



# Positive technology

Designing work environments for digital well-being

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# Introduction

“A wealth of information creates a poverty of attention.”—Herbert Simon<sup>1</sup>

THE transformative impact of technology on the modern workplace is plain to see. Face-to-face meetings have often given way to video conferences, mailrooms to email inboxes, and typewriters and carbon paper to word processors. Technology has also allowed a substantial portion of work—and the workforce—to move beyond the confines of a traditional office.<sup>2</sup> It is common for digitally connected professionals to perform some of their work in cafés or shops, at home, even lying by the pool while on “vacation.”

This technological revolution brings with it many obvious benefits. Colleagues can easily communicate across geographies, simultaneously reducing expenses, environmental damage, and bodily wear-and-tear. Open source software, search engines, and online shopping services enable us to summon in a few clicks the tools and information we need to be productive. Online maps, global positioning systems, and real-time translation services help us navigate unfamiliar places and communicate with locals.

But there are downsides to our technology-infused lives. Of particular concern are the engaging—

some fear addictive<sup>3</sup>—aspects of digital technologies, which can sap us of truly finite resources: our time and attention. While companies may benefit from tech-enabled increased productivity in the short term, the blurring of the line between work and life follows a law of diminishing returns. As recent Deloitte research suggests, the value derived from the always-on employee can be undermined by such negative factors as increased cognitive load and diminished employee performance and well-being.<sup>4</sup>

In short, digital and mobile technologies give—but they also take away. It falls on talent and technology leaders to weigh the efficiencies enabled by always-connected employees against increased demands on scarce time and attention, and longer-term harm to worker productivity, performance, and well-being. Getting the most from technology *and* people isn’t about simply demanding restraint. It’s about designing digital technologies that facilitate the cultivation of healthy habits of technology use, not addictive behavior. And it’s possible for leaders of organizations to play an active role in designing workplaces that encourage the adoption of healthy technology habits.

# The perils of workplace digital technology

**W**ORKING long, stressful days was once regarded as a characteristic of the proletariat life. Yet today, being “always on” is instead often emblematic of high social status.<sup>5</sup> Technology may have physically freed us from our desks, but it has also eliminated natural breaks which would ordinarily take place during the workday. And recent research suggests that this effect is not restricted to the workday. According to the American Psychological Association, 53 percent of Americans work over the weekend, 52 percent work outside designated work hours, and 54 percent work even when sick.<sup>6</sup> Flextime, typically viewed as a benefit of technology providing greater freedom, actually leads to more work hours.<sup>7</sup> Without tangible interventions, there’s little reason to think this behavior will change anytime soon.

These environmental factors and cultural norms are increasingly compounded by technological design elements—some intentional, others not—that

make technology use compulsive and habit-forming, taking on the characteristics of an addiction.

In his recent book, *Irresistible*, New York University marketing and psychology professor Adam Alter identifies a variety of factors that can contribute to digital addiction.<sup>8</sup> In the context of the workplace, many of these factors—summarized in the following section—can enable employee technology addiction.

## Metrification and alerts

Digital technologies can quantify previously unquantifiable aspects of our lives, yielding fresh insight into how we spend our time. On a personal level, we can track our steps and count our likes, friends, and followers. At work, we are greeted each morning with dozens of unopened emails and reminders of sequences of meetings. During the day,

### UNINTENTIONAL VS. INTENTIONAL DESIGN

It often seems that for technology designers, the main objective has been to maximize productivity and profitability, forgoing all other concerns.<sup>9</sup> Yet ignoring the end user’s well-being means these products have become devoid of features to help mitigate the negative outcomes of technology. This has resulted in products being designed to capture some of the scarcest commodities we have: our time and attention.

Some of these design decisions occur unintentionally, a byproduct of an endless pursuit to create the most efficient product. Other designs are products of designers creating features to maximize the likelihood that employees will become hooked. Both unintentional and intentional design can result in a similar outcome: addicted users.

Fortunately, both can be overcome when more attention is paid to the problem, and interventions—both technological and environmental—are put in place. Even more heartening is our belief that as users become more educated and more accustomed to being less beholden to technology, they will willingly employ these countermeasures themselves to promote better usage and well-being.

workers are interrupted by continual streams of emails, texts, and instant messages.

Certainly, many such messages and notifications are necessary and helpful. But many others do little more than distract us from important tasks at hand, undermining productivity rather than enhancing it. In a widely cited study, cognitive scientist Gloria Mark and her colleagues state that people compensate for interruptions by working faster, but this comes at a two-fold price: The individual experiences more stress, frustration, and time pressure and effort.<sup>10</sup> Concurrently, the organization often experiences not only decreased employee performance,<sup>11</sup> but also, as elaborated in the next section, less optimal business decisions due to the lack of adequate time to sufficiently weigh pros and cons and consider and evaluate viable alternatives.

Specifically, constant streams of messages, prioritized in terms of importance can create *cognitive scarcity*, resulting in a deterioration of the individual's ability to adequately process information.<sup>12</sup> Recent research has found that conditions of scarcity impose a kind of “cognitive tax” on individuals. For example, an experiment that involved focusing low-income persons' attention on a scenario in which they urgently needed to raise several thousand dollars resulted in the equivalent of a 13-point drop in IQ. (This is similar to the drop in IQ someone would experience after going a night without sleep.) Surprisingly, this phenomenon has similar effects on overloaded individuals who are scarce on a different dimension: time. This raises the concern that digital firehoses of poorly-filtered information can hamper our ability to pay attention, make good decisions, and stick to plans. And when we try to compensate for interruptions by working faster, we only get more frustrated and stressed.<sup>13</sup>

Another cognitive effect of too many alerts and too much unfiltered information is *choice overload*. Individuals experiencing choice overload often find it difficult to make decisions unless clear environmental cues or default options are established to help guide—nudge—their decision-making.<sup>14</sup> Such cues and defaults are examples of what the authors of the 2008 book, *Nudge*, call *choice architecture*.<sup>15</sup>

Absent smart choice architecture, workers often come up with their own rules for prioritizing options and tasks. Such improvised heuristics can vary over time and across individuals, and be inconsistent with roles and performance goals.<sup>16</sup>

## Zero cost for inclusion

Virtual meetings offer organizations many advantages, such as cost savings, knowledge transfer, and team culture-building.<sup>17</sup> And employees can benefit from less travel and more telecommuting opportunities. But the very ease with which people can be invited to and accept these meetings (especially many days in advance, when calendars are typically more open) can translate into a disadvantage. Meeting organizers often choose to err on the side of inclusion, minimizing the risk of leaving someone out; and the average worker often chooses to attend it for fear of missing out on something important. The all-too-common net result is a day packed with back-to-back meetings, during which much is said, less retained, and even less achieved. This results in either less time to complete actual tasks at hand, or multitasking, which can diminish the quality of the meetings and the overall engagement.

## Bottomless bowls

Technology design that removes natural stopping points keeps the user in a state of productive inertia.<sup>18</sup> This mind-set often plays a productive role in our work life, enabling us to get into the groove and accomplishing task after task without the inefficacy of acting to continue. Although, when we immerse ourselves in an inconsequential task, there can also be unproductive flows. Who hasn't lost hours reading low-priority emails simply because they appear one after another? This is perhaps a workplace analog of the “bottomless design” implemented in social media feeds and online entertainment platforms to capture viewers' attention. The natural default is to continue, not to stop.<sup>19</sup>

## Smart screens and slot machines

Who can resist checking a buzzing mobile device? It could be an email congratulating a promotion or a team message about a testing success. Or it could be spam. Yet we're compelled to check, and technology designers know that—which is why, drawing from the work of psychologist B. F. Skinner, they know altering the timing between rewards for particular tasks is highly effective—and often addictive. This variability of rewards, which Skinner called the “variable-ratio schedule,”<sup>20</sup> has been put to ample use in technology design, embodied particularly in the swipe-down-to-refresh design of many mobile applications. In this sense, our devices are metaphorical slot machines, incentivizing us to continue coming back for the big payoff.<sup>21</sup> To capitalize on this addictive quality of the element of surprise, many popular social media sites have changed their algorithms to no longer show feeds in chronological order. Instead, each refresh presents a new curation of a tailored feed—incorporating both old and new—with no apparent rhyme or reason for the new ordering.<sup>22</sup>

Unhealthy use of workplace technology can do more than compromise productivity—it can impair workers' physical and mental well-being. A few examples establish the point.

**Poor sleep:** Addiction to technology and the always-on work culture are contributing to a societal dearth of sleep.<sup>23</sup> The wakefulness that accompanies engaging in work means we're less tired during the

day, while exposure to blue screen light emitted by mobile devices simultaneously reduces the melatonin required for good sleep. This self-reinforcing loop makes the seven- to nine-hour sleep cycle, considered necessary to avoid a catalogue of negative health outcomes, more difficult to maintain.<sup>24</sup>

**Physical disconnection:** Technology is having an even more profound negative effect on social well-being. While it can enable us to engage in relationships across distances and time zones, this sometimes comes at the expense of good old-fashioned face-to-face relationships.<sup>25</sup> With devices always demanding our attention, family and friends are often neglected—altering our entire social structure.<sup>26</sup> And our connection to social media too can become strong enough to mimic the rewarding sensation caused by cocaine.<sup>27</sup>

**Anxiety and depression:** Information overload is not only distracting, but potentially *mentally damaging*. We live with a finite amount of time and a limitless well of information and choices, often resulting in a phenomenon called FOMO—fear of missing out. With phones and computers constantly alerting us of all the opportunities available, becoming double-booked is not infrequent and can lead to anxiety when the user needs to skip one meeting in favor of another. Viewing others' social profiles can also affect our mood.<sup>28</sup> We see sites filled with users only emphasizing the positives,<sup>29</sup> showcasing glamorous vacation and social photos, or news of promotions and other triumphs. Perhaps it's no wonder we can begin to question whether our lives pale by comparison.

# What employers can do

**S**KEPTICS of technology addiction often respond: “Just put the phone down.” Yet willpower is not enough. Technology is designed to psychologically stimulate the reward centers of our brain to keep us coming back for more, mimicking the effects of a physical drug addiction.<sup>30</sup> Rectifying this will ultimately require that developers and technologists adopt the human-centered approach of designing technologies and work environments that help users overcome—rather than be overcome by—natural human limitations.<sup>31</sup>

Fortunately, the growing ubiquity of digital technology is matched by the growing prominence of the cognitive and behavioral sciences, accompanied by a burgeoning collection of practical tools for prompting healthy behavior change. Especially significant is the emergence of the field of *behavioral science* or when applied, behavioral “nudges.” This

core insight finds that relatively modest evidence-based environmental tweaks can lead to outsized changes in behaviors and positive outcomes.<sup>32</sup> (See the sidebar, “Behavioral science and design application ethics.”) Take one example: placing less nutritious foods in a cafeteria out of direct sight or easy reach. Doing so doesn’t eliminate any options; individuals are still free to choose whatever they want. But the thoughtful placement prompts more nutritious choices and less “mindless eating.”<sup>33</sup> Analogous sorts of behavioral design can be applied to our technology-mediated work environments when employers choose both *better technologies* that have been designed with user well-being in mind, and *better workplace environments*, social norms, and expectations to positively influence how we use our devices.

## BEHAVIORAL SCIENCE AND DESIGN APPLICATION ETHICS

Behavioral science can be applied to nudge people to act in ways that are either consistent or inconsistent with their long-term best interests. Therefore, organizations considering nudge strategies should think through the ethical dimension of applied behavioral science. The choice architecture pioneers Richard Thaler and Cass Sunstein use the term “libertarian paternalism” to characterize the field. Ethical choice architecture is “libertarian” in the sense that it maintains freedom of choice, and at the same time “paternalistic” in the sense that it makes it easier for individuals to act in ways that are consistent with their long-term goals. Thaler comments that whenever he autographs a copy of *Nudge*, he writes “Nudge for good.”<sup>34</sup>



# Better technology

## Track, analyze, and change usage patterns

All of us are now effectively part of the Internet of Things: We leave behind “digital breadcrumbs” as we go about our digitally mediated lives.<sup>35</sup> In particular, this happens on the job: Email and calendar metadata are a rich, largely untapped data source, and it is now technologically feasible to collect “affective computing” data from cheap electronic devices that capture data about tone of voice, facial expression, and even how much we sweat during states of stress or excitement.

It is obviously crucial to avoid using such data in invasive, “big brother” ways.<sup>36</sup> Still, it is worthwhile to consider using such data to help individuals better understand and regulate their use of technology.<sup>37</sup> For instance, smart meters can display individuals’ application usage patterns, highlighting areas of concern. There is already software which is available to monitor application usage and time spent on various websites; at the enterprise level, other solutions exist that can track the time that an employee spends on each application, creating reports that include comparisons to other employees. Such comparison metrics can help workers truly understand how their efforts compare to those of their colleagues, and, when delivered with the appropriately framed message, convey messages about work-hour social norms in an effort to guide decisions and also discourage “always on behavior.” Such data could also be used to tailor peer comparison messages designed to nudge healthier technology use. Such social proof-based messaging has proven effective in applications ranging from curbing energy use to prompting more timely tax payments.<sup>38</sup> For instance, an employee working more than 50 hours a week could be sent a notification informing her that she has been working more than her coworkers, who average around 45 hours of work a week. This nudge could be enough to break her free from

the perceived social norm that everyone works a 60-hour week or prompt her to begin a workload conversation with her manager.<sup>39</sup>

## Use AI to promote healthier behavior

Artificial intelligence (AI) can also help us better mediate our interaction with technology, performing tedious “spadework,” to free us to focus on higher-level tasks. In particular, AI can be harnessed to help us manage our digital work environments. For example, some email systems now use AI to sort emails into categories, making urgent emails easier to locate and only pushing primary emails to a user’s phone.<sup>40</sup> Google has also worked with behavioral economist Dan Ariely to build AI into its calendar application, which can automatically schedule “appointments” for performing tasks that are important but tend to get crowded out by concrete tasks that are urgent in the short term. “Email shows up and says, ‘Answer me,’” Ariely says. Unfortunately, time for thinking does not do that.<sup>41</sup>

At the next level, emerging examples include a chatbot that can help cut down technology-related negative behaviors. For instance, its software features a smart filter that can prevent certain applications, such as a social media feed, from refreshing.<sup>42</sup> It is possible that AI products can be designed to ameliorate other forms of stress and anxiety on the job. Another AI-enabled chatbot, designed by a team of Stanford University psychologists and computer scientists, can perform Cognitive Behavioral Therapy (CBT). CBT is often employed as an intervention technique to help individuals identify the factors driving negative thoughts and behaviors and subsequently identify and encourage positive alternative behaviors.<sup>43</sup> This technique was covered in recent Deloitte research,<sup>44</sup> and has been found to be a solid intervention for improving emotional well-being.<sup>45</sup>

## Encourage productive flows

Employers can build into their email and internal systems mechanisms that incorporate stopping points into applications, nudging users to decide whether to continue an activity. Reminders have proven to be an effective nudge strategy in various contexts.<sup>46</sup> Drawing from the consumer realm, some developers have begun to incorporate new nudging features. When a customer begins to excessively use another commonly scarce resource, data, many phones will notify the user that they are about to exceed their data limit. These alerts can nudge a user to break free from the flow of data usage and reassess their continued use. Transferring this concept to the work environment could, for instance, take the form of employers nudging employees to disconnect from emails while on vacation or outside of work hours.

Technology can likewise be used to maintain positive states of flow, and also as a commitment device to nudge us toward better behaviors.<sup>47</sup> For example, the “Flowlight” is a kind of “traffic light” designed to signal to coworkers that a knowledge worker is currently “in the zone,” and should not be disturbed. The Flowlight is based on keyboard and mouse usage as well as the user’s instant message status.<sup>48</sup> Likewise, Thrive Global has a new app that, when you put it in “thrive” mode, responds to senders that you are thriving and will reply later.<sup>49</sup>

## Better environments

The aforementioned ideas exemplify various forms of human-centered design applied to workplace *technologies*. However, as also alluded to,

human-centered design can also be applied to work *environments*. Indeed, nudging can be viewed as human-centered design applied to choice environments.<sup>50</sup> Providing information and establishing policies, restrictions, and guidelines are “classical economics”-inspired levers for effecting behavioral change. Smart defaults, commitment devices, social norms, and peer comparisons are examples of “soft touch” choice architecture tools that can be employed to design work environments that are conducive to more productive uses of technology (see figure 1).

## Technology and social pressure

Employer policies and cultural norms can mitigate the always-on culture. For example, both policies and organizational cultures can be tuned to discourage employees from communicating with each other via email outside of work hours. This can be complemented with technological default mechanisms that make it logistically harder or impossible to send emails or set up meetings during off hours.

A less heavy-handed but potentially equally powerful persuasive technique is subtly employing the power of peer pressure via *social proof*. Social proof is premised on the social psychology finding that individuals often use the behavior of others to guide their own actions.<sup>51</sup> Social proof has proven effective in a variety of settings ranging from encouraging people to reuse their hotel towels<sup>52</sup> to getting them to pay their taxes on time.<sup>53</sup> With this in mind, companies could inform employees that sending emails to colleagues during off hours is not the norm and not encouraged. Going one step

**Figure 1. Potential environmental nudge strategies to help break technology addiction**

Nudge strategy	How it works
<b>Reminders</b>	Design technology-enabled reminders to break ongoing continuous activity on digital tools such as email and social media.
<b>Social proof</b>	Communicate social norms regarding email and work habits during off-work hours—for example, that the majority of workers and leaders do not check email during certain times.
<b>Commitment devices</b>	Encourage employees to take a “digital detox” or work-life balance pledge, committing to limiting their email use outside of work hours.

further, one leading multinational auto corporation uses a hybrid of technology-enabled processes and cultural norms, allowing employees the option of automatically deleting *all* emails received during vacation, notifying the sender that the message was not received.<sup>54</sup> If this seems too radical, another option is offering a day-long vacation extension, allowing employees who have been off for multiple successive days to ease back into work by catching up on email and other non-collaborative tasks. Another simple bit of choice architecture can lighten the load of numerous back-to-back meetings: Setting the default meeting durations to 25 minutes rather than 30 automatically builds in rest periods.

## Commitment devices and social support

Research shows that if someone publicly commits to specific steps to achieve a goal, they are more likely to follow through.<sup>55</sup> Commitment devices such as pledges are premised on this finding. For example, Johns Hopkins University has created a well-being pledge for its employees. Interested workers are offered a plethora of opportunities and strategies to help increase work-life fit over the course of 30 or 90 days. Once they sign up, they be-

gin to make life changes with the support of their employer. So far, the organization has found this approach successful.<sup>56</sup> In addition to the automatic-reply devices we mentioned earlier, another activity that could incorporate a pre-commitment pledge is a “digital detox,” something Deloitte itself employs. This is a seven-day program that involves making small technology-related changes each day.

Regardless of the specific policy or choice architecture intervention, the overarching aim is to rewire the workplace in ways that improve the employee-technology relationship. To be successful, there must be a push from the top down: It is one thing to create a new policy, but quite another for an organization’s leaders to openly display their commitment to it, and communicate its resulting benefits.

## A matter of habit

Improving our relationship with technology—both on the job and off—is less a matter of continual exercise of willpower than designing digital technologies and environments to reflect the realities of human psychology. Poorly (or perversely) designed technologies can hijack our attention and lead to technology addiction. But design can also facilitate

### DIGITAL DETOX: ACTIONS CONSUMERS CAN TAKE (AND EMPLOYERS CAN ENCOURAGE)

In need of a digital detox? Here’s a sample approach:

**Monday:** Unsubscribe from all unwanted emails; unfollow anyone you don’t know on social media. If you are feeling really ambitious, put your phone on grayscale to reduce its distracting attractiveness.

**Tuesday:** Move any mobile apps that you have not used in the past month into a folder to cut down clutter; turn off push notifications on social media.

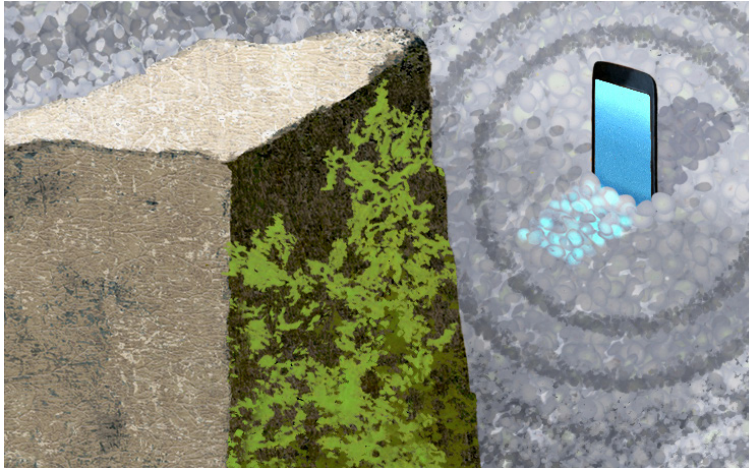
**Wednesday:** Charge your device *outside* of your bedroom. Buy an alarm clock to replace your phone clock.

**Thursday:** Don’t look at your phone until you arrive at work. When you sit down for dinner, shut off your phone.

**Friday:** Eat all your meals in a room without a TV, phone, or computer for the day.

**Saturday:** Stay off social media for the entire day.

**Sunday:** Turn your phone off for eight consecutive hours (while you’re awake!). Take your smartwatch off your wrist.



the cultivation of healthy habits of technology use. Many of our automatic, repeated behaviors are cued by environmental factors.<sup>57</sup> People who successfully cultivate positive habits do so less through contin-

ual exercises of willpower than by taking the time to redesign their environments in ways that make positive behaviors more effortless and automatic.

Metaphorically, it pays to reimagine and reshape our environments in ways that make healthy habits a downhill rather than an uphill climb. In the workplace, individual employees can play a role in cocreating positive technological environments. But, ultimately, leaders of organizations should play an active role in spearheading

such design efforts and taking an evidence-based approach to learning what works, and continually improving on it.

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