



Misuse of Persuasive Technology in Social Media with Subsequent Solutions

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ABSTRACT: *In recent times the terms social anxiety, mental disorder among teens, low self-esteem, and screen addiction got common. This led me to research the correlation between persuasive technology and human engagement and its short and long-term effects. The term 'persuasive technology' was first coined by B.J Fogg, a professor at Stanford University. He founded Behaviour Design Lab at Stanford University where he explored and did research on captology. Social media has mainly 3 goals: engagement growth and, advance goal. In the end, I have discussed personal solutions and changes that can be made in social media sites for user wellbeing. Mainly social media has three goals: keep user engagement high, increase its network and make money while doing this all. Studies and surveys done by the National Broadcasting Company (NBC), Common Sense Media, and Massachusetts Institute of Technology (MIT) signify that teen know that social media is manipulating their minds, but they find it a more efficient way of communicating and keeping in touch with friends and family. Teens prefer social media for networking rather than meeting in person. They know that social media is guilty of anxiety, mental disorder, fights, cyber-bully, reduced spending time with loved ones in person, and low self-esteem and patience. Social media are designed in a way that triggers the mental and psychological vulnerabilities of users and keeps them engaging for hours without realizing it. The solution to all this is to create less addictive and engaging social media, where user engagement is not monetized; this can be done by inserting enough traction in-between which makes the user think before acting. Can add features like time limit, user can set a limit for its everyday use, categorize notifications and only show pop-ups for those which requires urgent action, can add a feature to mute notifications, social media feeds should be categorized into personal and general, in personal mode only people whose post you want to see is visible and in general mode all suggested and preferred posts are visible.*

KEYWORDS: *Persuasive technology, social media, teens, addiction, manipulation, Facebook, YouTube, Google, Instagram, time, engagement, pop-ups, notification, communication, anxiety.*

INTRODUCTION

Social media started in the early 2000s, almost after a decade of CERN (The European Organization of Nuclear Research) making WWW (World Wide Web) public domain with an open license [15][14]. Around 2004, Myspace, the first known social media site, reached 1 million monthly active users [15]. This was a remarkable entry of social media into our lives and people loved it. This altogether changed and designed our day-to-day social interaction and connecting to one another. No doubt people loved the idea of social media, and this is the reason that today it has a 62.5 billion US dollars market [16]. The motive behind social media platforms is to connect users with friends and moreover establish new friendships and connections. For the past two decades, 12 social media platforms rose to fame, and below is the line graph to interpret their growth rate yearly.

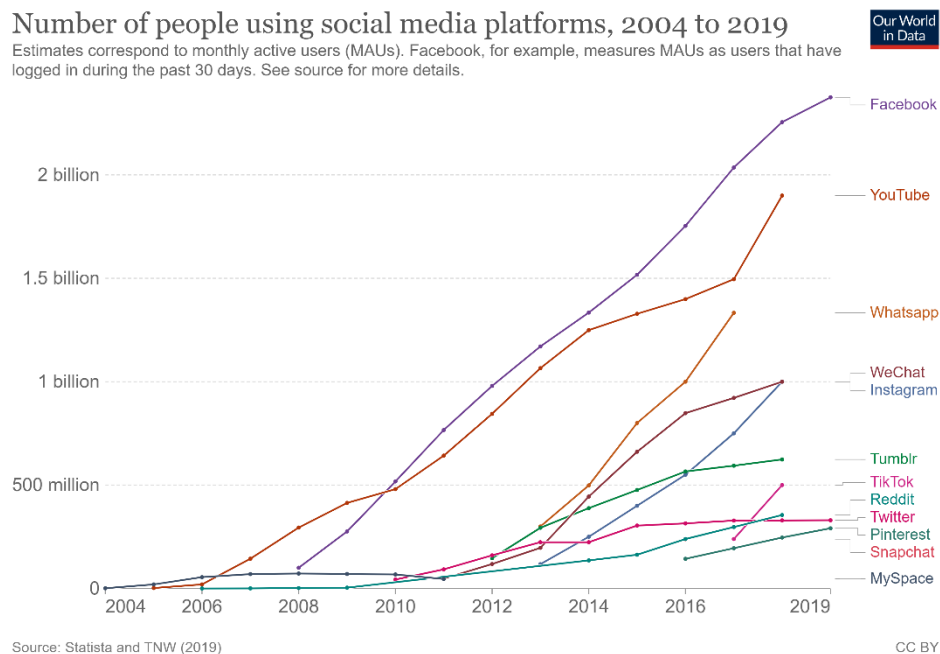


Figure 1: Number of people using social media platforms from 2004 to 2019 [15]

Figure 1 illustrates the usage of various popular social media applications/platforms. According to the line graph above figure-1, Facebook is on top with more than 2 billion people using it, YouTube and WhatsApp following the lead with 1.7 and 1.35 billion (approximately), and Instagram with 1 billion. It is observed from the graph that the growth of YouTube, WhatsApp, and Instagram has been phenomenal in comparison to other competitors like Snapchat, Twitter, TikTok, etc. Social media is benefiting in adolescent development tasks like connecting with friends, exploring interests, identity development, and aspirational development [17][18]. Today's online behavior reflects a lot about your offline character [19][20]. Moreover, it helped teens to develop new friendships and maintain old ones [21]. According to more than 90 percent reported that social media helped them to keep in touch with their old friends whom they do not see offline enough. About 2/3rd stated that they use social media to make new friends [22]. Moreover, it helped adolescents to know each other's feelings through their posts and stories which means they feel more connected to [23]. Social media helped teens with peer support and approval in the past [22]. Social media gives platforms the flexibility to present them as they want them to be, share their feelings, and adventure with others. Moreover, youngsters who engage more on social media had been found with greater self-clarity and identity discovery [24]. Moreover, it is found that during adolescence it is difficult for children to find their sexual orientation or generally have low self-esteem, even body shame or different thought processes or likings, but social media helped them discover more about them and connect them with like-minded ones [24][25].

These are just positive aspects of social media, but there is also the dark side of it, it is not always that social media will benefit youngsters or adults. Some of the negative aspects are cyberbullying, depression, social anxiety, and exposure to inappropriate arousing content [17]. The social drama is another term for cyberbullying which teens can more correlate [21]. The research found out that cyberbullying or social drama results in more depressive symptoms than actual traditional bullying [26]. Moreover, the research found out that risky self-presentation posts are more likely to get negative feedback, which eventually results in affecting you mentally and emotionally [27]. Other than cyberbullying, lack of sleep is also the reason among teens to develop symptoms of depression. It is found that due to seamless peer

interactions teens keep them engaged on their cell phones, even at night they do not switch off their phones due to the fear of missing out on something, which results in a lack of sleep [28]. Moreover, lack of sleep apart from depression is connected with problems at school, motor vehicle crashes, loss of memory, and other issues [29]. In order to impress peers on social media it has been found that more than 54 percent of content uploaded by teens contains substance abuse, violence, and sexual activities, due to immaturity they do not know if it is correct or will it affect their life ahead, all they care is to build an impression among their peers that they are cool [30]. Moreover, these platforms are for-profit organizations that sell users' data and show advertisements, so it is a high possibility for inappropriate advertisements to reach young users [18][31]. Due to social media non-fatal self-harm incidents rose by 62 percent and suicide rates in teen girls increased by 70 percent [11]. According to a survey done by NBC, it was found that most teens prefer texting over talking and half of the teens admit that smartphones distract them from having real conversations with their friends and family [1].

Today tech companies knowingly influence you by creating persuasive technology, which engages you for hours on their apps by recommending or showing related content that interests you and you enjoy churning on. Only a handful of designers and engineers working at FAANG companies (Facebook, Amazon, Apple, Netflix, and Google) hold the power to influence the world. According to the Washington Post, about 28 percent of accidents involve texting or talking on cell phones. Now, some might think that we make our own decisions on using these technologies, but according to the design ethnicity and ex-googler, Tristan Harris does not think the same. In his digital wellbeing transcript explained that humans have vulnerabilities, which can be amplified and exploited at times. He stated that via product design we can achieve this phenomenon and make people act impulsively or change their behavior or mood. According to him, we are losing our power of better judgment [2]. Currently, there is not much being done for user wellbeing as most solutions are irrelevant and could affect social sites' average user engagement. Tristan Harris, a design ethnicity and ex-googler, started the Center for Humane Technology, a non-profit organization, acting as a whistle blower to unethical activities of tech platforms with the mission to drive a comprehension shift towards humane technology [12]. Apart from him, there are surveys and studies done by NBC, Common Sense Media, and MIT about the impact of social media. Most research is being done on teens as they are more prone to get addicted to social sites. I have researched the impact of persuasive technology in the face of social media, and what could be the feasible solutions in transferring this tech towards being more humane. I have discussed vulnerabilities and solutions suggested by Tristan Harris, moreover included my own suggestions, and evaluated their feasibility in terms of ease of implementation and impact factor.

The world is being made more distracted. Time is all that we have, you might have noticed that time flies when we are engaged and time hardly expands when we are idle. Hours and hours can get by when we are engaged on Gmail reading and replying to emails, or checking feeds, commenting or watching reels on Facebook and Instagram, reading hundreds of WhatsApp messages in a week, and replying back and waiting for others replies. Our valuable time and attention are what is at the stake here. This motivated me to contribute to the field of captology and derive persuasive technology towards being more humane technology as what B.J Fogg's mission is.

GOALS OF SOCIAL MEDIA

The motive behind social media platforms is to connect the user with friends and moreover establish new friendships and connections. But as time passed their needs and demand also changed. Take Facebook as an example started out as an intra-university social platform for

Harvard, with the motive of initially connecting Harvard students but soon from that, it expanded to other universities as well and then to the general public as well, started advertising ads with charging fees for monetizing the platform, in past 15 years Facebook has acquired 78 companies including Instagram, WhatsApp, Messenger, and Snapchat, with currently having 2.85 billion monthly active users [35][34][33]. Surely Facebook has established its monopoly in the field of social media. Moreover, these platforms are for-profit organizations that keep on coming into the limelight for accusations of selling users' data and moreover manipulating voters during election campaigns. So, it is difficult to put a finger on one goal as for this fast-evolving industry goals and motives alter with time. But three main goals will tend to be the core, these are:

- (1) Engagement goal: how much time you spend on their site [11].
- (2) Growth goal: to keep coming back, and inviting friends [11].
- (3) Advance goal: to make money [11].

BACKGROUND OF PERSUSASIVE TECHNOLOGY

Persuasive technology is nothing but persuading, changing behaviour, and manipulating minds with the help of technology. And it has a big impact on digital marketing, almost every social media platform uses user data to get insights on what they search for and their likings which results in showing advertisements of similar products and services. Moreover, Google AdSense also uses it. Dr. B.J. Fogg professor at Stanford University first tossed the term 'persuasive technology' and established a sub lab for it under 'Behavior Design Lab'. The main motive of this lab is to empower you to create solutions to help people with positive behaviour change, conduct research, share insights, and create practical solutions to help people become happier and healthier [9]. Throughout the late '90s and early '00s, Dr. B.J. Fogg devoted his time to researching and creating ethical persuasive technology methods. At multiple events and conferences, he discussed the ethical issues of persuasive technology, its potential, and pitfalls. In 2006 he uploaded a video warning about problematic areas related to it, even discussing politicians and parties taking advantage of it in manipulating voters, which eventually happened in the 2016 elections [10].

TEENS INTERACTION WITH SOCIAL MEDIA AND ITS CONSEQUENCES

Teens are among the top social media users, with 89 percent of them having smartphones and a further 70 percent of them using social media on a daily basis and are most easily prone to manipulation and suffering its consequences [36]. Let us understand further about teens' interaction with social media and its consequences through line graphs, surveys, and research done in past.

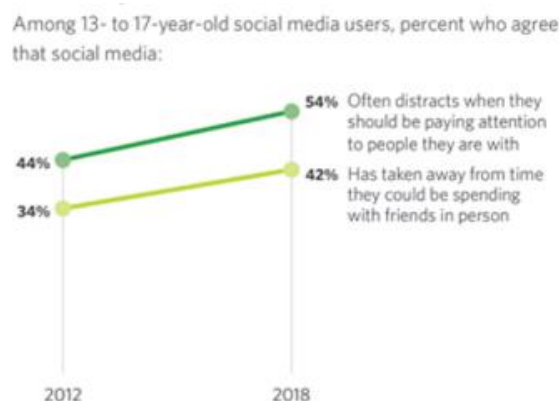


Figure 2: Social media distraction from face-to-face interaction 2012 vs 2018 [32]

The line graph above represents increasing numbers of users (ages between 13-17) who agree if social media distracts them from interaction with the person, they are present physically with and if social media has consumed their time which they could have been spending with friends and families. According to figure 2. There has been a 10 percent increase in users who agree that social media distracts them from having an actual in-person conversation and an 8 percent increase in users who feel that social media takes away the time that they could be spending with friends in person. From this, we can conclude that social media is distracting and taking away time which teens could have been spending with friends and family and engaging in real in-person conversation.

According to a survey done by NBC News, most teens prefer texting over talking. Half of the teens admit that smartphones distract them from having a real conversation with friends and family or a person physically present in front of them, which is a sign of behaviour disorder. Common Sense Media, which conducts research into media use, interviewed more than 1,100 teens aged 13 to 17 and found that 57 percent of them admits that social media distracts them from doing homework, 54 percent admits that they sometimes ignore people around them just to pay attention to social media and 29 percent have admitted that a text, notification or call had woken up them at night [1].

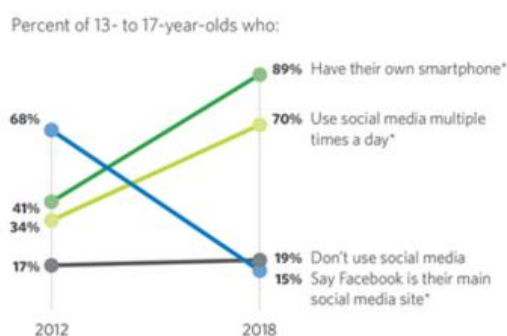


Figure 3. Social media and digital device use 2012 vs 2018 [32]

The line graph above represents social media and smartphone use in age groups 13-17 from 2012 to 2018. It is observed from figure 3. that there has been an increase of 48 percent in smartphone holdings, 36 percent increase in using social media multiple times a day, 2 percent increase in smartphone users who do not use social media, and a decrease of 53 percent in Facebook users, the cause could be due to increasing numbers of other engaging platforms that are taking its place like Instagram and WhatsApp [36]. From this, we can conclude that with time teens getting smartphones and using social media multiple times a day have increased, moreover due to the introduction of other social platforms teens are preferring Facebook less. About 44 percent accept that they get frustrated when their friends or partners are engaged on their phones. In 2018, more than 80 percent of students said that they use social media and among them, 70 percent use them multiple times in a day, which is more than double that was in 2012. Apps are built in a way that makes it hard to skip a day. For example, Snapchat has this feature in which users have to send at least one message to certain friends in a day [1].

The line graph above represents the preferred method of communication among age groups 13-17 from 2012 to 2018. It is observed from figure 4. that there has been a 2 percent increase in texting, a 9 percent increase in interaction through social media, an 8 percent increase in video chatting, and correspondingly a 21 percent decrease in in-person communication. From this, we can conclude that with time virtual communication is taking the place of in-person communication. Around 72 percent of teens are aware that companies like FB are manipulating them into spending more time, but they at the same time like them and consider a better

alternative to communicate. Proportions of teens who say they like talking in person have dropped from 49 percent in 2012 to 32 percent in 2018 [1]. It is not all negative, a quarter of students say that these apps make them feel less isolated and only 3 percent stated the opposite [1]. Nonfatal self-harm increased by 62 percent and, the suicide rate increased by 70 percent in teen girls. A 5,000-person study found that higher social media use correlated with self-reported declines in mental, physical health and life satisfaction [11]. Moreover, according to research at MIT, it was found that fake news spread 6 times faster than true news. 64 percent joined extremist groups on Facebook because the algorithms steered them there. Social media is an assault on democracy [11].

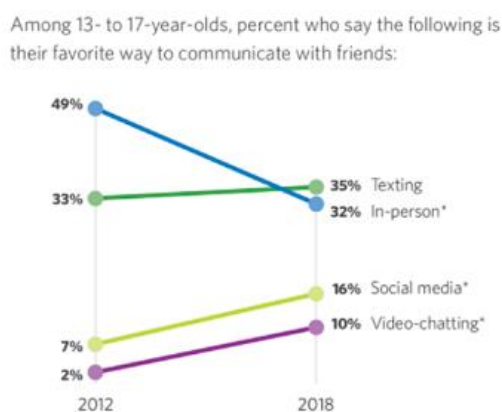


Figure 4: Preferred method of communication 2012 vs 2018 [32]

Cyberbullying, depression, social anxiety, and exposure to inappropriate arousing content are other threats to users [17]. Social drama is another term for cyberbullying which teens can more correlate [21]. The research found out that cyberbullying or social drama results in more depressive symptoms than actual traditional bullying [26]. Moreover, the research found out that risky self-presentation posts are more likely to get negative feedback, which eventually results in affecting you mentally and emotionally [27]. Other than cyberbullying, lack of sleep is also the reason among teens to develop symptoms of depression. It is found that due to seamless peer interactions teens keep themselves engaged on their cell phones, even at night they do not switch off their phones due to the fear of missing out on something, which results in a lack of sleep [28]. Moreover, lack of sleep apart from depression is connected with problems at school, motor vehicle crashes, loss of memory, and other issues [29]. In order to impress peers on social media it has been found that more than 54 percent of content uploaded by teens contains substance abuse, violence, and sexual activities, due to immaturity they do not know if it is correct or will it affect their life ahead, all they care is to build an impression among their peers that they are cool [30]. Moreover, these platforms are for-profit organizations that sell users' data and show advertisements, so it is a high possibility for inappropriate advertisements to reach young users [18][31].

IMPACT OF PERSUASIVE TECHNOLOGY ON TEENAGERS: PSYCHOLOGICAL CHALLENGES

Social media feeds on weak user psychology, they try to manipulate their user in giving as much time as can of their lives [2], below are the main 5 user psychology on which social sites make persuasive technology to effectively act.

(1) Bad Forecasting (aka that won't take long): Social media notifies us whenever there is any action, might that action be not intended to us, for example, Facebook notifies us whenever: you get tagged in any post, friends add stories or status, recommend videos or posts, shows

posts that our friends commented on or liked, suggests friends whom our friends follow, every like and comment on your post, notifies if any of your contacts is also on FB or Instagram [2]. According to research done on NBC news by Erika Edwards and Maggie Fox, these somehow distract from our task which we were doing or have to be done and get our attention and focus diverted to something else (social media). The engagement level is high and we eventually end up scrolling for 1-2 hours without even knowing. People have accepted that they picked their phone for doing something else and finished doing something different, they think it will take only a few mins just to check social media but ends up spending away from it more [1].

Solution: design products to help users forecast the consequences of certain actions [2].

(2) Intermittent variable rewards (aka slot machines): Tristan Harris referred to social media as slot machines, because users keep on buffering Gmail, FB, or Instagram pages for new content or messages. The process is not predictive, instead, it is intermittent and the house always wins in taking your time without us getting any value [2].

Solution: design to minimize the presence of intermittent variable rewards, and reduce addictions [2].

(3) Loss-aversion (aka fear of missing out): Tristan Harris argued that even if we plan not to see social media for 6-12 hours but at that time period, we would be having the urge to look as if we might not miss any important message or content. So, this fear of missing out is embedded in us with time [2].

Solution: design to give users confidence that they could disconnect more often, and not miss something more important [2].

(4) Fast vs. Slow Thinking (aka Mindless behaviour vs Mindful): We do not have to put effort or any strain while scrolling or reloading the page, according to Tristan Harris this feature affects our decision-making ability, it would be impulsive instead. Humans have lost the ability to think critically. According to him, social media is designed in a way to make you think less and creates a less fractious and seamless experience [2].

Solution: design to help users be fast and efficient while leaving enough friction for users to pause and consider [2].

(5) Stress and the Altered States (aka “I’m not in the best state of mind to decide”): Tristan Harris states that social sites not only change us psychologically but also physiologically. He introduced the term ‘email apnea’ an effect in which we actually stop breathing when we read our emails, our heart rate increases and our body prepares for fight response [2].

Solution: design to minimize stress and create calmer states of mind [2].

STEPS TAKEN BY TECH PLATFORM’S ON USER WELLBEING

Below are the companies which introduced a few features keeping in user wellbeing, let’s look at what they had to offer:

- (1) Facebook: Mark Zuckerberg in 2018 announced that they will increase the personalization on news feed i.e., you will mostly get to see posts from friends instead of irrelevant suggestions [5].
- (2) Google: In 2018 Sundar Pichai announced and released digital wellbeing tools [4], you can see which apps and websites you use most, and set daily limits. Once you hit the limit, those apps and sites pause, and notifications go quiet. So, you'll spend only the time that you want, exactly where you want [3]. Moreover, Pichai announced “Be Internet

Awesome,” a game through which kids will learn how to use the internet effectively and safely [4].

- (3) YouTube: It added a feature ‘Take a Break Reminder’, where users can go to settings and set the time period after which his YouTube video gets paused and reminded him of taking a break. The user can resume the video or close the app as per his discipline [6].
- (4) Instagram: ‘you are all caught up’ feature has been added by Instagram to minimize unnecessary scrolling down on the home page revisiting past posts [7].
- (5) Apple: after Google's digital wellbeing tools, Apple also added a similar screen time feature with similar features with subtle differences [8].

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PROBLEM FORMULATED

In recent times the terms social anxiety, mental disorder among teens, low self-esteem, and screen addiction have become common. This led me to research the correlation between persuasive technology and human engagement and its short and long-term effects. A few years back what we consider to be an asset is now becoming a liability and a burden which you carry with you most of the time, yes, I am talking about smartphones, and specifically social media platforms installed in it. Social media is causing cyber bullying, depression, social anxiety, exposure to inappropriate arousing content, lack of sleep, in addition to this it was found that cyberbullying results in more depressing symptoms than traditional bullying [17][26][28]. Social media sites collect user data and their algorithms study your behaviour, liking, disliking, engagement level, and much more. Believe me or not, social media knows more about your choices than you do. They use Persuasive technology/techniques to keep their users engaged and spend as much time as they can [2]. It has become a problem as students are getting distracted every day, even though it has changed their behaviour.

Teens are now more comfortable in connecting through social sites rather than meeting physically, even relationships are being made online, in some cases, both sexes are comfortable in keeping it online and afraid to meet offline. Spending much time on social media is causing low self-esteem, increasing body shaming, and higher expectations. Social media is silently changing, manipulating and corrupting our minds. I'll explain this statement by giving an example: when you are standing at a party, market, at the bus stop, or anywhere, your hand unconsciously reaches your phone and you simply start scrolling through feeds in social media. If you don't have this habit, then notice people around, because most of them have this habit, social media have silently corrupted their minds so much that they need engagement and feed their brain with entertainment at all times. This results in people not paying attention to the present, rather preferring living in the virtual world.

PROPOSED SOLUTION/SUGGESTION

According to Tristan Harris, niche/small start-ups are too small to tackle this challenge. The solution to the problem can only be followed from a top-down approach. It should start with big tech companies like Google who hold to influence millions. Google sets notification standards on more than 50 percent of the world's mobile phones, almost everyone uses Chrome and Gmail or other Google products on an everyday basis, so it is in a great position to execute the change we require [2].

Solutions that can be implemented in order to condemn the problems are that social media platforms:

- (1) Can be designed in a way to reduce the volume and frequency of notifications/pop-ups [2]. Can provide a feature in message-based apps, to group notifications and notify users after a stipulated time, so that users can focus on more important things than get distracted and forget what their initial plans were. Moreover, Tristan Harris proposed that as tech companies have a team to standardize our design aesthetic, they should also have a team to standardize our design ethics and define best practices to minimize distraction [2].

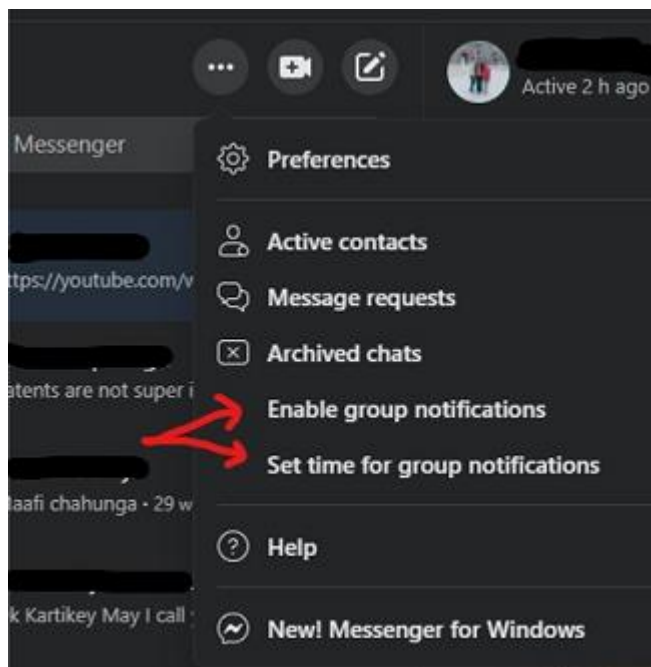


Figure 5: Group notification feature for messages (UI suggestion)

- (2) Can categorize important messages on which urgent action is required, and non-important/urgent ones and only show notifications for important/urgent ones. Can show notifications for non-urgent ones collectively like after 10 hrs (User can alter time accordingly) a digest of all notifications of that time period will appear, instead of notifying each one every single minute [2].



Figure 6: 'Urgent' tag on messages that require prompt action (UI suggestion)

- (3) Feeds should have two modes, 'personal' and 'general', in personal mode, only friend's posts are visible to the user in feeds and for general mode all kinds of generally suggested

posts are visible. With this user who is only interested in viewing friends' posts will not get engaged in other general suggested posts, it will save them time and reduce engagement level and addiction probability. Even if a user is keen on viewing other suggested posts, he/she can simply change the mode from 'personal' to 'general' mode. Though Facebook after 2018 introduced a feature under 'Settings and Privacy' → 'News Feed preferences' called 'manage preferences' where users can favourite people whom they want to see their posts first, this isn't the solution. The user wanting to see posts from their chosen one will result in getting suggested posts again when posts from their preferences finish after scrolling down. In addition to this Facebook should inherit the 'you are all caught up' feature from its child company Instagram, as it lets the user know if they have covered all the unseen posts or not. In addition, Instagram should also apply the feature in its web application as well, as currently, it is only in the mobile application.



Figure 7: 'Personal' and 'General' feed tags on home page (UI suggestion)

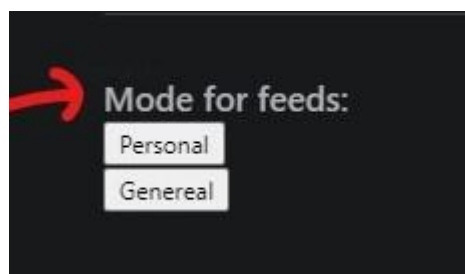


Figure 8: 'Personal' and 'General' feed tags on side panel (UI suggestion)

- (4) Launching the premium version for the paid user, which will not show ads and moreover, give the user more flexibility and some additional features for customizing the app according to his or her need.

Remember: “If you are not paying for a service then you are not a user, you are a product”.

- (5) Users can set a time limit for each day and if exceeded the limit the user gets automatically logged out of the session and has to log in if they want to continue using. Moreover, an additional feature to the same feature can be that whenever he opens up the application the timer starts for 'time left' according to what his daily limit is. This way the user would know how much time more he left on using social media for the day.
- (6) Reels on social sites like YouTube and Instagram should provide options to traverse or fast forward through. As it will save a lot of time most of the reels create a climax in the beginning and conclude in the last few seconds, wasting up your 10-15 secs on every reel you watch.
- (7) Give a parental feature to block inappropriate content on a young one's accounts.

- (8) Teach digital literacy in schools, conduct webinars on digital frauds, and cybercrimes and motivate and teach them healthy ways to use social media which will benefit them.

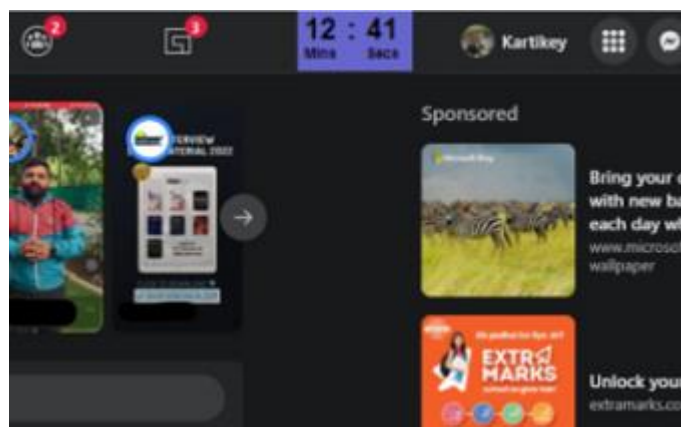


Figure 9: Timer on top showing time left set by user (UI suggestion)

Further research can be done on how to implement any of these changes effectively so that social sites also do not suffer huge losses and user wellbeing can also be assured.

RESULTS AND DISCUSSION

According to surveys and studies done by NBC, Common Sense Media, and MIT about the impact of social media I discovered most research is being done on teens as they are more prone to get addicted to social sites. Moreover, half of these teens admit that smartphones and social sites restrict them to have an actual conversation with friends and families in person face to face, and this is leading them into behavior disorder according to NBC reports. Moreover, teens prefer texting over talking nowadays. A survey was done by Common Sense Media on 1,100 teens aged 13 to 17, found out 57 percent of them admits that social media distracts them from doing homework, 54 percent admits that they sometimes ignore people around them just to pay attention to social media, and 29 percent have admitted that a text, notification or call had woken up them at night [1]. About 44 percent accept that they get frustrated when their friends or partners are engaged on their phones. In 2018, more than 80 percent of students said that they use social media and among them, 70 percent use them multiple times in a day, which is more than double that was in 2012. Apps are built in a way that makes it hard to skip a day. 72 percent of teens are aware that companies like FB are manipulating them into spending more time, but they at the same time like them and consider a better alternative to communicate. Proportions of teens who say they like talking in person have dropped from 49 percent in 2012 to 32 percent in 2018 [1]. It is not all negative, a quarter of students say that these apps make them feel less isolated and only 3 percent stated the opposite [1].

So, from the above data, it is clear that the majority of the young generation knows that social sites are manipulating them and are a distraction but at the same time they consider it as a better alternative. It has made communication easy, feasible, and you can connect to literally anyone anywhere. But it all comes at a price for those who engage with it a bit more, according to studies nonfatal self-harm increased by 62 percent and, the suicide rate increased by 70 percent in teen girls. A 5,000-person study found that higher social media use correlated with self-reported declines in mental, physical health and life satisfaction [11]. According to Tarris Harris, social sites target 5 human/user psychological challenges (weak points): bad forecasting, intermittent reward, loss aversion, don't giving us time to think before acting and stress and altered state [2]. Most social sites try to create their interface seamless, requiring users' bare minimum effort to act and they keep on showing related content as per your interest

which further keeps on engaging users and makes us feel like we want to know what's next. The three main goals of social platforms are to keep on engaging you, make sure you come back and invite friends as well and the last is to make money (not from users but from the time we spent, as they show us ads of advertisers from whom they take direct money) [11]. B.J Fogg is the father of Persuasive technology and he intended it to be for the betterment of society but at the same time warned about negative consequences which eventually happened and is happening like in elections manipulating voters' minds, collecting user data, and then using it against user only, etc [9][10]. The solution to this hassle could be that all products have the feature of blocking or reducing notification pop-ups, instead of as Gmail categorize mails into spam and not spam, similarly there should be the categorization of notifications as well, urgent, important, and not important only show pop-ups for urgent one and give the user flexibility to alter it as well as per need. Nevertheless, there are features of blocking notifications in some products but with that user afraid of missing out on urgent ones, the approach discussed would be a better alternative. Moreover, this would eliminate the user's psychological challenge no. 1st, 3rd, and 5th in many ways. Moreover, Tristan Harris proposed that as tech companies have a team to standardize our design aesthetic, they should also have a team to standardize our design ethics and define best practices to minimize distraction [2].

Feeds should have two modes, 'personal' and 'general', in personal mode, only friend's posts are visible to the user in feeds and for general mode all kinds of generally suggested posts are visible. With this user who is only interested in viewing friends' posts will not get engaged in other general suggested posts, it will save them time and reduce engagement level and addiction probability. Even if a user is keen on viewing other suggested posts, he/she can simply change the mode from 'personal' to 'general' mode, moreover, this would limit challenges 1st, 2nd, and 4th to kick in up to some extent. In addition to this feature, Facebook and Instagram web applications should inherit the 'you are all caught up' feature from Instagram's mobile application, as it let the user know if they have covered all the unseen posts or not. Moreover, they can launch the premium version for the paid user, which will not show ads and moreover, give the user more flexibility and some additional features for customizing the app according to his or her need.

Social sites can also give a feature to the user to set a time limit for each day and if exceeded the limit the user gets automatically logged out of the session and has to log in if they want to continue using. Moreover, an additional feature to the same feature can be that whenever he opens up the app the timer starts for 'time left' according to what his daily limit is. This way the user would know how much time more he left on using social media for the day, this would limit challenges 1st, 2nd, and 4th to kick in up to some extent. The other thing Reels on social sites like YouTube and Instagram should provide options to traverse or fast forward through. As it will save a lot of time, according to insights shared by Growthoid, time spent by Indians on Instagram increased by 3.5 percent after the launching of reels [13]. Moreover, the same insights point out that 500 million use Insta reels on a daily basis [13]. According to my personal observation, most of the Insta and YouTube reels create an engagement and climax in the beginning and then conclude in the last few seconds, wasting up your 10-15 secs on every reel you watch. And this change would limit challenges 2nd and 3rd to kick in a little. There is an increasing number of accounts and engagements of children on social sites and one of the most effective ways to make social media children friendly, is to introduce parental restriction, this parent on their child id can switch on secure mode and keep a password only for that particular feature, so that child cannot turn off the feature on their own, and inappropriate, sexual arousing content will be blocked for that account. Moreover, digital literacy should be included in the education systems of schools, they should hold classes and webinars to teach students to use the social site in a way to extract benefits from it.

Nevertheless, social sites will only consider such changes if they see profit in doing so whether financially or publically, as in the end they are not the non-profitable organization they have given employment to thousands of people all around the globe with high paying jobs they need to money to keep on going and for that, they have to make a smart decision even if it is not in favour of general wellbeing of society. According to Tristan Harris, the change should be initiated from the top, he stated it be Google and I will add that even if companies like Google are reluctant then the government will have to take charge in their hands and pass laws and enforce regulations on these companies to build technologies that are more ethical and humane.

CONCLUSION

During the research, I found out how social media is using data and persuasive technology against users to spend more time on it. Social media is manipulating users and most affected are teens, surprisingly most of them are aware of consequences and criticize a few aspects of it but in general, they find it a better alternative to communicate and connect. The use of social media is increasing and so is the anxiety, anger, and nonfatal self-harm among youngsters. The solution to all this is to create less addictive and engaging social media, where user engagement is not monetized; this can be done by inserting enough traction in-between which makes the user think before acting. Can add features like time limit, user can set a limit for its everyday use, categorize notifications and only show pop-ups for those which requires urgent action, can add a feature to mute notifications, social media feeds should be categorized into personal and general, in personal mode only people whose post you want to see is visible and in general mode all suggested and preferred posts are visible. Moreover, can give the option to avail paid version, in which no ads are shown and the user has the flexibility to add and customize the platform as per need. Reels (short video) should have features to traverse back and forth. Moreover, give a parental feature to block inappropriate content on a young one's accounts and can teach digital literacy in schools, conduct webinars on digital frauds, and cybercrimes and motivate and teach them healthy ways to use social media which will benefit them. In conclusion, the changes will only be considered if it is the company's personal benefit whether it is social or financial. In the end, social media is run by profitable private companies, they want to make money in order to pay off thousands of employees, investors and in the end make a profit. So, there is little likelihood that these companies would initiate, so the government should pass laws and enforce regulations on these companies to build technologies that are more ethical and humane.

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