

Digital Applications and Phones: Patterns of Desirability for Digital Device Usage

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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

People have been spending much more time on their devices since the boom of social media (YouTube, Instagram, TikTok, Twitter...). Relatively, digital applications and access to them constitute a very small and recent timespan within history. Given its proliferation, many scholars have sought answers for the impacts that it has on people (Cabre-Riera et al., 2019; O’Keeffe & Clarke-Pearson, 2011). Unfortunately, many have fallen into addiction to these technologies, and it is likely the most widespread addiction in the world (Walsh et al., 2008). The uncontrollable urge to use the applications has become a problem for many people, especially those who grew up with access to technology (Healy-Cullen et al., 2024; Kushlev, 2018; O’Keeffe & Clarke-Pearson, 2011). Why that happens can be explained in the context of recent neuroscience and cognitive research. What researchers have found is that certain cognitive paradigms explain motivation, drive, and (by extension) productivity among humans. These systems make up a significant part of how we interact with technology in general. Currently, we see this play out in how people interact with digital applications on their devices. An example of how difficult it is to control their consumption of media can be seen in a person who openly claims to have recovered from a digital pornography addiction. He discusses ordering school textbooks with his mother, saying: “The whole time that we are doing that, I am just shaking [...] I’ve known people who have been addicted to drugs before, and you can tell when they are not on it, they are just shaking” (Jak Piggott, 2024). In Jak’s life and many others, work, focus, productivity, and a sense of self-worth have been damaged through the poison of digital addictions in their minds. This results in an insatiable and constant desire to return to their phones/applications. Ultimately, among some digital technology addicts, natural processes of desirability have compromised their

autonomy and attentiveness. This is an unfair and problematic truth for many people in the world.

For the sake of the study, we can consider the roles and ethics of the engineers, government, psychologists/medical professionals, and content creators involved with digital technology. This problem can be framed under the sociotechnical framework of deontology. Deontology (/Kantian ethics) seeks to answer ethical issues by considering the duty and responsibility of the parties involved. It also seeks to define the uniqueness of human autonomy and seeks to place its protection upon a high order of dutifully respecting others (Johnson 2020). Using it, we find it essential that the designers and creators of digital content have humility and transparency in their work. Furthermore, it places them in a position of partial responsibility for the well-being and collective benefit of their users. When looking at these creators, the dichotomy between experienced benefits and harms that interactive users could experience should be central to future development. On the other hand, there is a level of more immediate responsibility that must be afforded to the users of digital applications. The users themselves have the highest agency over their will and intention and thus hold primary responsibility for their well-being. Furthermore, a lower-order (yet similar) responsibility lies on interest groups and the governing bodies of digital environments. These stakeholders, according to their positions of public trust and moral direction, are compelled to act in the best interest of the collective well-being of all people who use digital technology and thus should orchestrate a transition to better interaction with digital applications.

There are philosophical and psychological aspects of digital well-being that are unattended and actively damaged by certain uses of digital products. It should become a higher priority for technologies to be resilient to such damages. In the surveys of Burr and Floridi, when assessing

well-being under a psychological context, the subjectivity of well-being is emphasized, and fundamental themes for digital well-being are introduced: digital gratitude, automated interventions, and sustainable co-well-being. They also point out some factors across psychological work that should benefit because of good and virtuous technological design: competence, emotional stability, self-esteem, personal growth, purpose in life, and others. According to several surveys and interviews, many youth experience a lack of sleep, reduced self-esteem, obsession, and negative academic performance correlated with addiction / digital device usage (Hou et al., 2019; O’Keeffe & Clarke-Pearson, 2011; Demirci et al., 2015; Healy-Cullen et al., 2024). The observed prominence of such problems experienced by youth points towards a critical need for attention and urgency to attend to these struggles. Considering that, the contribution that each party can make to solve such issues.

Paths to Unproductivity, the Problems with Current Digital Content and Devices

People are vulnerable to returning to their phones because of cognitive desirability patterns, and digital devices should be designed considering the vulnerability that users may have. There are three main ways that users interact with content on digital devices, and it includes consumption, participation, and production (Khan, 2017). Each method of interaction with a device can be considered gratifying in some way, ultimately increasing levels of dopamine for the user. Reviews of social media use and gratification frameworks from Khan’s research for social media engagement find that interaction provides users with instantaneous gratification for their respective desires. People primarily come to these applications for entertainment, social satisfaction, and/or validation (Khan, 2017; Hou et al., 2019; Chen & Lin, 2018). As a result of the experience users have with these applications, people experience a rise in dopamine levels above baseline (Huberman, 2021), which sets up the future desirability of the activity

experienced. Knowing cognitive patterns, these experiences that people have with their digital technologies set the seeds for future pursuit and can spiral into a more intense addiction if it goes too far (Huberman, 2021; MaciT et al., 2018). In the words of Eliza Mik, an expert in the intersections of technology and law: “Entire websites can be customized to match the cognitive preferences of specific individuals, and that entire marketing strategies can be designed to target specific persons based on their idiosyncratic (and frequently hidden) desires and vulnerabilities” (Mik, 2017) For this reason, (taking into context the nature of future desirability), the design, and content of digital applications have high influence on the habits that people develop with their digital devices. Private organizations or content creator’s immediate obligations seem to be to provide the highest quality of service that they can, though they must acknowledge the ethical problem with the problematic usage of their products. Problematic use patterns are an example of how certain behaviors and interactions with digital technologies can compromise autonomy, time, and discernment through digital addictions. In this scenario, creators should seek to find a balance in how they can make their services available, but not too easy to obsess over and fall into patterns of constant desirability.

Digital devices have attention-grabbing artifacts which can be problematic when digital devices are seen or are available. “Portable and connected screens [...] provide a wide range of search tools, production and computation software, and entertainment and playful options that extend an individual’s sense of control not only over space and time but also across emotional and cognitive domains” (Khalili-Mahani et al., 2019). When interacting with digital devices, there is a constant bombardment of icons and notifications that draw attention. Professional computer scientists who have expertise in information visualization say that “Visual popout effects allow users to rapidly identify one item among a field of many candidates. Interface

designers can use a variety of popout visual stimuli to alert users to objects that need attention.” (Gutwin et al., 2017). The study emphasizes the importance of motion, the visual field, as well as luminance as primary factors for the popout of objects on a screen (Gutwin et al., 2017). The logos of distracting social media (e.g. YouTube, Instagram, TikTok) leverage luminance in their design, which helps make them stand out compared to more conservatively designed logos. There are multiple examples of these potentially attention-grabbing designs, including notifications (which are centrally located and move into the central frame). They say “view the most recent ...” or “<username> has posted ...” and because of their location and movement, have high levels of potency and popout according to such studies. Another example includes the onset of more video content in social media (Khan, 2017). Motion is more prominent in these applications. This quantity and the significance of popout across digital applications demonstrate how stimulative and attention-grabbing these designs could be for users. Bringing all this evidence together, we can acknowledge the breadth of ways that people can become overly attentive to their social media. In these ways, there is consistency across digital platforms on how that happens.

Digital applications don’t just have the power to disrupt intention and focus when they are in our eyeshot, they can impact our attention and autonomy when merely in our presence. Researchers have found competency in task completion can be modeled as a function of a phone’s power state and distance to the owner (Ward et al., 2017). In the studies, the results support that the presence of phones when attempting to perform tasks at hand is disruptive to the focus, and the capacity of the user to problem solve in the first place, even when removing the impact of notifications. Many applications are designed in a matter that is not self-aware of this. Cognitive science discussed earlier in this paper is indicative of how this is possible, and the

interpretation that is most sensible by it is that access to gratification is access to content on devices is so short and simple to obtain. Any implication that the mere presence of a phone impacts cognitive ability is highly problematic when considering the scale of use, and the access that people have to these systems. However, it's not a bad thing that we enjoy using our phones and devices (Khan, 2017). They do serve a good purpose, and there is nothing wrong with entertainment when the time is right. With the interests of its users at heart, the creators of applications that drive this phenomenon need to be aware of this and find solutions to make their products not invade the psychological state of the users when they are not using or desiring to use their products.

Deontological and Kantian ethics indicate the ethical problem with what I have described so far. In the words of Johnson, speaking about Kantian ethics: “[A] rational will must be regarded as autonomous, or free ... Moreover, it is the presence of this self-governing reason in each person that Kant thought offered decisive grounds for viewing each as possessed of equal worth and deserving of equal respect.” Considering this, people are brought into patterns of desirability, digital content/applications are designed with stimulating characteristics, and digital applications impact cognitive ability. Digital application developers, entertainers, and content creators oftentimes have financial incentives (because they are private organizations), providing some form of entertainment to generate advertisement revenue. This is a simple truth in economics, regarded as rational self-interest (*Self-Interest*, n.d.). Because of this, we sometimes observe the exploitation of cognitive processes against independent human autonomy to the ends of corporate financial growth. This is in stark contrast to ethical development practice, as it compromises the self-governance of the users of the software in favor of self-interest incentives. Moving forward, developers, entertainers, and content creators should work in a manner that

does not compromise human autonomy. Considering the consequences of some content forms that I have described, particularly video form content, steps towards the reduction of potentially addictive content are sensible for future practices to prevent cognitively harmful content.

The Roles of Users, the Need for Support

Drawing from work in neuroscience, we can consider a few things within the context of digital habits: dopamine, gratification-reward systems, and intermittent dopamine schedules. According to Huberman and Liu, in the research and expertise, these things can be defined as follows.

Dopamine is a finite-resource neurochemical that is attributed to pleasure, gratification, and motivation. Gratification-reward systems can be summarized as moderators of motivation and drive; these systems in the brain attribute desirability to activities that increase pleasure and gratification, thus moving us towards such activities in the pursuit of it. Intermittent dopamine schedules are patterns of intermittent dopamine release, which maximize the desirability of activities by providing repeat rewards, and by optimizing the release of finite amounts of dopamine. In the state of dopamine depletion when pursuing something (completing an assignment, or doing work), we are very intensely compelled by cognitive systems to pursue a higher dopamine state (Liu et al., 2021; Huberman, 2021). To satiate that drive, digital devices offer instant gratification in the form of highly stimulative, videographic, and socially involved activity (Huberman, 2021). The accessibility and enthralling nature of this makes it particularly more attractive than a task or job at hand and can completely strip away interest in tasks/work that could have been gratifying. Because of the induction of distractions in one's phone, attention to it becomes a perpetual motion machine, potentially spiraling into clinical addiction.

As the topic of problematic and distractive technology has been under consideration for the past few years, several solutions have been offered, such as minimalist phones, “dumb” phones,

grayscale, time limiters, and other solutions. But in many cases, they ultimately fail to release people from their digital addictions. The creators of these applications are developers who have some level of specialization in cognitive and psychological science. As expected, each of these solutions is effective in the time scales that they are analyzed in (Rahmillah et al., 2023; Holte et al., 2023; Fitz et al., 2019), typically within 2-3 weeks of study. However, there are some prominent limitations to these studies, because their purely quantitative measurement processes fail to acknowledge the underlying problem of reward-gratification systems. The solutions above are successful in the short term because they change the experience that users have with their devices. By doing this, they make the paths to unproductivity in the earlier section of this paper less accessible and less noticeable to the users. This is empirically effective for many people who use these products; however, other users are more deeply psychologically and cognitively dependent on the content that they find desirable. This, (in the field of cognitive science) can be a metric for addiction given its definition in that field: “The progressive narrowing of that which gives one pleasure” (Huberman, 2021). It’s clear then, that underneath distractive technology tools, people still have desirability for old habits and old content, indicating that the solution for people must lie deeper in. The Productivity apps provide barriers to using unproductive digital software that are very easy to overcome by someone familiar with them. Even the best blocking and productivity tools on the market are paid, only work on one device, have faults in the detection of unproductivity, and require multiple contingencies and outsider support to lock down a productivity device. This is comparable to other addiction recovery issues, where many fall back into addictions, despite their best efforts to escape (Holyfield, 2021).

If one attempts to change the quality of the experience (e.g. Grayscale, batching notifications), sometimes, their mind can easily adapt to the new norm and continue to indulge in

problematic usage regardless. In continuation of the previous statements, recovery from digital application addiction is not any simpler than overcoming a real addiction. Ultimately, failure to reach one's recovery goals using tools can fail over longer timescales. The solution to reducing problematic digital application usage (for all people) lies not only in blinding one to what they see but blinding themselves to the desire and the pursuit of its pleasure itself. So, sometimes, problems with using distractive technologies can be solved for those who have no strong cycle of future desirability which invades their regular headspace by using tools of the nature described above. For others, strategic medical support and firm intentionality are essential given the difficulty of overcoming patterns of future desirability as they become more familiar with their productivity tools. One study of social media addiction divulges that record-keeping, daily reflection, and self-awareness of one's social media addictions can result in decreased usage and improved self-esteem, sleep quality, and mental health (Hou et al., 2019). This indicates the importance of self-intentionality in the recovery process and shows how the self-awareness that results from intentionality can result in improvement. This acts as an affirmation of the cognitive science understanding, which finds that addictions may require anywhere from 30-90 days to recover from (*How Long Does Addiction Recovery Take?*, n.d.), far beyond the timeframe that the current solutions have been experimented on, and also acknowledges underlying cognitive recovery processes. The source of the relevant struggles (cognitive processes) that people experience from digital applications indicates a solution that rests in psychological recovery in a supportive, long-term setting, something that makers cannot provide, but can offer access and attention to. In the better interest of public mental health, taking responsibility over what they can to acknowledge the problems of application overuse, and to help make the recovery methods and needs of its users more apparent.

Conclusion

High-quality digital applications unfortunately are highly distractive in their nature. When analyzing the content of digital applications against the usage patterns of the product, it becomes clear that problematic phone usage looks different for different users. For many, they are stimulating, and attention-grabbing. The designs and content that exist within them make it so easy for users to fall into patterns of constant desirability to see their screens. These designs and content take multiple forms, including designs that have high popout, satisfying content, distractive artifacts across the screen, and AI-powered content feeding. For many, this results in a downfall in productivity. Problematic designs and forms of content in digital applications need to be understood, controlled and then managed in a way to reduce the potential potency they can have for addiction.

Because all this distraction and attention is baked into the underlying cognitive sciences of desirability, it's an oversimplification to say that designs should be rolled back to something that is less enticing in the ways that I have described. The underlying cognitive patterns and science of addiction imply that the problem is central to our minds and lies within the fundamentals of desire and pursuit. Problematic device usage has become highly problematic in youth and requires a concerted and intentional effort by designers, developers, and psychological medical professionals to help remedy the relationship that people have with their devices and applications. There are always ways around the barriers to what a person desires, so for someone to take control, one must obtain a firm intentionality. The problems with some proposed solutions can be discovered in higher timescales than those discussed above, in the order of 2-3 months. Knowing that these addictions are proliferating across the world and that they are sometimes difficult to escape, the problem must be faced with higher agency and urgency. This

obligation is a partial responsibility for app developers, requiring transparency about the dangers of extensive usage and indicating the importance of seeking recovery, as well as providing solutions for those who would like to limit their usage. Taking that into account as a part of the solution, it is important to bring into action those with the most power and ability to promote a change. In the case of more severe addictions, (because the sources of such patterns of cognitive desirability lie within the end-users and their relational support groups) the target of effort to eliminate addictions to devices lies in self-intentionality and self-reflection in a supportive self-help setting.

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