Depictions of Social Media Using the Social Construction of Technology Concept

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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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Abstract

The sociotechnical relationship between human activity on social media and the depiction of social media is a complex subject and has many opposing views. In general, individuals either praise or criticize the usage of social media. Some are not in favor of social media as it can often lead to negative outcomes, such as decreasing one's feelings of self-worth. There is often a presence of a skewed reality on social media. On the other hand, others admire social media as a positive concept. They feel as though they may benefit using social media by expanding their means of connecting with others and networking. These two different views can be acknowledged as to how behavior has ultimately shaped some of the platforms of social media. This paper will explore these two different outcomes and will be using the Science and Technology studies (S&TS) framework, social construction of technology (SCOT) concept to better understand these two perspectives. These two different approaches regarding the depiction of social media have the least overlap with one another. By focusing on these two perspectives, factors will be examined to assist one to better understand the relationship of social media and behavior.

The Relationship Between Human Behavior and Social Media Depiction

Introduction

The average person spends one hundred and thirty-five minutes on social media. An estimated twenty seven percent of children who spend three or more hours a day on social media exhibit symptoms of poor mental health. Negative effects regarding prolonged time using social media include mood modifications and interpersonal problems (MCSWEENEY, 2019). This addiction to social media can be credited to the machine learning algorithms created by prominent technology companies (e.g. Facebook, Instagram, and Twitter). Contrary to these studies, others have shown that social media can be beneficial, as it has been seen to strengthen users' in-person networks and help small businesses grow (Roeder, 2020). These differences regarding the usage of social media can be further analyzed by the Science and Technology studies (S&TS) concept, social construction of technology framework, also known as SCOT. When this concept is applied, specific outcomes can be examined. In terms of this paper, this concept will be looking at possible reasons of why different opinions towards social media exist. Social media is constantly consuming people's time and essentially dominating one's everyday life. Societal trends in fashion, technology, and political events are reflective of what social media presents to its users through the machine learning algorithms. Therefore, the overarching research question that will be analyzed in this paper is the examination of the sociotechnical relationship between human behavior and social media's depiction. Furthermore, human activity on social media presents a convoluted relationship because as the user becomes more engaged, more data is collected and in return causes a variety of effects on human behavior. Contrary to popular belief, the usage of social media has net benefits for its users as seen in published works. Yet this is often masked because there is a negative connotation to social media as seen in *The*

Social Dilemma. The movie, *The Social Dilemma*, depicts how social media platforms are purposely created to be addictive and highly engaging to specific social media sites, such as Instagram and Twitter. The movie also reveals how machine learning algorithms play a large contributing factor for this addiction-like feature and how it has a role in influencing users' behavior (Girish, 2020).

This paper will explore how social media's depiction is influenced by people in society using the framework, the social construction of technology (SCOT), which is derived from the field of science and technology studies (S&TS). The SCOT concept is related to the depiction of social media by demonstrating how social factors can influence the development of technology (*Social Construction of Technology | Encyclopedia.Com*, n.d.). Furthermore, the SCOT concept will be used to examine the depiction that is portrayed in the movie, *The Social Dilemma,* as well as in other scientific journals which point toward the benefits of social media. These two distinct perspectives indicate how social media has been portrayed in society and the future development of social media, such as the rising ethical concerns regarding its usage.

Challenges and the Social Construction of Technology

The enhancement of efficiency of machine learning algorithms is increasing due to the presence of high levels of human activity on social media platforms. With respect to analyzing the sociotechnical relationship, the social construction of technology concept (SCOT) can be applied to this as an example of human activity dictating technology. However, it is important to note exactly how these technologies are depicted by people.

The social construction of technology is the concept that a variety of social factors, such as human behavior, can shape the technological development of a certain kind of technology. This concept emphasizes that different groups of people can perceive objects differently (i.e.

usage of Twitter verses the usage of Facebook) (*Social Construction of Technology | Encyclopedia.Com*, n.d.). In other words, these different groups, such as technology go-getters and people who are not so enthused about the usage of technology, interpret objects or in this case social media differently. This concept can also help clarify the connections that are often associated with social media. As seen in the movie, *The Social Dilemma,* social media has a negative impact on one's health. This has been validated by the scientific publications and verbalized by experts who were included in this documentary. Besides these negative examples, it is important to see that there are also benefits of social media, such as helping connect to one another in society. This positive aspect of social media, which can also be found in the literature, is not hinted at or depicted in the movie at all. Similarly, the articles that emphasize the benefits of social media, fail to warn that if one is not careful, it is very easy to have their mental health negatively influenced. Lastly, these two presented perspectives exist among numerous other perspectives regarding the impact of social media. As mentioned by Pinch and Collins, social media's views have a huge gray area for individuals as technology is not perfect and is similar to how human perspectives have its shortcomings (Collins, & Pinch, 2014).

These contrasting views regarding the outcomes of social media are from select groups of individuals who present their thoughts and views to others in society. A recent study done depicts the differences in the type of outcome based on the user's need. They found that using social media as part of a routine was mostly associated with positive healthy outcomes while emotional usage for social media was associated with negative outcomes (Bekalu et al., 2019). These views tend to be from a narrow perspective and do not necessarily consider all of the factors that technology is capable of doing. That being said, people can shape the views of how others see technology by constraining them. This tends to limit how people can see technology's

outcome and can cause different impacts on people. People who are in different social groups can also have the ability to view technology's intended purpose(s) differently. Social media across countries can be seen for different purposes. For example, people in Australia have been noted for using social media to keep in touch with friends while people in Brazil use social media to figure out "how to do things" (*Social Media Usage Across Cultures*, 2011). These different views of technology reflect how people shape the way one uses technology.

There are criticisms about using the SCOT concept to analyze technical relationships and its relative purpose, especially in terms of using technology. Critics have indicated that this concept's intended purpose does not consider social structures when looking about how humans have shaped technology. In turn, social constructivists have coined the term technological frame to consider these immeasurable factors, such as demographics (Prell, 2009).

A Depiction of Social Media

Negative Psychological Impacts

The movie, *The Social Dilemma*, emphasizes the negative consequences that social media it has on its users, such as the 62% increase rate of United States Hospital Admissions for non-fatal self harm and suicide rates for teenage girls when Instagram first came out to the public. This data collected emphasizes that Generation Z was the first group of people to be surrounded by social media in their teenage years (Orlowski, J, 2020). The movie includes experts in a variety of fields who talk about the rise of mental illness rates and the negative effects it has on a user's confidence (Prendergast, 2020). The movie also demonstrates the psychological impact it can have on its user, especially with the role of dopamine and its relationship with social media usage. Dopamine is one of the two main chemicals in the brain which can be stimulated when using social media platforms. Dopamine, which is often referred to as the "pleasure" chemical in the brain, is stimulated at unpredictable levels when one uses social media. This is especially

prominent when one receives a sign of approval (*The Psychology of Social Media*, 2016). As expressed in the movie, when a user obtains validation from others, such as when one receives a "like", the level of dopamine increases. This search for more dopamine hits can lead to negative emotions and poor coping strategies if one feels lonely (Prendergast, 2020)**.** Specifically in *The Social Dilemma*, there was a scene when a young teenager put up a selfie and seemed upset when she only received two likes. She then deleted the post because she did not feel as if she got enough "approval" from others and went on to post a filtered photo of herself. Once she posted the filtered photo, she received many positive comments and appeared to be happier. However, then her emotions took a turn when she received a negative response regarding the size of her ears. For the remainder of the movie, the girl appeared to be hurt by the comment that was made and was very self conscious (Stevenson, 2020; Taylor, 2020) . The feelings approval on social media can be very short lived and this is not primarily due to the sudden release of dopamine. The emotional roller coaster social media can cause is unsettling.

Another chemical that is released at increased levels when one uses social media is oxytocin which is referred to as a generosity-trust chemical. Upregulation of this chemical can cause one to have abnormal feelings while staring at a screen. Studies have demonstrated that when one uses Twitter to "tweet", oxytocin levels can increase to 13.2% which is equivalent to a groom on his wedding day (Thurman, 2020). In fact, studies have shown that oxytocin and dopamine interact with one another to regulate one's close relationships which is also referred to as pair bonds (Love, 2014). Ensuring that these two chemicals are in a constant abundant state, can lead people to alter their behaviors in a way so that they are actually "addicted" to social media. Addiction to social media is not only acknowledged when the user is on a constant high

of these chemicals, but another factor as described in *The Social Dilemma*, is the uprising of machine learning algorithms.

Machine Learning Algorithms' Impact

Machine learning algorithms can help satisfy the natural instincts of human rewards which dopamine provides. Not only do these algorithms keep a user in a cycle, but the algorithms find more efficient ways to release the dopamine, oxytocin, and can achieve human satisfaction faster the more the user is on the designated social media platform. The objective of social media is to prioritize the user's feed by showing the content the user actually wants to see first. This is done by social media algorithms, which not only try to appeal to the user by collecting their data to predict their behavior, but also due to the fact that social media algorithms tend to prioritize paid advertisements first (Barnhart, 2019). By prioritizing what the user likes via advertisements, users spend more time on the designated social media platform. This can lead to a company reaching their target customers and in turn, most likely profiting from them. These machine learning algorithms also have the ability to create personalized messages that can target a group of people. This is commonly referred to as microtargeting. Microtargeting is a method which allows companies or even political campaigns to influence people within society. These machine learning algorithms are a controlling driving force influencing outcomes (Papakyriakopoulos et al., 2018). These algorithms are meant to cause its users to feel "addicted" to the designated social media platform, which can lead to a vicious cycle for a user. In fact, this is a rising ethical issue according to Vikram Bhargava and Manuel Velasquez who claim that big technology companies should not have this right (Bhargava & Velasquez, 2020). This rising concern questions if big technology companies should sacrifice their annual earnings in order to not generate such a personalized feed from their machine learning algorithms. Furthermore, this addiction can be seen from the perspective of a normative ethics approach which describes the

moral standards of society that regulate what is wrong and what is right (*Ethics | Internet Encyclopedia of Philosophy*, n.d.). Technology companies that are run by people do this in order to keep their businesses alive, however, these people should not have the power to control the behavior of its customers. In both situations, how people see social media can lead to a heavy influence on its future in terms of technological development.

The Addiction Cycle

As seen in casino slot machines, the suspense of seeing what one receives and the feeling of anticipation is regulated by a dopamine feedback pathway that casino owners often use to target customers (Haynes & Clements, 2018). This feedback pathway has been classified as part of the reward prediction errors which is embedded into one's own neuronal hardware (Haynes & Clements, 2018; Schultz, 2016). This pathway has been shown to be a trait that is beneficial to humans and other organisms (i.e. monkeys and rodents) that help one learn about obtaining rewards and retaining motivation to have these rewards (Schultz, 2016). The strategy that casino owners use can often lead to gambling addiction problems and is acknowledged by the use of variable reward schedules. Similarly in *The Social Dilemma*, the refreshing of one's social media feed, leads to a user experiencing a feeling of suspense. Refreshing their feed often, is an attempt to resolve their feeling of anticipation in order to see if anyone posted a picture or if one received likes on their own post (Orlowski, J, 2020). These variable reward schedules are also what machine learning algorithms try to create to keep the user on the social media platform for as long as possible. As seen in the movie, *The Social Dilemma*, Tim Kendall, the former executive at Facebook, mentioned how he could not even get off his phone while at home to see his two young children. He talked about the irony of how he was working for a technology firm yet falling prey to it because he was staying on these social media platforms at home and he could not even help himself (Orlowski, J, 2020).

The purpose of variable reward schedules is to reward the user at unexpected time intervals, so that the user feels constantly on edge while waiting for his or her reward. This is similar to how slot machines work in which they try to keep the user engaged for as long as possible (Haynes & Clements, 2018). When someone uses a slot machine, he or she does not know if or when the reward will come. One may be seeing others around them getting rewards so the user engages in another round and "thinks" that the reward could be coming soon. Similarly, machine learning algorithms on social media can withhold users "likes" so that one keeps checking and refreshing to see if more "likes" were received(Malone Kircher, 2018). This tactic allows the machine learning algorithms to promote constant checking for a user which can eventually lead into a user having a habit, which is social media's primary goal.

Consequences of Machine Learning Algorithms

As depicted in *The Social Dilemma*, machine learning algorithms can change human behavior by manipulating the content a user sees and has the ability to spread fake news (e.g. conspiracy theories) (Dabbour, 2020). A clear example is demonstrated in *The Social Dilemma* when it revealed live footage and users' posts from social media surrounding the Pizzagate conspiracy theory. This is a result of how the displayed misinformation created by these social media algorithms lead to a man being arrested outside a pizzeria in Washington, D.C. He had a gun and claimed that he wanted to "free the children" that were trapped in the basement of the pizzeria (Taylor, 2020) . When in fact, there were no children in the basement of the pizzeria, and it was fake news generated by the machine learning algorithms. This particular scene was shown in the movie using police footage which was actually the police trying to reassure the man that there were no children in the basement (Orlowski, J, 2020).

The Social Dilemma is not the only film that has documented the negative consequences of using social media and its respective machine learning algorithms. Several other movies

depict the negative connotations of the use of machine learning algorithms which has been shown to the public over the years, such as *Life 2.0*. This movie was produced in 2010 and is about how people have a second life in a virtual online world; users are able to alter their identities and ego through this platform which is similar to the usage of social media and how people can change their identities (*Life 2.0 (2010)*, 2010). The changing of one's identity can be assisted with the use of machine learning algorithms which can try to manipulate one's feed to make the user believe that there is a specific way one should be acting. Another film, *The Great Hack,* focuses on how the technology behind social media (i.e. social media algorithms) can influence societal trends such as the United States Presidential election of 2016 and the Brexit vote (Henderson, 2019). Specifically, this movie talks about the great rise and fall of Cambridge Analytica, a data analytic company in the United Kingdom that had a significant role in political events that occurred in the United States and Europe. This company was able to persuade people using man-made generated ads that they displayed on social media platforms (i.e. Facebook) (Henderson, 2019). The depiction of machine learning algorithms and social media has been noted to be negative in the eyes of some people in society which ultimately is how one can shape this type of technology. However, these publications and examples fail to acknowledge the benefits of social media and machine learning algorithms can have.

Another Perspective of Social Media

Scientific Journals

Scientific journals show that social media can also have a positive impact on one's life. In particular, social media can help its user reconnect with others to help improve a user's network (Roeder, 2020). Big technology companies such as Facebook, Instagram, and LinkedIn help people grow and expand their relationships. This in turn can help people digitally connect with others who have similar interests without worrying about the aspect of traveling. The current

depiction of promoting the usage of social media has often been referred to as addictive-like which does not consider how social media can increase a user's behavior in a way that can help their overall health (e.g. exercising). A more clear example of this, is that social media has been the platform to promote and recruit daily interactions that increase participation for dieting and exercising as seen in RedBrick Health (Centola Damon, 2013). Another study involving children between nine and ten years old, showed that exposure to social media and texting, resulted in fewer sleep problems and increased physical activity (Kiely Watson, 2018). Aside from this, another study indicated that social media provides a form of literacy that some school curriculums do not cover (Collin et al., 2011). Therefore, social media can have positive impacts on children's brains.

From a physiological perspective, social media alters human behaviors by interrupting Maslow's Hierarchy and the satisfying of human needs. Social media offers support, voyeurism, self-expression and a means to search for support which is similar to satisfying Maslow's hierarchy of needs (Riva et al., 2016). In other words, human needs in terms of motivation are provided by social media and offer alternatives to satisfying different levels of the Maslow's hierarchy of needs.

Satisfying Maslow's Hierarchy of Needs on Social Media

Looking more in-depth in regard to Maslow's hierarchy of needs, there are five main categories which are arranged in a pyramidal structure. Numerous studies have analyzed the relationship between levels three through five (love and belonging, self-esteem, and self-actualization, respectively) in relation to a user on social media. Love and belonging, the third level defined by Maslow with respect to social media has been seen as a way to keep connected with their friends and to update their statuses as a way to build their relations with others (Ghatak & Singh, 2019). As seen and hardly acknowledged by critics in *The Social Dilemma,* the young

teenage boy finds himself having a crush on a girl in his school. He quickly turns to social media to try to find out if he has any mutual friends with this girl to ultimately connect with her (Orlowski, J, 2020). This analysis could be part of the reason why people feel the need to constantly update their status on social media. They feel connected with their friends through this type of a platform and unknowingly are satisfying one of their own personal needs. The next level up is self-esteem which has been one of the main focuses of the many outcomes social media has. Specifically, it has been noted that college students express a direct relationship between using social networking sites and their own self-esteem (Chen & Lee, 2013; Ghatak & Singh, 2019). As seen in *The Great Hack*, political campaigns (i.e. Trump campaign) target groups of people who are neutral in elections through social media. This in turn helps political leaders sway and ultimately win elections, further boosting their own morale. Lastly, the highest level of self-actualization has been noted to play an intertwined role with social media. People who use social media frequently to engage and learn to help their own self-development have found a way to reach the highest level of the Maslow hierarchy of needs (Ghatak & Singh, 2019).

Having these alternatives, promotes the user to engage in an attempt to satisfy their specific motivational needs. Social media has also been seen as a great resource for people with mental illness, as they can connect with others who may also be struggling. This philanthropic behavior is beneficial to society as a whole ("The Good, Bad, and In-between of Social Media," 2019). A recent study surveyed young adults in ten countries who identified themselves with a mental illness; Eighty five percent of the total participants expressed interest in using social media platforms that would help their overall wellbeing and use mental health programs on social media (Naslund et al., 2019). This feature of social media has unfortunately been

neglected in the movie, *The Social Dilemma*. As it instead focuses on what other aspects social media can do to a user, yet fails to acknowledge the network of support social media has created.

Machine learning algorithms have also been seen to help small businesses grow their productivity. One small business was able to grow their number of enterprises by two hundred seventy percent over the past four years when they incorporated this type of technology (Countants, 2019). Small businesses can also benefit by the use of machine learning algorithms by gaining an understanding what their customers like and dislike. Big technology companies offer small businesses their machine learning algorithms to help display the small business ads to enhance sales (Countants, 2019). In return, these ads are displayed to people that would be best suited for their products based on the collected data that the machine learning algorithms have on a user.

Important Considerations

Socioeconomic and other demographics play an important role when trying to determine how social media should be depicted (Bekalu et al., 2019). A study demonstrated how social media can be seen in the eyes of people in society with varying backgrounds and beliefs. As seen in the movie, *The Social Dilemma,* the sole focus was aimed to show the negative effects it has on a user's emotions. However, it fails to suggest the benefits as well as how these impacts vary across a user's demographics. A study indicated that there are significant differences in the usage of Twitter that can be accounted for by one's race. For example, this same study demonstrated that cities in the United States where there are larger populations of black people who use "Blackhashtags" (i.e. #blacklivesmatter) would have a faster rate of tweeting about these hashtags than their White counterparts. Similarly, this study also showed that Twitter promotes many interactions between others who are collocated with one another (Murthy et al., 2016).

This in turn can produce stereotypes in certain cities (i.e. people on Twitter who indicate that Chicago is a ghetto-like city) because of the mobilization that Twitter has to offer (Murthy et al., 2016).

On the other hand and in a similar manner to how people portray social media in a negative way, the published works that indicate the benefits of social media, fail to acknowledge that there can be negative consequences based on a user's belief or cultural norm. These groups of people also do not mention how too much social media can actually have negative consequences (i.e. increased levels of anxiety) and should be used in moderation (*Social Media Addiction*, 2021). Moderation has been shown to be a way to balance the use of positive impacts social media can have on a user, but also fails to consider the immediate impacts social media has on its users, such as the immediate release of dopamine that can lead to an engaging feed.

Conclusion

People can view social media and its associated algorithms in many ways which can lead to a very diverse set of outcomes. It is important to use the concept of technological frame with the SCOT concept to understand the depictions different groups of people have regarding social media. The technological frame acknowledges the differences people have in terms of demographics and cultural beliefs. These factors are often not considered when looking at the range of perspectives regarding the way in which people see the functionality and purpose of social media. Social media's purpose and function vary in degree and outcome depending on the user. This needs to be considered when addressing societal implications. These differences are seen when one compares demographics from one region to another. These differences can be attributed to the cultural and societal norms of a specific area. The implications of not taking these factors into account may have the potential for people to not be respective of others

beliefs. This in turn could create conflict between individuals or even groups of people. Therefore, it is important to have an open mind and to try to understand factors which shape values and behavior regarding social media to reduce conflict and increase tolerance. People need to take a step back and examine that their reaction to and perspective of their environment, in terms of using social media, could be very different than their first-year college roommates.

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