How Engagement and Attention Engineering in Facebook and Instagram has Contributed to Social Media Addiction Among Users in Generation Z

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On my honor as a University Student, I have neither given nor received unauthorized aid on this assignment as defined by the Honor Guidelines for Thesis-Related Assignments

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Introduction

I was recently spending time with friends when a candid photo was taken. In it were seven college students, all looking down at their smartphones – what a great photo it would have been had we been interacting with one another. The picture had me wondering: why are we acting this way? I started recognizing my own problematic smartphone usage patterns. I noticed that at work events and family gatherings the older crowd was clearly less consumed by their phone than the younger. In my life and the lives of my friends, I know that much of this screen-time is spent on social networking applications. I decided to look into the origins and causes of this problem with respect to attention and engagement engineering, specifically looking at Meta as the company that owns and operates Facebook and Instagram, two of the largest and most recognized social media platforms that exist today.

The introduction of social media in the 21st century has had benefits for society in communication, entertainment, education and many other areas, but there are ways in which its usage can become problematic. Meta's largest platforms, Facebook and Instagram, have become deeply ingrained in the daily lives of their billions of users across the globe. This can be partially attributed to group pressure, which is defined by the APA Dictionary of Psychology as "direct or indirect social pressure exerted by a group on its individual members to influence their choices" ("Group Pressure", n.d.). In this case, the group is broadly members of Generation Z with internet access who have been pressured by their peers to conform to frequent social media usage, interaction, and staying informed on the latest trends or news. Users may spend hours active on these platforms as a result of tactics employed not only by the platforms themselves, but also companies and individuals that leverage them to gain brand visibility or market a

product; some of these tactics have exacerbated the group pressure aspect of this issue, further increasing addictive potential.

Meta's social networking business models depend on users' constant concentration and interaction in order to gain advertisement revenue and generate monetizable data (Burt, 2019). Attention is defined as "a state in which cognitive resources are focused on certain aspects of the environment rather than others" ("Attention", n.d.), and attention engineering includes methods deployed by engineers and companies to capture users' cognitive resources and keep them focused on profitable activities on the platform. Today, there is an entire attention economy in which music, movie and television, videogame, social media, and many other industries compete for human attention and treat it as a scarce commodity. Social media marketing has become increasingly important to smaller businesses who aim to increase customer engagement with their company profiles on platforms like Instagram with emotionally engaging content (Lee, 2018 pp. 5105-5106). This has created an environment where there is a variety of players constantly engineering for more engagement and attention from casual users.

Understanding addiction in general is important for framing this problem. Anna Lembke, Professor and Medical Director of Addiction Medicine at Stanford University, weighs in on the relationship between pleasure and pain, dopamine pathways in the brain, and addiction in modern society in her book *Dopamine Nation*. She defines addiction as "the continued and compulsive consumption of a substance or behavior despite its harm to self and/or others" (Lembke, 2021, p. 20). Use of social media platforms can be abused to the point of addiction under this definition. Social media addiction is described as a failure to control problematic usage that leads to negative effects on a user's personal life (Ryan et al., 2014, p. 133). Whether this addiction has disproportionately impacted Generation Z, which includes people born after

1997, is worthy of investigation as they are the first to have internet technology readily available throughout their upbringing (Dimock, 2019).

Attention and engagement engineering strategies in Meta's social media platforms have contributed to social media addiction among Generation Z both directly and indirectly. Through my analysis I will discover the complex interplay of social and technical factors and actors that interact to create and propel the problem. In managing social media addiction in the youngest generations of people, the societies they are deployed in require multifaceted approaches to mitigate or solve the problem, where lawmakers, engineers, social scientists, users, and many more involved parties address the business models, the engineering practices, technological literacy of our public officials, and user responsibility and self-awareness. This will be a long-term process, but will be made most possible through laws and regulations that are supported by social movements and a voluntary shift in business practices by Meta and other social network providers since working towards legislation has failed thus far.

Literature Review

Hartman-Caverly performed a literature review to examine attention engineering with respect to learning analytics technology and the manipulation of attention. It includes claims that attention is "intrinsic to human consciousness" and is "exercising control over one's own consciousness," and that it is necessary for intellectual freedom and independent thought. In both learning analytics and personal computing technologies like social media, Hartman-Caverly finds that these companies undermine attentional autonomy by building them with features that can "addict" users (2019, pp. 26-29). Ben Parr, Author of *Captivology*, interviewed Facebook COO Sheryl Sandberg and asked her what she believed the "key to capturing attention" was. She responded, "motivation," and Parr follows this account by stating that both intrinsic and extrinsic

rewards are vital to motivating users to engage and commit their attention to a platform. Parr describes intrinsic rewards as being far more powerful in achieving long-term motivation due to the fact that there is no tangible reward that, when received, will relieve the "want" mechanism of the dopamine in our brains (2016, pp. 90-102). *Captivology* contains a wealth of research and experience in the field of attention, with particular focus on how it can be leveraged to drive internet-based businesses.

A group of former Apple, Facebook, and Google employees banded together to form The Center for Humane Technology, a coalition meant to fight technology addiction in the youth. The formation of this coalition was announced during a time when criticism of large technology companies' use of addictive engineering methods was growing. The group lobbies public officials to fund related research and alter social networking sites to reduce their addictive potential, and have created a living document that provides engineers with details about the technology they create and how it can be harmful to adolescents and children (Weller, 2018).

A major facet of the attention and engagement engineering problem is the involvement of machine learning and artificial intelligence. Meta pushes massive amounts of user data through machine learning pipelines in order to create artificially intelligent algorithms. They have a variety of services and thus require a variety of complex and specific models (Hazelwood et al., 2018). The artificial intelligence that permeates Meta's social media platforms and its iterative nature can allow biases and manipulation of those who configure their underlying models to impact end users. One paper cites an argument that the use of AI in social media by popular and powerful platforms can create a slew of problems including but not limited to redlining, targeting, and favoring certain demographics of users (Bechmann & Bowker, 2019, p. 2). Based on the business models of Facebook and Instagram, then, it is worth considering how AI

algorithms that optimize advertisement clicks and active time on the platform can lead to addiction, especially for the generation that grew up in the midst of the social media revolution – Generation Z.

Addiction to both Facebook and Instagram have been examined through the lens of uses and gratifications theory in an effort to show that there are possibly harmful uses and gratifications that underlie these platforms (Foroughi et al., 2022; Ryan et al., 2014). This theory and associated model involve the investigation of active audiences and their relationship to media (Katz et al., 1973). Aspects of media like interactivity, demassification, and asynchrony have been introduced or enhanced with the growth of the internet in the 21st century and have increased the active role that users play (Ruggiero, 2000, pp. 15-17), thus requiring novel approaches to researching the sociological and psychological effects. Internet and social media addiction is not a new concept by any means and has been studied for over 15 years, although it is excluded from the most recent version of The Diagnostic and Statistical Manual of Mental Disorders (Ryan et al., 2014, p. 133). Previous work in this area has had a large emphasis on the evidence and existence of this addiction through psychological and social studies, but little on the causes.

Methods

I will be using the case study analysis method to investigate the problem as I am considering addiction to two specific platforms among a narrow age group of people. Sources gathered for literature review and analysis cover topics such as social media addiction, usage statistics, engineering methods, relationships with human psychology, the business models of Meta's two social networks, and social media addiction related legislative failures. I have selected academic research articles that cover social media and addiction (in addition to other

mental illnesses) to understand the relationship between them. The majority of information gathered is from within the last five years and is up to date with the latest advancements in the social networking industry. I have selected interviews of and letters/articles from relevant individuals on the subject of attention/engagement engineering or social media addiction. These interviews are valuable primary sources that will provide a better inside look into the platforms. I plan to collect evidence directly from Facebook and Instagram (i.e., functionalities or UI components) and their associated marketing materials to understand how they are leveraged to keep users engaging and online. I am selecting media/journalistic accounts describing the business models of Facebook and Instagram, their use of engagement or attention engineering strategies, and the lack of regulation. These are from reputable media outlets, including Forbes and Harvard Business Review. I have also selected two legal texts, both of which are proposed social media addiction mitigation bills that died in Congress. These will serve as examples of failed legislative efforts to solve the problem at hand.

Actor Network Theory

I will analyze this case through Latour's Actor Network Theory (ANT). In truly understanding this problem, one must consider all contributing factors. Technical contributors include algorithms, artificial intelligence, and design components that influence user interaction. Economic contributors include the Facebook and Instagram business model and revenue streams, and company ideologies that translate from executives and managers into the work done by engineering, marketing, and sales employees at Meta. Social contributors include the effects of advertisement and business account activity on social media platforms, as well as the activity and interaction that takes place between personal account users.

There is value in employing ANT to examine how these platforms are composed of many human and nonhuman actors, and how behavior can be imposed on users by the platforms. ANT focuses on how these actors are involved in the construction of technological systems and treats the social and natural worlds as webs of relationships in which power and influence are continuously generated. Cressman wrote in a summary of ANT, "We act as we do, not by some idealistic notion of free choice, but because our actions are bounded by technologies that delegate how and what we can do within a sociotechnical network" (2009, p. 10). Facebook and Instagram are great examples of this idea, as user actions are bounded by the platforms' form, function, and social norms of their use that have formed over the past decade and half. The boundaries are created both intentionally and unintentionally by the aforementioned contributors. We can evaluate how Facebook or Instagram prescribe behavior onto their users, how users and other actors subscribe or de-inscribe to those behaviors or the role that platforms impose on them, and what pre-inscriptions exist both in software and human nature that may lead to unhealthy usage. Each of these concepts are defined in Latour's (1992) explanation of ANT.

Prescription is defined as "the behavior imposed back onto the human by nonhuman delegates" (Latour, 1992, p. 232), and in my case the nonhuman delegates are the social media platforms. Subscription and de-inscription are defined as the actors' acceptance or rejection of their prescribed roles in the actor network, respectively (Latour, 1992, p. 257). Pre-inscription is defined as all of the preexisting factors that influence actors' behavior before any prescription happens and can be leveraged by engineers when developing a technology. An example of a pre-inscription in my case would be humanity's innate desire to socialize with others, creating the prospect of success of social media platforms. By leveraging ANT to look at all of the relevant actors and the relationships between them, I aim to determine in what ways Meta has employed

attention and engagement engineering in their platforms, how they have persisted throughout the expansion of social networking applications over nearly 20 years, and how that has created an addiction problem among the youngest generation of users.

Analysis

For almost twenty years now Meta has been employing attention and engagement engineering strategies in its platforms, taking advantage of human psychology to manipulate their users into remaining online for prolonged periods of time and feeling inclined to engage with the content they see, in some cases to the point of addiction. Tristan Harris, a magician and former Google design ethicist, wrote an article that highlights the ways in which technology "hijacks" the minds of users. All of the following examples serve as non-human actors in the overall actor-networks, Facebook and Instagram. Although non-human, the various components and functionalities of the platforms do impose behavior onto the user and have shifted power into the hands of the platform with very little detection or concern from society. He first highlights the illusion of free choice as a strategy, where a platform controls the choices that a user has (Harris, 2016). An example of this would be Instagram and Facebook recommending more users to follow after following or friending someone new. In providing this display of recommended connections, users may be more inclined to connect with someone they would not have otherwise – creating the potential for more interactions and engagement, as well as more time spent on the platform if the user decides to look through the profiles of the recommended connections.

An even broader example of Meta creating an illusion of free choice is the acquisition of Instagram, allowing them to capture and maintain the attention of users from the largest social networking platforms on the market. By owning both Facebook and Instagram users are given an

illusion of choice, but by choosing one over the other they are still giving their attention and engagement to Meta. Since the acquisition new features have been added on each to promote the other (users can choose to share a post from Instagram to Facebook simultaneously, for example), increasing overall engagement. He then draws a relationship between these kinds of technologies and slot machines, using push notifications and refresh features (Harris, 2016). Both platforms include these features, which Parr describes as "the real culprits" of addiction rather than smartphones themselves, because "they grab our attention by triggering a complex mechanism in our brain that powers our motivations and desires" (Parr, 2016, pp. 89-90). When a user posts on either of these platforms, they often have their settings configured to notify them when they receive a like, a follow, or someone shares their post. Each time they check their phone and see the notification, they are anticipating a reward – some engagement by others with their profile. Pulling down their feed to refresh is the same way – they are anticipating the new content that will populate the feed. These concepts also tie into a human need for social approval and reciprocity, where users are hoping that their followers and peers engage with their content or follow/friend them back. Social approval and reciprocity are examples of pre-inscriptions that are being considered by designers and engineers at these companies to optimize the addictive nature of the platforms.

The aforementioned features serve as prime examples of Meta usurping attentional and cognitive autonomy and thus infringing on a fundamental human freedom – intellectual freedom, potentially causing addictive behavior in their users. The end users, as human actors, are subscribing to the prescriptions (various attention or engagement features) being imposed on them by Meta without considering the negative impacts that they can have on their psychology in the long term. Meta's features and tactics primarily deliver intrinsic rewards (self-confidence,

contentment as a result of social approval or entertainment). Meta's use of intrinsic rewards, whether intentional or unintentional, is what captures attention in the long-term creating potential for excessive use.

This excessive use is further evidenced by Hannah Schwär's article in *Business Insider* about how Instagram and Facebook are designed to mimic addictive painkillers (2021). The article included an interview with app developer Peter Mezyk who described that "the success of an app is often measured by the extent to which it induces a new habit" and that "painkiller apps" typically generate stimuli centered around negative feelings like loneliness and boredom. Loneliness and boredom are more examples of pre-inscriptions; these are natural human feelings, and the platforms produce constant entertainment and virtual socialization to relieve users of those feelings. The existence of The Center for Humane Technology aligns with Mezyk's message and shows that many engineers and former insiders, the human actors most knowledgeable about the inner workings and goals of these platforms, recognize this problem as one worthy of assembling and raising awareness for. The use of attention and engagement engineering strategies by Meta is not solely driven by its mission to connect people and build communities but also by its business model, which is designed to generate user data and target personalized ads. While Meta's mission statement suggests a focus on community-building, the reality is that the company's primary goal is to generate revenue through advertising, making addiction a side-effect of its business model.

The business models of Facebook and Instagram are optimized for advertisement views and generating massive amounts of user data to create personalized ads, which require retaining user attention and encouraging high levels of engagement, driving their need for attention and engagement engineering practices. Treating the business model as a non-human actor in our

case, we can see how it interacts with other actors including users, AI, and attention or engagement features to reinforce the addiction problem. In an article in the *Harvard Business Review*, Burt discusses the disconnect between the goals of Meta's social networks and the goals of its users. Facebook's business model depends on its users being constantly engaged, as well as leveraging collected data to target users with advertisements and new features. He describes that Meta wants time, attention, and data from its users, while users are pursuing social interactions, news, and entertainment – this is where the interests diverge (Burt, 2019). Meta's mission statement is "Giving people the power to build community and bring the world closer together" (Meta, 2023), and statements like this conceal the true priorities of the company.

In a letter from 2019, Mark Zuckerberg addresses some of the questions surrounding Facebook's (and analogously Instagram's) business model (Zuckerberg, 2019). He explains that the best way to give the most people a voice on the platform is to offer it for free, and that ads are required to enable this. Feedback received by Meta has indicated that if users have to see ads, they prefer them to be relevant, which can be realized using engagement data. Zuckerberg addresses questions about Facebook selling user data and leaving up divisive content to drive engagement, answering explicitly that they do not do these things. However, when he addresses the concept of a misalignment of interests between users and Meta, and about having an incentive to increase engagement to generate more advertising revenue, he segues into a new paragraph about the importance of user's time on the platform being well spent rather than answering as explicitly as before. This reveals an effort to appear to be addressing that question without revealing the true nature of Meta's efforts to drive engagement and maintain user attention.

Manipulative engineering strategies are vital to maintaining the current business model of Facebook and Instagram, and Meta fails to address or prioritize the potential for addiction and excessive usage. As much of the conversion of big data into valuable, actionable information takes place autonomously through complex machine learning algorithms (Bechmann & Bowker, 2019), consideration of pressing social concerns like addiction are stripped away from that process. A common theme between the business models of Facebook and Instagram and the companies that leverage them for marketing is the desire for user attention and interaction. Companies need to focus on building strong user communities, creating engaging content, and utilizing effective marketing strategies to stand out in an increasingly crowded market. The combination of the human desire for social connections, the advanced algorithms and usefulness of Meta's apps, and the expansion of the digital marketplace have led to widespread adoption that makes these social networks almost unavoidable.

The widespread adoption of both Facebook and Instagram has led to group pressure within society to start or continue using these platforms regularly, in addition to creating an ecosystem of competition for attention and engagement of users by businesses, advertisers, and even personal account users on these platforms. Between 2005 and 2021, adult usage of at least one social media site grew from 5% to 72%. This statistic illustrates the rapid rate at which social media has been adopted by society for regular use. When broken down by age group, the youngest age group of 18-to-29-year-olds had the highest usage rate of 84%, decreasing as age increases. Of the top three most used platforms, Facebook and Instagram place 2nd and 3rd, respectively (Pew Research Center, 2021). As these platforms have grown over the past two decades so has group pressure to adopt these platforms and conform to common usage patterns especially within younger users.

Generation Z, being the first generation to have access to internet technology and smartphones, has become particularly dependent on and savvy with them (Prakash-Yadav & Rai, 2017, pp. 110-111). Prakash-Yadav and Rai acknowledge that while there are studies regarding social media usage among this generation, there needs to be more research into the activities they participate in and the behavioral impacts it has. It's important that we consider the behavioral impacts as well as the psychological harm that could be inflicted as a result of Generation Z's unique relationship with social networking technologies. The potential for addiction to these platforms is highest in this generation as a result of these circumstances, but for the same reasons it has become normalized and less apparent as an important societal concern.

The world of advertising and marketing has followed Generation Z in this unprecedented level of dependency on social media. Since consumers are changing, businesses must adapt to digital and social media marketing strategies. Brands now attempt to make connections with consumers through these platforms by encouraging engagement. This includes hosting livestreams, competitions, polls, and more (Ricchiardi, 2021). Moreover, Facebook and Instagram both include their own e-commerce services, drawing companies of all sizes to their platforms to increase business. An in-depth study investigated the effect of social media advertising content on consumer engagement by content-coding 106,316 posts acquired from Facebook. The researchers found that emotional content and brand-personality content increased engagement, while strictly informational content reduced it (Lee et al., 2018 p. 5128). This highlights another aspect of the social media addiction problem: not only is Meta engineering for user attention and engagement, but the businesses that leverage their platforms for brand-building and marketing are also doing so.

The technology has reached a point where there are multiple actors who have a common goal with respect to end users – they want their attention and engagement. Between Facebook and Instagram, business profiles and accounts, and the new-age desire for virality and internet fame, the cards have been stacked heavily against social media users from Generation Z in the battle against addiction and for attentional autonomy. In conflicts between massive industry giants and "the little guy," government intervention is often necessary for positive change. In this case leaders have unfortunately proven themselves inept at handling the situation, perhaps in part due to pushback against the existence of social media addiction from some researchers.

As I have argued throughout this paper, evidence suggests that social media addiction or addiction-like behavior can materialize as a result of attention and engagement engineering. Professionals in the psychology and tech communities do not unanimously agree on the existence or magnitude of this addiction in society. A study conducted on 100 participants, many of which were regular Facebook and Instagram users, by researchers and professors from the UK suggests that high usage of social media may not be an addiction due to the absence of attentional bias. Attentional bias, a hallmark of addiction, is defined as "the priority processing of addiction related stimuli." This experiment consisted of a smartphone display that first included no "distractor" apps as a practice trial, then included social media apps as "distractors" in 50% of the trials, and finally included notification bubbles on those distractor apps. Response time was the metric used for determining a relationship between the participants usage and their level of attentional bias for social media (Thomson et al., 2021).

While the study concluded that there were no indications of a relationship between social media usage in participants and a decrease in response time when a distractor app was present, the design of the study and its results are ambiguous at best. The paper addressed the possibility

of some participants having a stronger ability to focus their attention on a primary task, but ruled out that alternative explanation by re-running the experiment with participants who had the largest dip in response time due to distractors and coming to the same conclusion as before. Measures of attentional bias with relation to addiction, however, may reflect many underlying processes and factors including withdrawal or the environment (Field & Cox, 2008). One such factor may be scarcity, and a collection of experiments conducted by University of British Columbia researchers Zhao and Tomm indicate a strong relationship between scarcity of specific stimuli and an attentional bias towards it (2008). In the attentional bias study from the UK, participants are not experiencing any genuine scarcity of access to social media, and so the results of that experiment should be interpreted cautiously and do not confirm or deny that users have an attentional bias towards social media. In my personal experience I often have my attention drawn towards social media when I am aiming to perform an unrelated task on my smartphone, suggesting some level of attentional bias is possible. Studies like this are problematic because they send a message to the academic community that this problem is not as serious as one may believe. These conclusions can make their way into industry or government sponsored research and influence lawmakers to believe this addiction is a low priority issue.

Conclusion

Attention and engagement engineering have not only led to a disproportionate level of addiction among younger users in Generation Z directly through active engineering methods, but also indirectly through more discrete means. For instance, the culture of attention and engagement engineering within these platforms has created an ecosystem of platforms, businesses, and even individual users competing for user attention. Social media advertising, entertainment profiles, and new applications continue to exercise tactics that manipulate users

into getting hooked and engaging with the content they see. Widespread adoption of these platforms was likely accelerated due to these engineering methods which in turn caused the issue to spiral out of control. Technological advancements in the fields of machine learning and cloud computing have allowed the platforms to spread across the globe, and for attention and engagement engineering to be more obscured and effective. Through all of this, our government officials' technological literacy has not increased at the same rate as the technologies discussed throughout this paper, so very little is being done to help solve or contain this problem.

There are numerous examples of legislative failures and technological illiteracy within Congress. Take for example the Social Media Addiction Reduction Technology (SMART) Act that was introduced in the Senate in 2019 and eventually died. This bill would have prohibited infinite scroll, autoplay, and engagement rewarding features from platforms. It also would have required that a 30-minute time limit should be enabled by default unless users opt out, among other things (2019). Most, if not all of the content of this bill would be beneficial to end users with very little downside. In 2022, the Nudging Users to Drive Good Experiences (NUDGE) on Social Media Act was introduced and was far more extensive than the SMART act. NUDGE included requirements for research on social media addiction, research on methods of intervention on social media platforms, regulation by the Federal Trade Commission, and even disclosures of statistics and information by platforms of a certain size (2022). Even with its improvements over the SMART act, it failed to pass in Congress. These failures are indicative of this issue's low priority in the eyes of congress people and United States citizens.

These failures, coupled with the level of technological illiteracy within our government, demonstrates that legislation alone is an ineffective route for solving this problem. Technological illiteracy is a lack of understanding of how technology works, and having high levels of this in

our highest levels of government has hindered the passing of laws relating to security, antitrust, social media addiction, and more. An article in *The Mercury News* cites 84-year-old Republican Orrin Hatch not knowing how Facebook sustains its business model (ad revenue) as well as Alexandria Ocasio-Cortez's "Twitter Class" given to over 200 congresspeople and staffers including very basic engagement tips as examples of this issue (Albertson, 2020). In the 116th Congress every member of leadership in both houses of Congress, in both parties, was over the age of 69. The average ages in the House and Senate, respectively, were 57.6 and 62.9 years. Returning to the Pew Research Center data, social media usage trends downward with age (2021). This problem is not something that directly affects many of our congresspeople, and not something they are well informed about.

Future research could investigate the ways in which this topic is being brought to the attention of the US government and legislators, as the current methods have been unsuccessful. My research could be leveraged to educate legislators in a more holistic way about all of the different factors and actors that contribute to this problem. Future research should also investigate contemporary attention and engagement engineering tactics within newer platforms where little research exists. This includes apps like TikTok and Snapchat that use similar tactics to keep users active and grow in popularity at an unprecedented and alarming rate. Another potential study could focus on older age groups or simply include them, perhaps comparing and contrasting the different ways that addiction or problematic usage materializes in users belonging to different generations. Some of the greatest limitations of this research include a lack of access to proprietary information and algorithms belonging to Meta, and a lack of sound research on the roles of specific marketing strategies or software components indicating a relationship with addiction.

The primary goal of this research is to educate policymakers and encourage them to prioritize legislation that aims to solve or control the problems of attention/engagement engineering and social media addiction. In the long term, I hope that this research leads to a shift in the practices of social technology engineers to be more focused on the mental wellbeing of end users. If groups like the Center for Humane Technology could take insight from this paper and apply it in their efforts to urge large tech companies to change their practices and persuade lawmakers to take action in this space, it could lead to positive outcomes for the average social media user. Ethical social media engineering can be made practical with careful consideration of the different actors and influences conducive to addiction. Whether it be greed, power, or a misunderstanding of user needs and goals, reevaluating the existing systems of social media engineering and measuring their success in terms of the users' quality of life and maintenance of intellectual autonomy would be a step in the right direction.

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