their history.

We have in our capacity today the ability give information to the user about what parameters were considered for a specific decision to be made. In other words, we can challenge the supposed "Blackbox" nature of the algorithms. In their paper titled *Accountability of AI Under the Law: The Role of Explanation,* Finale Doshi-Velez et al tell usthat we could reasonably expect as much transparency in decision making of algorithms as we do from humans (22). In this work, the authors ask how we could continue to take advantage of the power of AI systems while still holding them accountable, and they respond: "explanation".

Taking the precedents of legal perspectives as what explanations we accept as valid in human judgment, they suggest that the same form of explanation can be expected of AI algorithms as well. The two methods they employ are "local explanation" and "constructing counterfactual scenarios". To understand these tools, first we must recognize that explanation and transparency are not equivalent. For example, a social media platform could give out their source code, but this would not necessarily translate to an explanation interpretable by humans without challenging calculations. However, the authors suggest that we do not need transparency in order to get explanations for particular decisions. With this in mind, giving local explanation is the ability of an algorithm to respond to questions such as: "What were the main factors in a decision?" and" Why did two similar-looking cases get different decisions?".

A local explanation is an "explanation for a specific decision, rather than an explanation of the system’s behavior overall". Even though algorithms look for an abundance of parameters and give them weights through non-linear (and therefore difficult to calculate) functions, the study shows that the algorithms could be questioned about particular decisions in these human-friendly ways. Similarly, constructing counterfactual scenarios is the algorithm's ability to respond to the question: "Would changing a certain factor have changed the decision?" By simulating the algorithm with an altered particular parameter, it could tell us whether this parameter was a tipping-factor in the judgement. Through these two tools, the authors suggest that "demanding explanation from AI systems in such cases is not so onerous that we should ask of our AI systems what we ask of humans".

Without much difficulty, we can imagine how designing a platform with such explanations regarding its news ranking or suggestions algorithm can help with the problems of disempowerment we described in Chapter 2. First of all, we explained that users can get inadvertently pigeonholed into a category which they are not happy with. For example, we can consider the videos Tufekci watches on YouTube for her research, and how she finds that she finds more extreme versions of the same category of videos in her "Up Next". With an algorithm that allows for explanations, Tufekci could ask whether a particular video would be in the Up Next if she had not seen another particular video at a past instance. Even as it is today, YouTube allows its users to delete any video from their watch history, so that the recommendations no longer take those data points into consideration; in a way, YouTube can "forget' that the user watched the video (33). In a platform with explanations, Tufekci could identify the videos that have pigeonholed her into a certain category and remove them from her watch history. Similarly, Mark Zuckerberg recently claimed that they are building a system that will allow the users to delete any portion of their profiles, in a similar method to YouTube, such that the recommendation algorithms "forget" about that past behavior (23).

At the same time, the explanation allows the users to have they type of first-order-input that we suggested is lacking in current systems. By tweaking their user history to determine which behavior they would like to affect the recommendation algorithms and news ranks, users get to make explicit decisions about their own experience of the platform, thus being empowered in a way that they currently are not. Thus, without having to give users physical control over the functioning of the algorithms, which might be a technical burden and might poorly affect the efficiency of the algorithms, the platform could still grant the users the ability to change the system's behavior in predictable and useful ways.

However, one drawback of exposing any information in a proprietary system is that it introduces a vulnerability into the system, namely that users of the system are better able to manipulate the system for a result desired to them. In the case of social media users, we might be tempted to claim that it should be a feature that users can get the desired results, since that is what we have been advocating for. However, for any given system, there is an underlying threat model, and in any threat model, there are actors who wish to abuse the system. Without dwelling too much on the specifics, we can speculate that the threat actors for a social media platform can be malicious users who wish to get a harmful message to a specific audience or advertisers who wish to discriminate against users in a way that is prohibited by law. Hopefully, local explanations of the sort that Doshi-Velez describe are user and instance-specific enough that they will not enhance threat actors' understanding of the underlying algorithm in any meaningful way. However, it must be noted that there is an inherent tradeoff of exposing information about a system, and this tradeoff requires careful deliberation from the side of the developer.

Finally, the two main counter-arguments that pertain to a specific feature we have recommended are those about the enhancement of notification settings. The first problem we articulated in Chapter 2 was Turkle's "life-mix", the co-presence and conflation of the individual's physical presence with his online presence. We found that the main bridge between those two selves is the red alert notification, the invitation that calls the user to move from the physical world to the online world. Rather than study the fact of a social media platform having notifications at all, which has many advantages, such as the ability to alert the user to relevant activity, we questioned how the notifications in current platforms behave. For this, we turned our attention to notification settings.

We suggested two improvements on notification settings in an alternate design. First, we recommended that the default notification alerts, both when the user signs up to the platform for the first time, and as new notification alerts emerge, should not be completely opt-out. Further, we recommended that the user be directed to the notification settings page when she first signs up, so that she can alter them to her liking at that moment and be aware of the altercations she is allowed to make for future use. Secondly, we suggested that users have a way of dealing with notification settings as a whole, such as the ability to turn on a "do not disturb" mode, which pauses all notifications until a desired date. In response to these recommendations, we expect two counter arguments.

The first counter argument is that human beings are logical creatures, so they should not have any problems identifying what notification settings they would like to have, finding the corresponding settings, and changing them. In other words, it should not matter whether certain decisions are opt-in or opt-out, given that there exists a way for the user to curate the settings that are desirable for him.

Nobel Award recipient behavioral economist Richard Thaler names the predictable ways in which human behavior deviates from the dictates of logic as "nudge theory". He explains the mantra of this theory as follows: "If you want people to do something, make it easy" (cite). In other words, even if it there is a set of decisions that are more advantageous for a person, she may fail to make the "rational" choice and settle with the default if there are barriers to changing behavior, no matter how small. For example, in his study outlining the measures necessary to increase enrollment to retirement plans in the US, Thaler claims: "There is now conclusive evidence that automatic enrollment, where employees are automatically signed up unless they opt out, is extremely successful in overcoming the procrastination that can impede signing up. Opt out rates average about 10%" (34). The study eliminates other possible explanations to be able to make the claim that the increase is tied to the default option. If individuals are unwilling to a significant extent to make an active effort to change the default behavior in a long lasting and impactful decision such as retirement savings, it is difficult to imagine that users would be more willing to make an active effort to change their notification settings, an admittedly smaller-scale and less impactful decision.

Furthermore, it is not only opting decisions that change ultimate results, but anything that affects how difficult it is to make a change. Thaler's paper outlines other results that reaffirm the potential impact of our suggestions, one of which is as follows: If forced to actively decide rather than passively accept the default investment rates, employees prefer higher investment rates, which is assumed in the paper to be a desired result. Then, we can safely assume that if users are taken to the notification settings page when they first sign up, they will be more likely to curate settings that are to their benefit, whatever they might be in individual cases.

The second counter-argument we anticipate is that providing more options cannot be a blanket-solution to all software problems, since this itself introduces new problems of user-friendliness. If there was no tradeoff, social media platforms (and any other technology, for that matter) could introduce more granular preferences ad infinitum. For notification settings, as well as for other areas of social media design, we have made recommendations that include adding more options. Therefore, this criticism deserves recognition and response.

Hick's law suggests that as the number of options in a given environment increase, the time it takes for a human being to decide on what to do next increases. (38) Although there are exceptions to this, it is true that giving more options has the tradeoff of requiring the actor to consider a larger field of possibilities, increasing the likelihood of overwhelming the user. This becomes a problem in the case of software design especially combined with another fact: Human attention is a scarce and fragile resource that is easily distracted, especially when challenged (35). Therefore, Hick's law is a rule of thumb in human computer interaction which anticipates that engagement and conversion rates tend to drop when a technology introduces numerous options without consideration for user friendliness.

Particularly in the case of notification settings in which the user could easily fall on the default settings in order not to make decisions that challenge their attention, one could argue that the increased number of options only creates a perception of choice, whereas most users will most likely continue with the default settings, thus failing to have the impact the choices were intended for. As the Interaction Design Foundation puts it: "Users bombarded with choices have to take time to interpret and decide, giving them work they don’t want" (38). If the decision is necessary for the user to continue with the website, the effect of the bombardment can go as far as pushing the user to close the website to delay the decision making.

There is no denying the Hick's law is a fundamental design principle that we must recognize. Design is ultimately a game of finding the right balance between tradeoffs; compromises must be made to ensure a happy medium between complexity and simplicity; between flexibility and usability. Therefore, we turn to the suggestions of design literature on how to mitigate the complexity added by more choices.

The Interaction Design Foundation explains that if more options are essential, grouping choices by high-level categories and progressively disclosing more details allows the user to be familiar with the field of possibilities in every screen. Breaking down the decision process such that going into each screen, the user knows what choice they make allows us the make use of the main exception to Hick's law: If the user knows what they want before encountering the screen, having more choices does not have the same effect. In this case, the user simply peruses until she finds the option she is searching for, rather than deliberate on each individual option. Hence, our recommendation in Chapter 2 includes a set of meta-options: "Permissive", "Conservative", and "Power User". By grouping all notification settings in three broad categories, we hope to avoid overwhelming the user without losing functionality.

Furthermore, by grouping the items in these specific categories, we make use of another design principle called the "Pareto Principle" or the "80/20 Rule". Although the rule has been applied to all types of data, within UX, it argues that 80 percent of users use merely 20 percent of the functionality (38). In the case of notification settings, we assume that the needs of most users are covered by either permissive settings, which basically correspond to the default settings social media platforms provide today, or conservative settings, which require opt-in consent from users who wish to be mostly unbothered by notifications. The power user case allows us to target the remaining 20 percent of the users who wish to build custom settings for each type of notification.

Thus, we conclude our discussion of anticipated counter-arguments, and turn to a summary of the farther-reaching implications of the design choices we have recommended.

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