Social Manipulation Tactics Utilized By Social Media
(Technical Topic)

Ethicality and Social Impacts Regarding Human-Computer Interaction Implementation

(STS Topic)

A Thesis Prospectus
In STS 4500
Presented to
The Faculty of the
School of Engineering and Applied Science
University of Virginia
In Partial Fulfillment of the Requirements for the Degree
Bachelor of Science in Computer Science

By
Jack Warner

March 23rd, 2022

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.

ADVISORS

Kathryn A. Neeley, Department of Engineering and Society

Caitlin Donahue Wylie, Department of Science, Technology, and Society

Introduction

Many business models function under the premise of capitalism. However, somewhere along the way business models of many applications we see on smart devices have become fundamentally flawed in the sense that it no longer serves the best interest of the customer but profit for the business. Utilizing time (user retention) as monetary currency, this type of business model dominates the free application market. To maximize profit in this sense, these business models have implemented tactics and features in their applications to capitalize on time spent by taking advantage of vulnerable human psychology, going as far as studying user interaction to predict user behavior. Designing applications that exploit the psychology of the human brain creates an addictive behavior similar to tobacco (Sapone, 2021). This addictive behavior often overlooked as harmless, can lead to many negative mental health issues. As smart devices and applications like these become more and more prominent, it is in the best interest of the businesses as well as the users to take a step back and analyze just what kind of social-psychological techniques are currently utilized by big tech as well as the ethicality regarding the current impact and future prevention.

The goal of my technical and STS research is to create conversation by talking about some of the current prominent features implemented in big tech along with the psychological effects. I will delve into the ethicality of such implementations in addition to why we must be wary of such features. In the end, we will wrap up everything by looking at current suggestions to regulate such an issue and explore new ideas to challenge the current standard.

Technical Topic: Social Manipulation Tactics Utilized By Social Media

There are many implementations built into applications, whether on purpose or not, prolong the user's total time spent on such applications. These elements wouldn't be an issue if

they did not contribute to an overall negative effect on the human brain. As of 2019, over 2.71 billion humans use a smartphone (Christian, 2019). It is not excessive use of smartphones that is the issue, but rather excessive use of the applications on these smart devices. The current business model of many app developers values the exchange of personal data as well as the user's overall time spent, in turn, they can monetize it by selling data or gaining profit through advertisements.

On the element used to prolong the usage time of social media apps, one such effect is called the Ze ̆igarnik effect/Ovsiankina effect. The Zeigarnik effect came to be when Zeigarnik conducted a study where she interrupted her participants while they were trying to solve a puzzle. Afterward, those who best remembered the tasks were the ones who experienced interruptions (Christian, 2019). Rickers-Ovsiankina then observed that not only do these people seem to remember the tasks better, but several participants had the urge to come back and try to finish the unfinished tasks even after the experiment had ended. These classic works from the field of psychology suggest that those involved in the execution of a high-investment task experience emotional strain if they get interrupted.In Freemium games like Candy Crush Saga, players are often interrupted during their gameplay by a pop-up banner when a "super hard level" is approaching. Often rumored as being impossible to accomplish on the first try, if the player fails, they will have more of an urge to come back and retry that level rather than if they weren't interrupted with such a banner (Christian, 2019). In this article, the authors explore five more psychological mechanisms utilized by social media apps and freemium games to gauge attention retention. With Smartphone Use Disorder associated with negative emotionality and loneliness, it is in the best interest of users to inform them about just how easy it is to take advantage of human psychology. In turn, I hope the users will be more aware of their usage.

The plan to tackle this technical topic is to explore and find these psychological mechanisms utilized by applications seen today. By analyzing and researching the design goals for some of these implementations, and then cross-referencing them with psychologists, I hope it is possible to uncover the true intentions of these human-computer interactions. By introducing the idea of disengagement, where dichotomizing engagement shouldn't be desired but rather negative, stopping usage should be the norm of these free applications (O'Brien, 2022), I hope to persuade current application developers to move away from the current norm. After a better understanding of these implementations will I be able to challenge these current implementations by coming up with alternatives that put the users first.

STS Topic: Ethicality and Social Impacts Regarding Human-Computer Interaction Implementation

When it comes to the topic of ethics regarding technology development, there is no quantitative model or qualitative model to assess whether or not a piece of technology is ethical (Saura, 2021). While I do agree with Saura that it is almost impossible to implement regulations based on the value of ethics since ethics itself is so broad and nearly impossible to apply and regulate every aspect of technology, it should however be implemented in the business models that lead to these technologies. If the goal of a technology strays away from solving a problem or helping the user and deviates to profit, then the business model as well as the technology itself automatically becomes unethical.

There are many good parts of utilizing social media such as sharing content regarding well–being or resources that can aid in mental health issues, chronic use of social media can lead to low self-esteem, disturbed sleeping patterns, and an overall negative impact on your mental

state (O'Reilly, 2020). In O'Reilly's paper, she observed the perspectives of adolescents aged 11-18 while being told to discuss the good, the bad, and the ugly sides of social media. O'Reilly concluded in the paper that there are positive as well as bad things social media can bring, it is an extremely complex problem that needs a lot of research. However, I believe that just because we don't know the full extent of an issue, doesn't mean we shouldn't educate ourselves on what we currently know. There was a near consensus that social media addiction can lead to many negative mental health issues, that alone should be enough to start exploring the possibility of regulations regarding the usage of social media.

A paper examining the impact of social media on mood and body dissatisfaction using ecological momentary assessment from the Journal of American College Health has concluded that there is a positive correlation between the number of sites visited and body dissatisfaction. The number of sites you visit can equate to how many scratch-off tickets you scratch. Every time you open social media and see materials that display the best of someone, it will affect your view of yourself since it's human nature to compare. Opening more and more of these "scratch-off tickets" will start to take a mental toll on you (Bennet, 2019).

In a paper titled Addictive Use of Smartphones and Mental Disorders in University Students, instead of concluding with the idea that overuse and addiction to smart devices lead to an overall negative effect on their mental health, this paper concludes with the opposite. Out of the many papers I've read this is the first to talk about how poor mental health can lead to an addiction to smart devices. This correlation is scary in the sense that it makes smartphone addiction a way more daunting topic. It's now a rabbit hole of smartphone usage and poor mental health, where the two go hand in hand. The more addicted you are to smartphone usage, the

poorer your mental state is, the poorer your mental state is, and the more reliant you become on your smart devices (Alavi, 2020).

The findings in the above examples reinforce my ideas that there need to be more educational resources regarding the additive effect of social media. Conversations must be prompted to show the importance of regulation and research regarding social media. The first step to combat a problem that is already deeply rooted in our society is to educate. With education comes a better understanding then comes better implementations and regulations regarding the ethicality of features being implemented in these applications. Ethics of care is an approach that current businesses must try to adapt to their business model. As developers, the goal should be to accomplish an area of need for the user as well as care for the user's overall well-being. A system under capitalism driven solely on profit deviates from the fundamental idea of why capitalism works; to serve the best interest of the people.

Conclusion

Social media is helpful in the sense that it provides a platform for sharing as well as encouraging people in social networking. However, due to the rapid development of this type of technology, it has had a free range of implementation for far too long. Due to some innate features that exploit human psychology as well as poor business models, a user's mental health is a cost that should not be contributed to. By analyzing the goals of these implementations, utilizing the ethics of care framework, this research aims to create conversation. In turn, I hope to convince future developers to keep ethics in mind when serving the people, and I hope to convince businesses to develop an ethical check before releasing their products.

References

Alavi, S. S., Ghanizadeh, M., Farahani, M., Jannatifard, F., Alamuti, S. E., & Mohammadi, M. R.

(2020, April 1). Addictive Use of Smartphones and Mental Disorders in University Students. *Iranian Journal of Psychiatry*, 15(2), 96 - 104.

Bennett, B. L., Whisenhunt, B. L., Hudson, D. L., Wagner, A. F., Latner, J. D., Stefano, E. C., & Beauchamp, M. T. (2019). Examining the impact of social media on mood and body dissatisfaction using ecological momentary assessment. *Journal of American College Health*, *68*(5), 502–508. https://doi.org/10.1080/07448481.2019.1583236

Montag, C., Lachmann, B., Herrlich, M., & Zweig, K., (2019, July 1). Addictive Features of Social Media/Messenger Platforms and Freemium Games against the Background of Psychological and Economic Theories. *International Journal of Environmental Research and Public Health*, 16(14), 2612.

Glaser, P., Liu, J. H., Hakim, M. A., Vilar, R., & Zhang, R. (2018, November 1). Is Social Media Use for Networking Positive or Negative? Offline Social Capital and Internet Addiction as Mediators for the Relationship between Social Media Use and Mental Health. *New Zealand Journal of Psychology,* 47(3), 12 - 18.

Meng, M. D., & Leary, R. B. (2020). The effect of skeuomorphic digital interfaces on the illusion of control over gambling outcomes. *Journal of Gambling Studies*, *37*(2), 623–642. https://doi.org/10.1007/s10899-020-09961-2

O'Brien, H. L., Roll, I., Kampen, A., & Davoudi, N. (2022). Rethinking (dis)engagement in human-computer interaction. *Computers in Human Behavior*, *128*, 107109.

O'Reilly, M. (2020). Social Media and Adolescent Mental Health: The good, the bad and the ugly. *Journal of Mental Health*, *29*(2), 200–206.

Sapone, L (2021). Moving Fast & Breaking ThingsL An Analysis of Social Media's Revolutionary Effects on Culture and Its Impending Regulation. Duquesne Law Review, 59, 363.

Saura, J. R., Palacios-Marqués, D., & Iturricha-Fernández, A. (2021, May 1). Ethical design in social media: Assessing the main performance measurements of user online behavior modification. *Journal of Business Research*, 129, 271 - 281.

Tanega, C., & Downs, A. (2020, June 1). Addictive Technology: Prevalence and Potential Implications of Problematic Social Media Use. *Psi Chi Journal of Psychological Research*, 25(2), 151 - 161.

Xu, J., Shen, L.-xiao, Yan, C.-huai, Hu, H., Yang, F., Wang, L., Kotha, S. R., Zhang, L.-na, Liao, X.-peng, Zhang, J., Ouyang, F.-xiu, Zhang, J.-song, & Shen, X.-ming. (2012).

Personal characteristics related to the risk of adolescent internet addiction: A survey in Shanghai, China. *BMC Public Health*, *12*(1).