Pew Research Center

EXPANDED VERSION – This PDF includes the April 17, 2018 report on Well-Being AND a separate report released July 3, 2018 that covers these respondents' sharing of personal anecdotes about digital life

The Future of Well-Being in a Tech-Saturated World

A plurality of experts say digital life will continue to expand people's boundaries and opportunities in the coming decade and that the world to come will produce more help than harm in people's lives. Still, nearly a third say they expect digital life will be mostly harmful to people's health, mental fitness and happiness. Most say there are solutions.

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The Future of Well-Being in a Tech-Saturated World

A plurality of experts say digital life will continue to expand people's boundaries and opportunities in the coming decade and produce more help than harm in people's lives. Still, nearly a third think it will be mostly harmful to health, mental fitness and happiness. Most say there are solutions.

When the Pew Research Center asks American internet users for their bottom-line judgment about the role of digital technology in their own lives, the vast majority feel it is a good thing. Yet, over the past 18 months a drumbeat of concerns about the personal and societal impact of the internet has been growing – and it crescendoed April 10 and 11, 2018, in the grilling of Facebook CEO Mark Zuckerberg in Congressional hearings about his company's power and impact on American life. More broadly, the concerns are highlighted by headlines about the "Heavy Toll of 'Always On' Technology," the emergence of a "Techlash" driven by people's disillusionment with the online environment and worries over digital dystopia. Additionally, increasing commentary and research about the effects that people's uses of digital technologies have on their own well-being has been focusing on their level of stress, their likelihood of committing suicide, their ability to perform well at work and in social settings, their capability to focus their attention in an era of information overload, their capacity to modulate their level of connectivity and their general happiness.

In light of these mounting concerns, Pew Research Center and Elon University's Imagining the Internet Center queried technology experts, scholars and health specialists on this question: ***Over the next decade, how will changes in digital life impact people's overall well-being physically and mentally?***

Some 1,150 experts responded in this non-scientific canvassing. Some **47%** of these respondents predict that individuals' well-being will be *more helped than harmed* by digital life in the next decade, while **32%** say people's well-being will be more *harmed than helped*; and **21%** predict there will *not be much change in people's well-being* from the way it is now. (See the section titled "About this Canvassing of Experts" for further details about this sampling.)

Many of those who argue that human well-being will be harmed also acknowledge that digital tools will continue to enhance various aspects of life. They also note there is no turning back. At the same time, hundreds of them suggested interventions in the coming years they feel could mitigate the problems and emphasize the benefits. Moreover, many of the hopeful respondents also agree that some harms will arise in the future, especially to those who are vulnerable. Participants were asked to explain their answers, and most wrote detailed elaborations that provide insights about hopeful and concerning trends. They were allowed to respond anonymously and many did so; their written comments are also included in this report. Three types of themes emerged: those tied to perceived helpfulness to well-being; those tied to potential harms; and those tied to remedies these experts proposed to mitigate foreseeable problems. The themes are outlined in the nearby table.

Themes About the Future of Well-Being and Digital Life

MORE HELPED THAN HARMED	**Connection**	Digital life links people to people, knowledge, education and entertainment anywhere globally at any time in a nearly frictionless manner.
	Commerce, Government and Society	Digital life revolutionizes civic, business, consumer and personal logistics, opening up a world of opportunity and options.
	Crucial Intelligence	Digital life is essential to tapping into an ever-widening array of health, safety, and science resources, tools and services in real time.
	Contentment	Digital life empowers people to improve, advance or reinvent their lives, allowing them to self-actualize, meet soulmates and make a difference.
	Continuation Toward Quality	Emerging tools will continue to expand the quality and focus of digital life; the big-picture results will continue to be a plus overall for humanity.
MORE HARMED THAN HELPED	**Digital Deficits**	People's cognitive capabilities will be challenged in multiple ways, including their capacity for analytical thinking, memory, focus, creativity and mental resilience.
	Digital Addiction	Internet businesses are organized around dopamine-dosing tools designed to hook the public.
	Digital Distrust/ Divisiveness	Personal agency will be reduced and emotions such as shock, fear, indignation and outrage will be further weaponized online, driving divisions and doubts.
	Digital Duress	Information overload + declines in trust and face-to-face skills + poor interface design = rises in stress, anxiety, depression, inactivity and sleeplessness.
	Digital Dangers	The structure of the internet and pace of digital change invite ever-evolving threats to human interaction, security, democracy, jobs, privacy and more.
POTENTIAL REMEDIES	**Reimagine Systems**	Societies can revise both tech arrangements and the structure of human institutions, – including their composition, design, goals and processes.
	Reinvent Tech	Things can change by reconfiguring hardware and software to improve their human-centered performance and by exploiting tools like artificial intelligence (AI), virtual reality (VR), augmented reality (AR) and mixed reality (MR).
	Regulate	Governments and/or industries should create reforms through agreement on standards, guidelines, codes of conduct, and passage of laws and rules.
	Redesign Media Literacy	Formally educate people of all ages about the impacts of digital life on well-being and the way tech systems function, as well as encourage appropriate, healthy uses.
	Recalibrate Expectations	Human-technology coevolution comes at a price; digital life in the 2000s is no different. People must gradually evolve and adjust to these changes.
	Fated to Fail	A share of respondents say all this may help somewhat, but – mostly due to human nature – it is unlikely that these responses will be effective enough.

PEW RESEARCH CENTER and ELON UNIVERSITY'S IMAGINING THE INTERNET CENTER, 2018

These findings do not represent all the points of view that are possible to a question like this, but they do reveal a wide range of valuable observations based on current trends. Here are some representative quotes from these experts on each of these themes:

The Benefits of Digital Life

Connection: **Daniel Weitzner**, principle research scientist, MIT Internet Policy Research Initiative, explained, "Human beings want and need connection, and the internet is the ultimate connection machine. Whether on questions of politics, community affairs, science, education, romance or economic life, the internet does connect people with meaningful and rewarding information and relationships… I have to feel confident that we can continue to gain fulfillment from these human connections."

Commerce, government and society: **Pete Cranston**, a Europe-based trainer and consultant on digital technology and software applications, wrote, "There's a top-1%, first-world response, which is to bemoan the impact of hyperconnectedness on things like social interaction, attention-span, trolling and fake news – all of which are real but, like complaining about the marzipan being too thick on the Christmas cake, are problems that come with plenty and surplus. There's a rest-of-the-world response which focuses more on the massive benefits to life from access to finance, to online shopping, to limitless, free research opportunities, to keeping in touch with loved ones in far-away places (and think migrant workers rather than gap-year youth)."

Crucial Intelligence: **Micah Altman**, head scientist for the program for information science at MIT, said, "Most of the gains in human well-being (economic, health, longevity, life-satisfaction and a range of choices) over the last century and a half have come from advances in technology that are the long-term results of scientific advances. However, these gains have not been distributed equitably, even in democracies. Many advances from the fields of computer science, information science, statistics and computational social science are just beginning to be realized in *today's* technology – and there remains a huge potential for long-term improvement. Further, since information is a non-consumptive good, it lends itself to broad and potentially more equitable distribution. For example, the relatively recent trends towards openness in scientific publication, scientific data and educational resources are likely to make people across the world better off – in the short term, by expanding individual's access to a broad set of useful information; in the medium term, by decreasing barriers to education (especially higher-ed); and in the long term by enhancing scientific progress."

Contentment: **Stephen Downes**, a senior research officer at the National Research Council Canada, commented, "The internet will help rather than harm people's well-being because it

breaks down barriers and supports them in their ambitions and objectives. We see a lot of disruption today caused by this feature, as individuals and companies act out a number of their less desirable ambitions and objectives. Racism, intolerance, greed and criminality have always lurked beneath the surface, and it is no surprise to see them surface. But the vast majority of human ambitions and objectives are far more noble: people desire to educate themselves, people desire to communicate with others, people desire to share their experiences, people desire to create networks of enterprise, commerce and culture. All these are supported by digital technologies, and while they may not be as visible and disruptive as the less-desirable objectives, they are just as real and far more massive."

Continuation Toward Quality: **Paul Jones**, professor of information science at the University of North Carolina-Chapel Hill, proposes that future AI will do well at enhancing human well-being, writing, "Humans need tools. Humans need and want augmentation. And as the saying goes 'First we make our tools, then our tools form us.' Since the first protohuman, this has been true. But soon our tools will want, demand and create tools for their own use. The alienation of the industrial age has already given up the center stage to the twisted social psychology of the service industry. Next, will our tool-created overlords be more gentle and kind than the textile factory, the sewing room or the call center? I believe they will be."

Concerns Over Harms

Digital deficits: **Nicholas Carr**, well-known author of numerous books and articles on technology and culture, wrote, "We now have a substantial body of empirical and experiential evidence on the personal effects of the internet, social media and smartphones. The news is not good. While there are certainly people who benefit from connectedness – those who have suffered social or physical isolation in the past, for instance – the evidence makes clear that, in general, the kind of constant, intrusive connectedness that now characterizes people's lives has harmful cognitive and emotional consequences. Among other things, the research reveals a strong association, and likely a causal one, between heavy phone and internet use and losses of analytical and problem-solving skill, memory formation, contextual thinking, conversational depth and empathy as well as increases in anxiety."

Digital addiction: **David S.H. Rosenthal**, retired chief scientist of the LOCKSS Program at Stanford University, said, "The digital economy is based upon competition to consume humans' attention. This competition has existed for a long time (see Tim Wu's 'The Attention Merchants'), but the current generation of tools for consuming attention is far more effective than previous generations. Economies of scale and network effects have placed control of these tools in a very small number of exceptionally powerful companies. These companies are driven by the need to consume more and more of the available attention to maximize profit. This is already having

malign effects on society (see the 2016 presidential election). Even if these companies wanted to empower less-malign effects, they have no idea how to, and doing so would certainly impair their bottom line. Thus these companies will consume more and more of the available attention by delivering whatever they can find to grab and hold attention. The most effective way to do this is to create fear in the reader, driving the trust level in society down (see Robert Putnam's 'Making Democracy Work' for the ills of a low-trust society)."

Digital Distrust/Divisiveness: **Judith Donath**, author of "The Social Machine, Designs for Living Online," commented, "If your objective is to get people to buy more stuff, you do not want a population of people who look at what they have and at the friends and family surrounding them, and think to themselves 'life is good, I appreciate what I have, and what I have is enough.' If your goal is to manipulate people, to keep a population anxious and fearful so that they will seek a powerful, authoritarian leader, you will not want technologies and products that provide people with a strong sense of calm and well-being. Keeping people in a continual state of anxiety, anger, fear, or just haunted by an inescapable, nagging sense that everyone else is better off than they are can be very profitable. In short, the individual researchers and developers may be motivated by a sincere desire to advance understanding of mood, cognition, etc., or to create technologies that nudge or control our responses for our own good, but the actual implementation of these techniques and devices is likely to be quite different – to be used to reduce well-being because a population in a state of fear and anxiety is a far more malleable and profitable population."

Digital Duress: **Jason Hong**, professor at the Human Computer Interaction Institute, Carnegie Mellon University, wrote, "Many years ago, the famed Nobel laureate Herb Simon pointed out that 'Information consumes the attention of its recipients. Hence a wealth of information creates a poverty of attention.' Simon presciently pointed this out in 1971. However, back then, the challenge was information overload. Today, we now also have organizations that are actively vying for our attention, distracting us with smartphone notifications, highly personalized news, addictive games, Buzzfeed-style headlines and fake news. These organizations also have a strong incentive to optimize their interaction loops, drawing on techniques from psychology and mass A/B testing to draw us in. Most of the time it's to increase clickthrough rates, daily active users and other engagement metrics, and ultimately to increase revenues. There are two major problems with these kinds of interactions. The first is just feeling stressed all the time, due to a constant stream of interruptions combined with fear of missing out. The second, and far more important, is that engagement with this kind of content means that we are spending less time building and maintaining relationships with actual people. Having good friends [has the] equivalent [health effects] of quitting smoking, and today's platforms are unintentionally designed to isolate us rather than helping us build strong relationships with others."

Digital Dangers: **Tiziana Dearing**, a professor at the Boston College School of Social Work, said, "People's well-being will be affected for the worse by digital technology for three reasons. **1)** Because we have evolved as interpersonal, social creatures and therefore are unable to adapt to the behaviors, needs, even maybe the wiring required to thrive socioemotionally and physically in a digital world at the pace that digital change will require. **2)** Because digital technology – from design to algorithms – has evolved without sufficient consideration of social empathy and inherent bias. **3)** Because we have not figured out how to mitigate the ability that certain forms of technology have created to be our worst selves with each other. Don't get me wrong. Technological developments hold tremendous potential to cure disease, solve massive human problems, level the information playing field, etc. But our ability to adapt at a species level happens on a much slower cycle, and our human behaviors get in the way."

Intervention Ideas to Ease Problems

Reimagine systems: **Sherry Turkle**, one of the world's foremost researchers into human-computer interaction, shared the following action steps: "**1)** Working with companies in terms of design – [these tools] should not be designed to engage people in the manner of slot machines. **2)** [There should be] a movement on every level to make software transparent. This is a large-scale societal goal! **3)** Working with companies to collaborate with consumer groups to end practices that are not in the best interests of the commons or of personal integrity. **4)** A fundamental revisiting of the question of who owns your information. **5)** A fundamental revisiting of the current practices that any kind of advertisement can be placed online (for example ads that are against legal norms, such as age-ist, sexist, racist ads). **6)** Far more regulation of political ads online. **7)** An admission from online companies that they are not 'just passive internet services.' **8)** Finding ways to work with them so that they are willing to accept that they can make a great deal of money even if they accept to be called what they are! This is the greatest business, political, and social and economic challenge of our time, simply learning to call what we have created what it really is and then regulate and manage it accordingly, bring it into the polity in the place it should really have."

Reinvent Tech: **Susan Price**, lead experience strategist at USAA, commented, "We can use human-centered technology design to improve our experiences and outcomes, to better serve us. I have a vision for a human API that allows us to moderate and throttle what occupies our attention – guided by principles and rules in each user's direct control, with a model and framework that prioritizes and categorizes content as it reaches our awareness – to reduce effort and cognitive load in line with our own expressed goals and objectives. Today we cede that power to an array of commercial vendors and providers."

Regulate: **Dana Chisnell**, co-director of the Center for Civic Design, wrote, "There are dozens of projects happening to try to make the internet a better place, but it's an arms race. As individuals

find tools for coping and managing their digital lives, technology companies will find new, invasive ways to exploit data generated on the internet in social medial. And there will be more threats from more kinds of bad actors. Security and privacy will become a larger concern and people will feel more powerless in the face of technology that they don't or can't control. And it will take many years to understand how to negotiate that race and come to some kind of detente."

Redesign Media Literacy: **Alex Halavais**, director of the MA in Social Technologies, Arizona State University, said, "The primary change needs to come in education. From a very early age, people need to understand how to interact with networked, digital technologies. They need to learn how to use social media, and learn how not to be used by it. They need to understand how to assemble reliable information and how to detect crap. They need to be able to shape the media they are immersed in. They need to be aware of how algorithms and marketing – and the companies, governments, and other organizations that produce them – help to shape the ways in which they see the world. Unfortunately, from preschool to grad school, there isn't a lot of consensus about how this is to be achieved."

Recalibrate Expectations: **Sheizaf Rafaeli**, a professor at the University of Haifa in Israel, wrote, "People are adaptive. In the long run, we are reasonable, too. We will learn how to reign in the pitfalls, threats, bad guys and ill-meaning uses. These will continue to show up, but the march is towards progress. Better, more meaningful lives. Healthier, more-supportive environments. It is a learning process, and some of us, sometimes, get an 'F' here or there. But we learn. And with digital tech, we learn faster. We converse and communicate and acknowledge each other like never before. And that is always a good start. Bad things, like greed, hate, violence, oppression will not be eradicated. But the digital is already carrying, delivering and instantiating much promise. This is not rosy-colored utopian wishful thinking. It is a realistic take on the net effects. I would rather trade places with my grandkids than with my grandparents."

Fated to Fail: **Douglas Massey**, professor of sociology and public affairs at Princeton University, said interventions are not likely to be possible. He wrote, "I am not very optimistic that democratically elected governments will be able to regulate the internet and social media in ways that benefit the many rather than the few, given the vast amounts of money and power that are at stake and outside the control of any single government, and intergovernmental organizations are too weak at this point to have any hope of influence. The Trump Administration's repeal of Net neutrality is certainly not a good sign."

1. The State of Play for Technology and Looming Changes

A strong narrative about online life has arisen in recent years that pushes back against the techno-optimism of the earlier days of the internet. A roundup of recent headlines underscores the darker storyline:

- Global Risks 2018 report by the World Economic Forum lists "adverse consequences of technological advances" as one of the top risks societies are facing today.
- Psychology Prof. Jean Twenge has sounded widely-covered alarms that technology might be destroying a generation and, in particular, published research arguing that heavy tech use is linked to teen suicide and depression.
- The American Psychological Association found that constantly checking electronic devices is linked to significant stress for most Americans.
- The American Academy of Pediatrics reports that youth well-being, social connectedness and empathy are under threat in digital life.
- The National College Health Assessment reports record numbers of university students are seeking assistance for stress, overwhelming anxiety and depression. A New York Times magazine piece noted that the HERI college survey in 1985 showed 18% of students felt "overwhelmed"; in 2010 it was 29% and in 2016 it jumped to 41%.
- Some people blame business models of powerful corporations battling for attention in an age of information overload. Researcher danah boyd said the tech industry is "now the foundation of our democracy, economy and information landscape. We no longer have the luxury of only thinking about the world we want to build. We must also strategically think about how others want to manipulate our systems to do harm and cause chaos."
- Former tech leaders from Google, Facebook and Apple agree with boyd, saying a "fundamental flaw" in the way business is done in the digital age is causing damage to society. Facebook's original president, Sean Parker said the company intentionally sought to addict users by "exploiting a vulnerability in human psychology." Former Facebook executive Chamath Palihapitiya said: "The short-term, dopamine-driven feedback loops that we have created are destroying how society works. No civil discourse; no cooperation; misinformation; mistruth." Former Google design ethicist Tristan Harris launched the nonprofit Time Well Spent, aimed at stopping "tech companies from hijacking our minds." The Center for Humane Technology is reportedly creating a Ledger of Harms, a website where engineers can express concerns about what they are being asked to build.
- In early 2018 Facebook responded: CEO Mark Zuckerberg wrote in a post pledging to fix Facebook, "The world feels anxious and divided, and Facebook has a lot of work to do." And Facebook restructured its algorithm in early 2018 – it says the goal is to prioritize people's personal friends and family over viral content.

- XPrize Foundation CEO Peter Diamandis predicts that advances in quantum computing and the rapid evolution of AI embedded in systems and devices will lead to "hyper-stalking," influencing and shaping of voters and hyper-personalized ads, and will create new ways to misrepresent reality, effectively spread misleading messages and perpetuate falsehoods.

One current public debate is over whether it is enough to expect people to simply evolve to avoid unhealthy tech habits or whether the only effective solution is for the tech business to evolve different approaches. Nir Eyal advocates in the new book "Indistractible" that people can apply the concepts behind tech addiction – motivation, trigger and ability – to disconnect from unhealthy tech habits. Venture capitalist Roger McNamee spoke for many who believe that isn't enough when he said, "The best way would be for founders of these companies to change their business model… We have to eliminate the economic incentive to create addiction in the first place." Canadian journalist Eric Andrew-Gee summed up many concerns in an article titled "Your Smartphone is Making You Stupid, Anti-social and Unhealthy" writing, "Billions of people continue to be distracted and turned away from loved ones thanks to their smartphones. And untold billions of dollars wielded by some of the world's biggest companies are devoted to keeping it that way."

As concerns about the harmful impact of digital technology mount, Pew Research Center and the Imagining the Internet Center canvassed its database of technology experts, scholars and pundits about where things might stand in the coming decade when it comes to human and societal well-being. The preamble to the question we asked about digital life and its impact on people's health and well-being was:

> *People are using digital tools solve problems, enhance their lives and improve their productivity. More advances are expected to emerge in the future that are likely to help people lead even better lives. However, there is increasing commentary and research about the effects digital technologies have on individuals' well-being, their level of stress, their ability to perform well at work and in social settings, their capability to focus their attention, their capacity to modulate their level of connectivity and their general happiness.*

They were then asked to respond to the question:

> ***Over the next decade, how will changes in digital life impact people's overall well-being physically and mentally?***

They were given three options to choose from when considering their response. In all, 1,150 responded to these answer options:

Over the next decade, individuals' overall well-being will be ***more HELPED than HARMED*** *by digital life.* **47%** of these experts chose this option.

Over the next decade, individuals' overall well-being will be ***more HARMED than HELPED*** *by digital life.* **32%** of these experts chose this option.

There ***will not be much change*** *in people's well-being from the way it is now.* **21%** of these experts chose this option.

This report covers their written responses to our invitation to elaborate on their answer to this question and their written answers to a follow-up question:

Do you think there are any actions that might successfully be taken to reduce or eradicate potential harms of digital life to individuals' well-being?

Some **92%** of respondents chose this option: ***Yes****, there are interventions that can be made in the coming years to improve the way people are affected by their use of technology*.

Some **8%** chose this option: ***No****, there are not interventions that can be made to improve the way people are affected by their use of technology*

Some respondents wrote material that summarizes aspects of modern life that are being and will be shaped by digital technology. These overview answers serve as a good starting point.

An **anonymous professor** participating in this canvassing observed, "We're moving from the perception of time and space connected with factory life – in which the flow of time was stamped into schedules that needed advance planning – to a world of continuous flow, in which the moment can be reimagined and altered constantly. This allows many more possibilities, but also a keen sense of opportunity costs, as we compare the way we experience our lives to an endless set of better possibilities."

Jerry Michalski, founder of the Relationship Economy eXpedition, wrote about the disruptive chaos that lies ahead, "Whether the internet will increase well-being or not on the whole is unanswerable. In pockets, it's addressable, and right now I think the positive pockets outweigh the potential negatives. For example, learning can now cost nothing except a person's effort. People who fear one another can become familiar and dispel their fear. Plans for how to improve the world are easy to share. Resources and movements can collect energy and scale online. Meanwhile,

spin and the destruction of facts could take us into nuclear wars, the next nationalist nightmares or climate catastrophes larger than we've imagined. How do you sum all that?"

Some respondents stressed that both kinds of futures are possible and can be affected by the choices that are made now. **Amy Webb**, futurist and professor of strategic foresight at New York University, argued, "If our current habits continue unchanged, it's easiest to map pessimistic and catastrophic scenarios. People will be surrounded by more misleading or false information, not less. We'll see more YouTube and Twitch stars testing the thresholds of what their audiences are willing to watch, which means ever more salacious, incendiary content, disturbing images and dangerous behaviors. Government officials and political leaders at all levels will add to the vitriol online, posting quick hits that don't advance democracy in any meaningful way. Eventually regulators, hoping to safeguard our well-being, will introduce laws and standards that differ from country to country, effectively creating a splintered internet. Regional splinternets will likely cause more harm than good, as the big tech companies will find it impossible to comply with every legal permutation, while our existing filter bubbles will expand to fit our geographic borders. Our well-being is directly tied to our sense of safety and security, which would be upended in these scenarios. But the good news is that these scenarios haven't happened yet. We can decide that we want a different outcome, but that requires making serious changes in how we use and manage information today… We can choose to improve the quality of our digital experiences by forcing ourselves to be more critical of the information we consume… The world we see looking only through the lens of a single post never reveals all of the circumstances, context and detail. Schools must teach digital street smarts… from an early age, kids should learn about bots and automatically-generated content. They should have provocative ethics conversations – with their peers, not just their parents – about online content and about technology in general. Content distributors must stop asserting that they are merely platforms… As we enter the Artificial Intelligence era we must examine and make transparent how platforms make decisions on our behalf."

A **professor of philosophy at a major U.S. technological university** wrote, "There's a fundamental question that society needs to better confront: As technology advances and becomes 'smarter,' are we, human beings, being techno-socially engineered to behave increasingly like simple machines?

In the next section, we outline three sets of key themes found among the written elaborations to questions one and two of this canvassing. **1)** Statements affirming the great appreciation for the wonders of digital life expressed by the vast majority of these respondents. **2)** Statements illuminating people's worries over digital life. **3)** People's hopeful suggestions for potential improvements – and some doubts about expressed about the likely success of these.

2. Hopes for the Future of Digital Life

The core question guiding this study explores experts' attitudes about the future of people's well-being. A plurality of the participants endorsed the abundant positives of digital life and said they expect humans and technologies will continue to build upon them. On balance, this hopeful group argued that the beneficial impact of digital life will make its negatives mostly tolerable.

Rob Atkinson, president of the Information Technology and Innovation Foundation, said, "Like most technologies, the overall benefit is positive, otherwise people would not adopt them. The internet and its continuing evolution is no different. With all the popularity of 'internet-is-harmful' books, articles and talks these days, they overlook the amazing good that it provides for most people. As the internet has matured and become more ubiquitous we have all too often taken for granted the amazing improvement in our lives."

Vint Cerf, Internet Hall of Fame member and vice president and chief internet evangelist at Google, commented, "I am persuaded that we will have more tools at our disposal to improve our ability to do knowledge work, to discover relevant information, to keep ourselves and others informed. Machine learning will be part of that toolkit. Autonomous software running in the background (think: Google Alert for example) will also prove useful. Automatic translations (spoken and written) will improve our ability to conduct international business or maintain relationships. New businesses will form around these advanced information-processing capabilities."

Ethan Zuckerman, director of the Center for Civic Media at MIT, wrote, "We are becoming more aware of the dangers and shortcomings of a digitally connected life. That said, we can't forget the many people who've built new connections or rebuilt old ones through online tools. We're at a moment of waking up to downsides and figuring out how to address them – this isn't a moment to back away from the internet as a space for interaction."

Paul Saffo, a leading Silicon Valley-based technological forecaster and consulting professor in the School of Engineering at Stanford University, said, "Heraclitus put it eloquently over two millennia ago – 'nothing new comes into our lives without a hidden curse.' The greater the marvel, the greater the unexpected consequences. Five centuries ago, the advent of the printing press utterly atom-smashed the social, religious and ultimately the political order of Europe. It ushered in a half century of chaos and conflict. But it also opened the door to the Enlightenment and the rise of representative political orders. The optimistic internet visionaries of the 1990s were neither naive nor mistaken. The expected future always arrives late and in unexpected ways. We are in for a wild period of disorder, but beyond is a sunny upland."

An **anonymous technology developer/administrator** said, "The harms brought by technology are considerable, and should not be minimised. They represent both the adjustments that we need to make to accommodate new ways of doing things and structural changes and shifts in power that result. *However*, the benefits should not be forgotten; for every person who risks 'internet addiction' or 'smartphone overload,' there are people elsewhere who see quantifiable improvements in quality of life, opportunity, education and human rights as a result of technology."

David Weinberger, a senior researcher at Harvard's Berkman Klein Center for Internet & Society, said, "It is difficult and possibly impossible to evaluate a change of the magnitude that we are living through, for our values themselves are changing. For example, it is changing some of the most fundamental formations of sociality. We worry that our children or our colleagues are spreading themselves too thin across a loose network of 'friends' – putting the word in quotes to indicate our concern and disdain. At the same time, we are spending more time being social in these thin networks, and we carry our friends and acquaintances with us through our lifetimes in ways we never could before. Perhaps we'll look back and pity the millennia when we were limited to a handful of friendships formed among people who happen to live close to us, and when we had to say final farewells to friends when we move away. This is not to say that everything is working out great so far. For example, bullying and intolerance are flourishing on the Net, and there is no future state in which that is a good thing. We can blame this on the Net, or we can say that we have uncovered a nastiness in the human social makeup that needs to be addressed by norms, morality, art and education. Or both. But if I'm going to call out some negatives after saying that we can't evaluate what we are becoming, I feel compelled to point out some of the hopeful values that have already emerged on the Net. We are more social, more creative, funnier and more collaborative. This is a flourishing of our social nature so deep that it is transformative. It is important to remember the positives we see on the Net or else we will shut it down for fear of the negatives. My secret hope is that in this transitional stage we are poking at every extreme to explore the boundaries of the possible, and will eventually – before too long – file down the most hurtful edges."

Shiru Wang, a research associate at the Chinese University of Hong Kong, said, "Two sides coexist. On the one hand, the internet will significantly improve social communication and economic opportunities (e.g., e-shops) of the world population as a whole, especially when the former digital have-nots are able to access the internet. On the other hand, the redundancy, information explosion, the tendency of the internet's dominating one's life will continue bothering the 'post-Internet' generation, if not becoming worse. But I believe that there will be an inverted 'U-shape' on which the digital communication technologies benefit the overall well-being of the world population. We have not reached the peak point yet."

Fred Baker, an internet pioneer and longtime leader with the internet Engineering Task Force, wrote, "Will there be innovations? Yes, definitely. Will they impact us negatively or positively? Yes. And I would imagine the ones we will talk about will be the negative impacts, not the positive."

Brad Templeton, software architect, civil rights advocate, entrepreneur and internet pioneer, wrote, "That we need to do a better job mitigating the bad effects does not stop the good effects from being worth it. There are still scores of ways we all find it hard to imagine how we did things in the past without our digital tools."

In the next few sections of this report we share respondents' thoughts on the myriad ways digital life enhances individuals' well-being and builds a better future for people living digital lives. This content is organized under these commonly occurring themes: Connection; Commerce, Government and Society; Crucial Intelligence; Contentment; Continuation Toward Quality.

Connection: Digital life links people to people, knowledge, education, entertainment, anywhere globally at any time in an affordable, nearly frictionless manner

The essence of digital life, these experts argue, is *connection*. It is the most apt one-word reason people today feel they simply cannot get along without it. **Doug Breitbart**, co-founder and co-director of The Values Foundation, said, "The internet and the connectivity it provides offers greater and greater numbers of people access to information, education, social connection and affinity with others, and the potential to distribute, empower, enfranchise and unleash individual human generativity on a scale of unlimited potential."

Louis Rossetto, founder and former editor-in-chief of Wired magazine, said, "For all the negative effects of digital technologies - and there have been many - net the effects have been overwhelmingly positive. Across the planet, people in every culture, in every economic group have seen their lives improve dramatically, directly because the development and deployment of digital technologies and networks."

Alejandro Pisanty, a professor at Universidad Nacional Autonoma de Mexico and a longtime participant in the activities of the Internet Society, wrote, "The benefits of digital life will continue to outweigh the deleterious effects for a long time and for increasing numbers of people. At the very least this is a sampling and baseline issue: A fresh billion people will soon gain access to the most basic benefits with little or no significant damage from the negative side effects."

Hassaan Idrees of Karachi, Pakistan, said, "People will be helped more than harmed by digitization. Already, important discoveries and developments in areas as diverse and impactful as

genomics, cancer and stem cell research, energy access, curriculum delivery and health solutions have been, and continue to be shared. I foresee continued positive developments in this regard."

Fabian Szulanski, a professor at Instituto Tecnológico de Buenos Aires, said, "Well-being will be helped. The democratic distribution of knowledge and decision-making; remote access to health monitoring and to doctors and health workers; communication platforms for bottom-up peaceful and generative conversations; socialization of disabled people; communities of wellness; PTSD and depression treatment; and the 3D printing of everything, including medicines, are just a few examples."

Frank Feather, a business futurist and strategist with a focus on digital transformation, commented, "Every technology is an extension of human abilities and capabilities. To succeed, it must be technically viable, economically worthwhile and politically and socially acceptable. It must be used wisely and for good not ill. Overall, while each technology causes certain disruptions, over the long term, if well administered, every innovation improves the overall quality of life. So it is with the internet and digital technologies. These technologies will continue to enhance education, aid in research, foster a simpler lifestyle and work processes, and they will create far more jobs that they eliminate. They also will enhance life and commerce by creating wealth, higher productivity-induced incomes and shorter workweeks. They will enhance the leisure aspects of life, and also make it easier for people to connect worldwide, eventually helping to overcome differences in values and cultures."

Rob Frieden, a professor of telecommunications and law at Penn State University, said, "On balance, access to digital technologies and the literacy to use them will enhance social quality of life. These technologies provide new and better tools for individual and societal transactions, including education, career development, tele-health, e-government. I do not consider it wishful thinking to believe that many people can more effectively use these technologies than what pre-Internet technologies offered."

Nathalie Coupet, an internet advocate based in North America, said, "The internet will have positive aspects in people's lives as far as it can be harnessed. It facilitates meaningful communication in an Information Society, but also creates 'thought silos,' stress and isolation. There is no substitute for human interaction, and public policies should be designed to increase human interaction in public places."

Eileen Rudden, co-founder of LearnLaunch, wrote, "The broadening of access to information and education and work to all of the world's populations by the internet will continue to create a net new benefit to humanity."

Kathryn Campbell, a digital-experience design consultant, said, "There is no question that continuous connectivity and attention-enticing content is producing shifts in our behavior and even our cognition. I find it much more difficult to focus for long periods of time now, especially when I am online, which is most of the time. I also find it hard to disengage. However, the benefits of connectivity are enormous. Those who are physically and/or socially isolated can now interact with a wide range of people. All those with internet access can inform and educate ourselves according to our interests at little to no cost. Data on diseases can be pooled and analyzed in ways that were cost and time prohibitive in the past. Overall, the forces that connect us draw us closer together in myriad interesting ways."

Neil McIntosh, managing editor of BBC Online, said, "Digital technologies have brought myriad improvements."

A sampling of additional comments related to "connection" from **anonymous respondents**:

- "The benefits include the capacity to find each other and network in new ways; access to information and services at your fingertips; higher-quality entertainment in homes and in hand; finding things with considerable less hassle and travel; new advances in analytics."
- "Digital tools are often free, easily portable and can automate tasks that would otherwise take up cognitive space."
- "A great section of society now has the ability to learn about any subject on the planet. We walk around with the contents of a global library in our pocket."
- "There is huge educational potential in online and technology-enhanced learning and that we have barely scratched the surface of that potential."
- "The entertainment uses of the internet will continue to expand. Although many of these will be harmful to people's productivity, sense of purpose and well-being, in moderation they open opportunities for personal enjoyment that should not be discounted."

Commerce, government and society: Digital life revolutionizes civic, business, consumer and personal logistics, opening up a world of opportunity and options

The rise of global communications networks in the past few decades has produced revolutionary transformation of many essential life activities, according to the more hopeful experts responding to this canvassing. Many respondents chose to illuminate the ways in which society's political, economic and social realms have been enhanced globally, also enhancing individuals' well-being. Only about half of the people in the world are connected; billions more are expected to gain connectivity in coming years.

Nalaka Gunawardene, science writer and ICT researcher based in Sri Lanka, said, "Digital tools/technologies come with some potential problems, but on the whole I consider them more beneficial in a developing country like Sri Lanka where a third of the 21 million population now regularly uses the internet. The spread of digital and Web tools during the past decade has had far-reaching impacts on our families, society, culture and politics. For example, they undermine our feudal and hierarchical social orders, enabling a meritocracy to emerge. They disrupt conventional business models in our unimaginative media, creating new opportunities for digital startups to innovate. They create new spaces and opportunities for youth to participate in politics and social reforms. Digitally-armed young people are challenging the status quo in schools, workplaces and civil society. These larger benefits far outweigh misuse and excesses of digital technologies."

Larry Roberts, internet Hall of Famer, original ARPANET leader, now CEO/CFO/CTO of FSA Technologies, Inc., said, "The improvement in allowing the majority of us work at home will greatly improve our lives. This requires bandwidth and speed per home that many do not have today. Besides being able to do all our digital work online, this requires easy and cheap video conferencing with our co-workers, customers, and outside contacts. Savings in office space, an office computer, our ability to mix business with other home demands like signature deliveries and eliminating the stress and time lost in commuting are a few of the benefits. They represent significant cost savings and also an improved quality of life."

Akah Harvey, co-founder, COO and IT engineer at Traveler Inc., based in Cameroon, said, "We are already experiencing the many advantages that are brought by developing technologies that address our local problems. Most of these directly improve the well-being of people in this part of the world (Africa)."

Larry Irving, co-founder of The Mobile Alliance for Global Good, wrote, "The opportunities in health, education, commerce, agriculture, finance, sustainability and even government will compensate for the very real negative potential consequences."

Fernando Ortega, a director of the National Council of Science, Technology and Innovation of Peru, said, "New tech developments will allow the concentration of human efforts (including work) on more complex activities, leaving the routine activities to machines. This will generate new jobs and enhance the opportunities to new companies emerging from innovations. The key factors for a successful economy will be technological education, telecom infrastructure and a promotional environment for the creation of new ventures."

Olugbenga Adesida, founder and CEO of Bonako, based in Africa, wrote, "The digital revolution has led to radical changes that many could not have imagined only a decade ago. Despite the

radical shifts so far, the digital revolution is still at its infancy, especially with respect to its potential impacts on socioeconomic development in the developing world. The potential is high in various fields, from health, livelihoods, and education to governance. While the potential for harmful effects will always be there, the use of the emerging digital tools in development will be transformative. It will affect all sectors, from the way economic activities are organized, the way we deliver social services (education, health, etc.), to the way we govern ourselves. The critical challenge is whether Africa and the rest of the developing world will become active producers of the emerging technologies or remain primarily consumers."

Jon Lebkowsky, CEO of Polycot Associates, said, "I believe we're in a transitional phase – a phase that will last one or more generations. Digital literacy will evolve, as will global understanding of the implications of technology developments. Though we'll always have issues and bad actors, I believe that we'll catch up with technology and diminish the negative impacts. I'm lately focused on cooperative business, and I believe there are promising developments in that space – democratic worker co-ops forming, along with multi-stakeholder cooperatives facilitated by digital platforms. I'm also feeling hopeful about the impact of the 'internet of trust' that the blockchain promises to deliver. We're way early in the development of that technology, but it feels promising. Our way out of current moral challenges will definitely include/require systems of trust."

A sampling of additional comments related to "commerce, government and society" from **anonymous respondents**:

- "The internet is bringing about profound changes in medicine, public safety, education, our economy, public discourse and civic engagement."
- "The internet will continue its diversified growth at the core of work, leisure, social, etc."
- "Digital technology is already making big contributions to monitoring and diagnosis, access to information, education and markets, to job creation and similar markers of human welfare."
- "Blockchain will change the way that we pay for goods and services and undertake legal contracts."
- "We will see solutions to disease, renewable applications that will help address our climate crises and dependence on fossil fuel, the architecture of shelters, transportation and our exploration into the larger universe around us."

Crucial Intelligence: Digital life is essential to tapping into an ever-widening array of health, safety and science resources, tools and services in real-time

Many of the most enthusiastic experts made this argument: The advancement of knowledge in health and science globally and the potential future well-being of billions will be dramatically

improved by the way digital technologies enable people to create, share, discover, monitor and remotely enable real-time actions.

David A. Bernstein, a retired market researcher and consultant, said, "The well-being of individuals will improve over the next decade as a result of greater integration of personal wearable technology and the internet. I see a day in the not too distant future where diabetes, heart conditions and basic diagnostic tools will be made closer to the patient through these. The distance and time between practitioner and patient will hopefully be greatly reduced."

Shel Israel, CEO of the Transformation Group, said, "There is a very large mountain of evidence in how it will help the well-being of people. Just in immersive technologies, such as AR and VR, we are seeing improvements to the care and treatment of all sorts of diseases such as Alzheimer's, Parkinson's, schizophrenia, autism, non-opiate pain treatment and more. There are also clear improvements of surgery caused by use of the internet and immersive technologies in training medical practitioners."

Alf Rehn, a professor of innovation, design and management at the University of Southern Denmark, wrote, "AR has already gotten kids moving more (Go, *Pokemon Go*!). This will only increase, and new fitness solutions will help even us couch potatoes get up more. The Internet of Things will enable better health tracking, and a ubiquity of sensors will nudge us into better behaviors. Next up: The internet of healthier diets (or 'Who put a tracker in my liquor cabinet?!?')."

Gary L. Kreps, distinguished professor and director of the Center for Health and Risk Communication at George Mason University, wrote, "Digital health-information systems have the potential to significantly support individual and public health promotion by providing needed health advice (recommendations and reminders), answering important health questions, minimizing health care/maintenance errors and delivering timely support to solve health problems."

Fred Davis, a futurist/consultant based in North America, wrote, "There are a number of new transformative technologies that have the potential to increase people's psychological and emotional well-being. The one with the most potential is VR. It has been shown to increase people's capacity for empathy. This alone is profound. VR has been shown to treat depression more effectively and quickly than medications or talk-only therapy. VR has been used to treat anxiety disorders, phobias, social anxiety and PTSD. I know of a VR app for self-compassion targeted at quieting your inner-critic, also known as negative self-talk. It uses cognitive behavioral therapy. Other VR apps reinforce pro-social behavior and help relieve stress. 25% of the U.S. population has

a mental illness at any given time, and 50% will have one during their lifetime. Being able to develop treatments and therapies to address these issues could have a very positive effect on people's well-being."

Laurie Orlov, principal analyst at Aging in Place Technology Watch, said, "One of the most disruptive technology changes is underway – as significant as the browser, smartphone and tablet. 'Voice First' technologies (examples: Amazon Echo, Google Home, Apple Siri) will be quality-of-life enhancements and enablers, for older adults in particular. Price points for devices, at $50 or less, make it feasible to speak a request or need, including communicating with family, friends and service providers. The opportunity is to reduce social isolation in the home, easily access information and services and provide new ways to improve general quality of life."

A sampling of additional comments related to "crucial intelligence" from **anonymous respondents**:

- "We can anticipate major advances in health care delivery, active-wellness monitoring, management of chronic conditions, remote surgical procedures with potential for significant cost savings, patient access and improved outcomes."
- "Advances in technologies such as AI, machine learning and robotics will revolutionize fields such as medicine, healthcare and aged care."
- "There is a lot of potential for technology to help with affordances for people who have diminishing capabilities due to aging and mobility."
- "We can better monitor and respond to health threats, which can improve health and well-being of the entire population."
- "There will be an expansion of remote medicine, improved information sharing, improved analysis of many types of data, from medical images to city traffic patterns. Smart cities that provide more information and accept more input from citizens can shorten the time to identify and resolve problems, from a broken street light to system issues like inappropriate police behavior."
- 'The informational elements of the internet are unleashing a flow of data access, analyses and new knowledge that has led to many breakthroughs."

Contentment: Digital life empowers people to improve, advance or re-invent their lives, allowing them to self-actualize, meet soulmates and make a difference in the world

The internet, Web and associated technologies are powerful bootstrapping tools, according to some of these respondents. Digital life offers endless possibilities to anyone with a connection, anywhere, anytime. Yes, it offers these same possibilities to criminals, con artists and crackpots. But the enthusiastic experts in this sample say that the personal empowerment enabled by digital

technologies allows the vast majority of earnest, honest individuals to discover possibilities, solve problems, come together, find their bliss and make their lives sweeter. Their predictions argue that most people will spend most of their time online doing something they believe to be beneficial to their own well-being.

Richard Jones, an investor based in Europe, wrote, "The current development of IT tools in areas such as search, data mining and its feedback, voice interface and AI, AR and VR immersive experiences, drone and camera, blockchain and all applications thereof (such as value exchange and transaction enablement and accounting), smart-home management, remote education, mobility, etc., generally disintermediate, quicken and extend the possibilities for use of one's time. There is undoubtedly a challenge to accommodate this effectively into mentally stable patterns of behaviour as it tends toward a quickening of pace akin to burnout but some of this can be accommodated by digital natives whereas silver surfers will be flummoxed by having to rationalise rather than accept or simply be confused and feel out of control. Digital natives will generally have better habits and acceptance, but, having said that, the technology does appear to have the potential to spin out of control by either cyber warfare, chip design errors, systemic collapse due to some unforeseen problem, etc. Put simply, this is like any great change: a period of heightened uncertainty about direction and outcome so much so that the world order and the very survival of humankind and the planet are issues in flux."

Ralph Droms, a technology developer/administrator based in North America, said, "New internet technologies will allow people to remain independent longer as they age as well as contribute to augmenting and improving daily life."

Mary Chayko, a professor at the Rutgers University School of Communication and Information, wrote, "People's well-being will be both helped and harmed in substantial measure as they continue to use and depend on digital technologies. We will be positively impacted when useful and credible information and opportunities flow through our networks, and negatively impacted by false or demeaning exchanges and interactions – and in the modern social media era there will always be plenty of both. Access to education, literacy, physical and mental health care and financial (and other key) resources help tip the scale to the positive; efforts to increase their distribution widely and equally are therefore critical to the well-being of societies and individuals."

Kyle Rose, principal architect at Akamai Technologies, Inc. and active IETF participant, wrote, "Positive changes resulting from the greater opportunities for learning and exploration, communication and collaboration for which the internet provides a foundation will persist. The net effect will be positive."

Ed Black, president and CEO of the Computer & Communications Industry Association, said, "Improvements in access to information, services, knowledge will in some cases enhance personal, business and cultural empowerment. However, the opportunity for misuse and negative utilization is also a constant and needs to not be ignored."

Glenn Grossman, consultant of banking analytics at FICO, wrote, "In the next decade, digital abilities will improve life and work with higher-quality services."

Barbara Clark, Ph.D., said, "One has to think about the Gutenberg press. To control the impact, the Catholic Church created the Imprimatur. The Gutenberg press eventually allowed the common person to have access to textual information. Fast forward to the internet, which opened access to global information – most importantly the ability of the common person of any age to create text, video, voice and animation. While we, as a society, currently struggle the ramifications of this new Information Age, the coming years will only allow us to grow intellectually and help create a working global society."

A sampling of additional comments related to "contentment" from **anonymous respondents**:

- "The internet is a primary defense against isolation, in particular for people whose age, abilities, family circumstances and incomes limit their face-to-face interactions to a narrow circle. It allows people to continue to contribute in their fields and communities."
- "More people are meeting their life partners and friends online. The internet allows people a larger pool of other humans from which to choose who they spend their time with and it makes it more clear which of them they are likely to fit in with."
- "People's well-being will be improved because of increased efficiency at work and home. People can be more productive at work, and technology will improve convenience at home."
- "It expands the potential for local-community social safety nets, expands the potential for learning and education, expands the potential for exercising local-through-global citizenship."
- "People are able to access information about anything from anywhere, are able to speed up processes that ordinarily took much longer to complete, and with the advent of new technology will come new and improved ways of conducting business, learning, interacting and living."
- "Simply being online provides great benefits to people in many parts of the world, and in the next decade, a large number of people will get new access or faster access."
- "Technology affords a number of life-improving innovations. Technology will also contribute towards a reformulation of the social fabric, as online platforms begin to take the role that local communities have fostered and supported."

Continuation Toward Quality: Emerging tools will continue to expand the quality and focus of digital life; the big-picture results will continue to be a plus overall for humanity

A common sentiment found throughout many of the responses about well-being in the next decade was shared by **Christian Huitema**, a technology developer/administrator based in North America. "I am optimistic," he wrote. "Yes, we do see negative side effects of social networks in particular and various forms of automation in general. But I believe that society will adapt and that digital services perceived as unhelpful will be replaced by better and more convenient services. Given time, this process should lead to improvements."

Peter Lunenfeld, professor and vice chair of the Design Media Arts department at UCLA, said, "In the more than a quarter of a century since the advent of the World Wide Web, and the decade of smartphone-driven social media, we've explored and exploited a lot of the worst that the digital can bring into our lives. The next decade will see a pendulum swing to more conscious and deliberate use of emerging and extant technologies."

Internet Hall of Famer **Bob Metcalfe**, a professor of innovation at the University of Texas-Austin, wrote, "Connecting is a good thing. We have not yet developed the tools to deal with the sudden connectivity of the internet, but even still, reduced economic frictions are leading to better lives. The road is bumpy, but we are moving toward freedom and prosperity for all."

Ray Schroeder, associate vice chancellor for online learning at the University of Illinois-Springfield, wrote, "As the Internet of Things continues to expand, artificial intelligence applications become more integrated into the Web, virtual reality is refined and mixed reality is combined with geo-location, we will see a wide array of applications and uses that enhance the online experience. These technological advancements will combine with the network to disseminate services and create collaborations that we have not yet fully imagined."

Peter and Trudy Johnson-Lenz, principals of Pathfinding Smarter Futures, commented, "Individuals' over-all well-being will be helped by digital technologies – an increasing number of apps, virtual workshops, online support networks and the like emphasize aspects of positive psychology, work-life balance, de-stressing, personal and spiritual development and so on. Mindfulness is going mainstream and googling 'mindfulness apps' results in 1.7 million hits. A few mindfulness apps also include biofeedback. Mindful use of digital tools in one's life can support and enhance well-being. Better yet, design of digital tools that encourage and reinforce more mindfulness, rather than obsession with whatever is on the screen, would be a big benefit. Some digital designers are speaking out about the 'addictive' qualities of smartphone interfaces. Key online articles by Farhad Manjoo, Stu Goulden, Bianca Bosker describe what makes interfaces and

apps so addictive and what people can do to manage the negative effects. Former Google design ethicist Tristan Harris is now the executive director and co-founder of Time Well Spent. He writes, 'We are building a new organization dedicated to reversing the digital attention crisis and realigning technology with humanity's best interests… we are advancing thoughtful solutions to change the system.' Harris is a graduate of B.J. Fogg's Persuasive Technology Lab at Stanford. Fogg is a behavioral psychologist whose insights about how people change habits and behaviors has led to him to develop the field of behavior design over the past 20 years. On his website (https://www.bjfogg.com/) Fogg writes, 'Technology itself doesn't magically change behavior. People creating products need to understand how human behavior works. Teaching people the psychology of behavior change is core to my work these days. I've created a set of models - how to think clearly about behavior. And I've created a set of methods – how to design for behavior. These models and methods work together and comprise behavior design.' With people like Tristan Harris, Justin Rosenstein, B.J. Fogg and their many colleagues working to develop better digital technologies and supporting business models and organizational structures that contribute to personal and societal well-being, we are more hopeful about the positive impacts of digital life in the future."

Some who said the next decade will be mostly helpful to well-being also mentioned that negative change may come post-2027. **Dan Ryan**, professor of arts, technology and the business of innovation at the University of Southern California, wrote, "I suspect that for most of the next decade we will be in the more-better, less-worse part of the social-change gradient. That's based on the idea that there are still a whole bunch of folks who have not yet reaped what's already there and an expected 'second wave' of 'for the general welfare' work that's ongoing and upcoming. There are, I think, gathering negatives but I'd predict most of the decade will pass before they hit home."

A sampling of additional comments related to the theme of "continuation toward quality" from **anonymous respondents**:

- "With an increasing saturation of 'digital awareness,' people's sense that they are any better connected than anyone else should dissipate."
- "There is increasing pressure on IT companies and network service providers to make our digital infrastructure more secure, more reliable, more affordable and much easier to use. We have many of the technologies needed to accomplish that and they are being deployed."
- "There will be a better learning curve of using the internet more effectively."
- "People will become more responsible for their own actions, comments and how they interact with the digital world."

3. Concerns About the Future of People's Well-Being

About half of the people responding in this study were in substantial agreement that the positives of digital life will continue to outweigh the negatives. However, as in all great technological revolutions, digital life has and will continue to have a dark side.

Roughly a third of respondents predicted that harms to well-being will outweigh the positives overall in the next decade. In addition, even among those who said they are hopeful that digital life will be more helpful than harmful and those who said there will not be much change there were many who also expressed deep concerns about people's well-being in the future. All of these voices are represented in this section of the report.

Rob Reich, professor of political science at Stanford University, said, "If the baseline for making a projection about the next today is the current level of benefit/harm of digital life, then I am willing to express a confident judgment that the next decade will bring a net harm to people's well-being. The massive and undeniable benefits of digital life – access to knowledge and culture – have been mostly realized. The harms have begun to come into view just over the past few years, and the trend line is moving consistently in a negative direction. I am mainly worried about corporate and governmental power to surveil users (attendant loss of privacy and security), about the degraded public sphere and its new corporate owners that care not much for sustaining democratic governance. And then there are the worries about AI [Artificial Intelligence] and the technological displacement of labor. And finally, the addictive technologies that have captured the attention and mindspace of the youngest generation. All in all, digital life is now threatening our psychological, economic and political well-being."

Rich Salz, principal engineer at Akamai Technologies, commented, "We have already seen some negative effects, including more isolation, less ability to focus, more ability to be deceived by bad actors (fake news) and so on. I do not see those lessening. Sadly."

Leora Lawton, lecturer in demography and sociology and executive director of the Berkeley Population Center, University of California-Berkeley, shared these reasons digital life is likely to be mostly harmful: "The long-term effects of children growing up with screen time are not well understood but early signs are not encouraging: poor attention spans, anxiety, depression and lack of in-person social connections are some of the correlations already seen, as well as the small number of teens who become addicts and non-functioning adults."

David Ellis, Ph.D., course director of the Department of Communication Studies at York University-Toronto, said, "Much like a mutating virus, digital services and devices keep churning

out new threats along with the new benefits – making mitigation efforts a daunting and open-ended challenge for everyone. Over the next decade, the majority of North Americans will experience harms of many different kinds thanks to the widespread adoption and use of digital technologies. The last year alone has seen an outpouring of commentary, including some 20 trade books, arguing that our digital habits are harming individual welfare and tearing up the social fabric. In marketing its services, Silicon Valley is committed to the relentless promotion of convenience and connectedness. Its success in doing so has wreaked havoc on personal privacy, online security, social skills and the ability to focus attention, not least in college classrooms. While they may be victims of a kind, most consumers are simply in denial about their compulsive use of smartphones and social media, as well as other services designed by their developers to be addictive – a problem that persists even when legal sanctions are in play, as with texting while driving. There's growing evidence these digital addictions are promoting depression, loneliness, video-gaming abuse and even suicidal behavior, especially among teens and young adults. Instead of feeling obliged to moderate their level of connectivity, however, consumers have come to feel a sense of entitlement about their habits, unconstrained by social mores that previously framed these habits as inappropriate. Indeed, heavy use of digital devices is widely encouraged because of the misguided idea that so-called multitasking makes us more productive."

A **research scientist and professor** said, "The grand internet experiment is slowly derailing. The technologies that 50 years ago we could only dream of in science fiction novels, which we then actually created with so much faith and hope in their power to unite us and make us freer, have been co-opted into tools of surveillance, behavioral manipulation, radicalization and addiction."

The next few sections share primary concerns expressed by respondents, grouped under commonly expressed themes: Digital Deficits; Digital Addiction; Digital Distrust/Divisiveness; Digital Duress; and Digital Dangers.

Digital Deficits: People's cognitive capabilities will be challenged in multiple ways, including their capacity for analytical thinking, memory, focus, creativity, reflection and mental resilience

A number of respondents said people's cognitive capabilities seem to be undergoing changes detrimental to human performance. Because these deficits are found most commonly among those who live a highly digital life, they are being attributed to near-constant connectivity online.

Steven Polunsky, a research scientist at Texas A&M University, wrote, "One way to describe how we behave is the OODA cycle – when something happens, we Observe it, Orient it to our personal context, Decide what to do and Act on that decision. The internet is easily weaponized to short-

circuit that process, so we receive minimal information and are urged to act immediately on it. Unless behavior changes and adapts, this tendency will lead to greater dissatisfaction among internet users and those affected by their actions, which may be a wide audience."

Nikki Graves, an associate professor at Emory University's Goizueta Business School, said, "We currently live in a culture that fosters attention-deficit disorder because of hyperconnectivity. I have been teaching at the college level since 1993, and I can see a definitive decline in students' ability to focus on details and in general. Additionally, I believe that the research on the relationship between hyperconnectivity and this has merit."

Meg Mott, a professor of politics at Marlboro College, said, "The internet is harming well-being. My answer has to do with the disturbing trend amongst college students, who operate as if all questions should be answered online. The devices make it so easy to find answers elsewhere that students forget to ask deep questions of themselves. This lack of uninterrupted introspection creates a very human problem: the anxiety of not knowing oneself. The more the culture equates knowledge with data and social life with social media, the less time is spent on the path of wisdom, a path that always requires a good quotient of self-awareness. This becomes evident in classes where a portion of the grade is derived by open-ended writing assignments. In order to write a compelling essay, the author needs to know that the process of crafting a question is more interesting than the retrieval of any answer. Instead, the anxiety is attached to getting the 'right' piece of data. I am of the mind that a lot of the anxiety we see in college students is the agony of not having a clue about who they are. This hypothesis is now supported by Jean Twenge's research on the impact of smartphones on the Millennial and post-Millennial generations."

A **director of one of the world's foremost digital rights organizations** said, "I'm concerned that the pace of technology creation is faster than the pace of our understanding, or our development of critical thinking. Consider, for a moment, the latest buzzword: blockchain. Yesterday, I heard about a blockchain app designed for consent in sexual interactions – designed, of course, by men in Silicon Valley. If it sounds ridiculous, that's because it is. We've reached a phase in which men (always men) believe that technology can solve all of our social problems. Nevermind the fact that a blockchain is a permanent ledger (and thus incontestable, even though sexual abuse can occur after consent is given) or that blockchain applications aren't designed for privacy (imagine the outing of a sexual partner that could occur in this instance). This is merely one example, but I worry that we're headed toward a world in which techno-solutionism reigns, 'value' has lost all its meaning, and we're no longer taught critical-thinking skills."

A **president of a U.S.-based nonprofit** commented, "Increasingly social media is continuing to reduce people's real communication skills and working knowledge. Major industries – energy,

religion, environment, etc., are rotting from lack of new leadership. The level of those with aliteracy – people who can read but choose not to do so – is increasing in percentage. The issues we face are complex and intertwined, obfuscated further by lazy bloated media and readers and huge established industry desperate to remain in power as cheaply, easily, safely and profitably as possible – of course! Those of us who still read actual books that require thinking rather than mere entertainment, must redouble our efforts to explain the complex phenomena we are in the midst of addressing in simple terms that can encourage, stimulate, motivate."

Some respondents also more indirectly noted that individuals' anxiety over online political divisiveness, security and privacy issues, bullying/trolling, their loss of independent agency due to lack of control over what they are served by platform providers and other psycho-social stress are contributing factors in this cognitive change.

A **professor** wrote, "As life becomes more and more monitored, what was previously private space will become public, causing more stress in people's lives. Furthermore, some of these technologies will operate without a person's knowledge or consent. People cannot opt out, advocate for themselves, or fix errors about themselves in proprietary algorithms."

A sampling of additional comments about "digital deficits" from **anonymous respondents**:

- "We have less focus – too much multitasking – and not enough real connection."
- "The downside is too much information and the lack of ability to manage it."
- "Attention spans have certainly been decreasing recently because people are inundated with information today."
- "There is increasing isolation from human interaction and increased Balkanization of knowledge and understanding."
- "Over 50% of U.S. children over 10 now have some sort of social network-based application, whether it be Instagram, Snapchat or Minecraft. These children are always looking for what they may be missing online. They are increasingly finding it hard to be present and focused."
- "The writing skills of students have been in constant decline, as they opt for abbreviations and symbols rather than appropriately structured sentences."
- "Digital users who have not lived without technology will not know how to cope with utilizing resources outside of solely tech. With users relying on devices for companionship, we will no longer see people's faces, only the blue or white screens reflecting from this effervescent gaze."

Digital Addiction: Internet businesses are organized around dopamine-dosing tools designed to hook the public

Some of the most-concerned respondents pointed to the monetization of attention – the foundation of the internet economy – as the driving force behind many wellness issues.

Douglas Rushkoff, a professor of media at City University of New York, said, "The real reason why digital technology will continue to compromise human cognition and well-being is that the companies dominating the space (Facebook, Google, Amazon) are run by people with no knowledge of human society or history. By leaving college at an early age, or running companies immediately after graduating, they fell under the spell of venture capitalists who push growth of capital over all other values. So the platforms will necessarily compromise humanity, democracy and other essential values. The larger the companies grow, the more desperate and extractive they will have to become to grow still further."

Michael Kleeman, senior fellow at the University of California-San Diego and board member at the Institute for the Future, wrote, "The early promise of the Net has been realized, but the financial incentives to use it for harmful purposes, including legal and illegal ones, have proven too attractive. 'Digital Life' will continue to erode personal interactions, reduce the diversity of ideas and conversation and contribute to negative health impacts. Other than the use of data analytics we have virtually no proof that wearables, etc., alter health trajectories. We do have evidence of a radical reduction in privacy, increase in criminal activity (as digital means reduce the cost of major financial and personal crimes), reduction of engagement with and caring for the environment as a result of increased interaction with online and digital devices."

Kate Thomas, a writer/editor based in North America, wrote, "Unfortunately, major social media corporations have discovered that anger and insecurity keep people glued to their screens. As long as profit is more important than people, digital life will only grow more destructive."

A **professor at one of the world's leading technological universities** who is well-known for several decades of research into human-computer interaction wrote, "Deterioration in privacy; slicing and dicing of identity for sale; identification of individuals as targets for political messaging. I don't see the institutions growing that will bring this under control. I don't see corporations taking sufficient responsibility for these issues."

Sam Punnett, president of FAD Research, Inc., said, "Distraction is our most prevalent commodity, paid for with attention span. The society-wide effects of 'continuous partial attention'

and the tracking, analysis and corruption of the use of data trails are only beginning to be realized."

Many respondents to this canvassing wrote about their concern that online products are designed to tap into people's pleasure centers and create a dependence leading to addiction.

Richard Bennett, a creator of the Wi-Fi MAC protocol and modern Ethernet, commented, "Highly-connected nations such as South Korea have had to develop treatment programs for internet addiction. Gamers in particular are subject to this malady, and Korea's broadband networks make gaming very attractive to socially isolated teens."

Vicki Davis, an IT director, teacher and podcaster based in North America, said, "Un-savvy consumers don't realize the addictive nature of the dopamine hits they are getting through the social media sites they use. In an attempt to keep a Snapchat streak going or to perform for the illusion of a growing audience, this generation could easily live a life one inch deep and a mile wide instead of a deeper life with deeper relationships and deeper productivity. The future of society depends upon our ability to educate people who are willing to get out of the zone on their phone and live life in the real world… Many students I work with seem to show some sort of withdrawal symptoms after just a few hours away from Snapchat or Instagram. The greatest innovations often happen with uninterrupted thought. This interruption generation must learn how to turn off their notifications and find satisfaction in solving problems that aren't solved in a snap but take years of dedication. Without tenacity, self-control and some modicum of intelligence about the agenda of social media, the interruption generation will miss out on the greatness that could be theirs."

Robert Stratton, cybersecurity entrepreneur, coach and investor, wrote, "While there may be beneficial uses for this technology… we cannot ignore the question of what happens when addictive technologies are coupled with very plausible but erroneous content, particularly when generated by skilled actors with specific goals. Additionally, there are decentralized, distributed-actor groups with information operations capabilities that I will assert now rival those of nation-states. Things are not what they seem. We now live in an environment where digital audio and video can be generated with modest skill to produce video that is functionally indistinguishable from photography while being essentially wholly specious. Most internet users and virtually all of the news media seem to operating on two errant assumptions: **1)** People mean what they write on the internet. **2)** People are witting of their roles in events that occur due to their actions. I would respectfully assert that anyone with a basic knowledge of intelligence tradecraft would agree that these are naïve in the modern environment. Additionally, there are now generalized programming APIs that provide the ability to make essentially ANY application or website habituating for its users."

An **anonymous respondent** predicted this scenario as a continuation of today's trends into the next decade: "More and more will seem possible in all aspects of life. People may perceive that their lives are better but it will be the experience of the lobster in the slowly boiling pot. Digital life will take people's privacy and influence their opinions. People will be fed news and targeted information that they will believe since they will not access the information needed to make up their own minds. Out of convenience, people will accept limitations of privacy and narrowed information resources. Countries or political entities will be the influencers of certain groups of people. People will be become more divided, more paranoid as they eventually understand that they have no privacy and need to be careful of what they say, even in their own homes. Some people will break free but at the loss of everything they had worked for. The digital divide will become worse, and many will be unable to pay for all the conveniences. To ensure simpler access and control, some political entities may try to make it available to everyone but at a cost of even more privacy. Convenience will be chosen over freedom. Perhaps."

The massive change in people's news-finding habits instigated by the rapid adoptions of the smartphone and social media was cited by some as the reason for the destruction of accurate, objective journalism, a foundation of democracy. An **anonymous respondent** commented, "The addictive nature of social media means the dis-benefits could be profound. Watch a young mother utterly engrossed in her phone and ignoring her small children and you will know what I mean. Humans need real-time, real-life interaction not just social interaction, yet the pull of the phone is overwhelming. More broadly, the platform companies are already destroying the business models of legacy media, and as that continues civic journalism will become thinner, poorer and possibly obsolete. Journalism won't disappear. It will simply drift back to propaganda."

A sampling of additional comments related to "digital addiction" from **anonymous respondents**:

- "Engaging apps and digital experiences are much like addictive substances such as alcohol, tobacco and even sweet foods and sex and there has been little progress in creating a 'healthy' consumption model for digital experiences."
- "Kids and adults alike are prone to go for the quick fix, the easy high or pleasant feeling, but not well armed to understand its impact on their health."
- "People's well-being will continue to be affected by the internet because the software, hardware and structures that are already in place are built to do exactly this."
- "As social networking becomes 'professional grooming' as well as providing family/friend updates, the need for multiple platforms (such as LinkedIn and Facebook/Instagram) becomes an assumed need. The amount of time it takes for workers to manage tedious online interactions will lead to an increasing lack of work/life balance."

- "Behavioral and psychological impacts of digital life will continue to be discovered and will confirm negative trends."
- "Digital communications and the time they take away from personal interactions are contributing to growing social isolation and eroding interpersonal relationships. This affects individuals' mental well-being. People everywhere – walking, in their cars, in meetings, etc. – are glued to their cell phones."
- "Unless we are more aware/careful/media literate, there are a lot of 'analogue' behaviours we will jettison that are actually more efficient, positive and valuable."
- "When human beings are constantly reminding themselves about a selfish bubble they've lost touch with the truth."
- "I fear… social media having us surround ourselves with people who think like we do, entrenching divisions among people."
- "Engagement in social media takes a lot of time for the individual and gives back small and decreasing jolts of satisfaction for a substantial cost in time."
- "There is a reason the iPhone was initially called a 'crack-phone.' Spending time on websites and apps is a very seductive way to avoid and/or ignore painful and difficult situations. I've seen very young children ignored while their caregiver texts, plays games, or surf the Net and can't help but wonder how this neglect is affecting them. Will these children learn to parent their children in a better way or will they do the same thing?"

Digital Distrust/Divisiveness: Personal agency will be reduced and emotions such as shock, fear, indignation and outrage will be further weaponized online, driving divisions and doubts

Among the most-expressed fears for well-being in the next decade were those having to do with issues of social isolation, societal distrust and identity and human agency.

Fay Niker, postdoctoral fellow at Stanford's Center for Ethics in Society, wrote, "Understanding well-being in terms of human flourishing – which includes among other things the exercise of autonomous agency and the quality of human relationships – it seems to clear to me that the ongoing structuring of our lives by digital technologies will only continue to harm human well-being. This is a psychological claim, as well as a moral one. Unless we are able to regulate our digital environments politically and personally, it is likely that our mental and moral health will be harmed by the agency-undermining, disempowering, individuality-threatening and exploitative effects of the late-capitalistic system marked by the attention-extracting global digital communication firms."

Evan Selinger, a professor of philosophy at Rochester Institute of Technology, wrote, "The repeal of the Obama administration's 2015 rules for Net neutrality is a devastating blow… Net neutrality is fundamentally about social control. Thanks to the [Ajit] Pai regime at the FCC, Internet Service Providers have more power than they deserve to micromanage how we conduct our online social, political, educational and economic lives. While Net neutrality advocates have identified several disheartening outcomes to be on our guard for, the projected parade-of-horribles only scratches the surface. If we can't get the information superhighway right, it's a bad omen for the future where we'll need to govern a mature Internet of Things. Second, although analysis of the last U.S. presidential election is shining a spotlight on the problem of botified communication, the focus on internet propaganda obscures the more basic, habit-forming ways that we're being techno-socially engineered to outsource more and more of our communication – and thus ourselves – to software. Third, despite increased awareness of the value of being able to spend time offline, practical constraints continue make the freedom to unplug ever-harder to achieve."

Adam Popescu, a freelance journalist who has written for the New York Times, Bloomberg and other publications wrote, "You see it everywhere. People with their heads down, more comfortable engaging with a miniature world-in-a-box than with the people around them. And you see it while they're behind the wheel driving, while working and performing dangerous and focus-intensive tasks. Forget emotional happiness and the loss of focus and deep thought and the fact that we're now more comfortable to choose who we sleep with based on an algorithm than we are based on serendipity, intuition, chance, and the potential for rejection by walking up to someone and saying 'Hi, my name is…' The biggest issue with our addiction to smartphones, one none of us talk about openly yet all engage in, is the threat to health and safety. Sure, no one says 'hi' anymore when they're passing by, no one takes a moment to be friendly or reach out, even with just our eyes, because our eyes are no longer at eye-level, they're down, hiding in our screens. Social media over the past year has been revealed for the ugly wolf-in-sheep's clothing it is, a monster once draped in the skin of liberty. We see it for what it is. When will we see that it's not just the programs and toys and apps and sites on our screens that are the problem – but our screens themselves?"

Judith Donath, author of "The Social Machine, Designs for Living Online," also predicted, "We will see a big increase in the ability of technologies to affect our sense of well-being. The ability to both monitor and manipulate individuals is rapidly increasing. Over the past decade, technologies to track our online behavior were perfected; the next decade will see massively increased surveillance of our off-line behavior. It's already commonplace for our physical location, heart rate, etc., to be tracked; voice input provides data not only about what we're saying, but also the affective component of our speech; virtual assistants learn our household habits. The combination of these technologies makes it possible for observers (Amazon, government, Facebook, etc.) to know what we are doing, what is happening around us, and how we react to it all. At the same

time, increasingly sophisticated technology for emotion and response manipulation is being developed. This includes devices such as Alexa and other virtual assistants designed to be seen as friends and confidants. Alexa is an Amazon interface – owned and controlled by a giant retailer: she's designed, ultimately, to encourage you to shop, not to enhance your sense of well-being."

A number of these experts wrote about their concerns that technology's evolution would make people suffer a "loss of agency" and control over their world.

Dewayne Hendricks, CEO of Tetherless Access, said, "It is important to consider just how much of digital life is provided/controlled by cyber monopolies. Those entities will have an ever-increasing ability to control/shape the factors that make up that digital life. I see individuals for the most part having less control as time passes."

John Klensin, Internet Hall of Fame member, longtime Internet Engineering Task Force and Internet Society leader, an innovator of the Domain Naming System administration, said, "I am impressed by the increasing anecdotal and research evidence of people not only using the internet to isolate themselves from others but to select the information they are exposed to in a way that confirms and strengthens their existing, predetermined views. While that behavior is certainly not new, the rapid turnaround and instant responsiveness of the internet and social media appear to be reinforcing it in ways that are ultimately undesirable, a situation that is further reinforced by the substitute of labeling and denunciations for examination and reasoning about facts."

Rosanna Guadagno, a social psychologist with expertise in social influence, persuasion and digital communication and researcher at the Peace Innovation Lab at Stanford University, wrote, "In my professional opinion, the current trends in digital communication are alarming and may have a negative long-term impact on human social interaction. It was naive of social media companies fail to consider and prepare for the prospect that their platforms could be misused for large-scale information warfare (e.g., Russian interference in the 2016 U.S. presidential election). Furthermore, these companies have shirked their responsibility to their users by failing to protect their customers from cyberwarfare. This has not only interfered with people's perception of reality and their ability to tell fact from fiction (I've actually conducted research demonstrating that information presented on a computer screen is perceived as more persuasive than comparable printed material). This has caused a lot of disinformation to spread online and has fueled myriad divisive online interactions. In addition to these issues, there is quite a bit of evidence mounting that people are spending more and more time alone using digital communication as a proxy for face-to-face interactions and this is increasing loneliness and depression among people, particularly our young adults. These technologies should be designed to promote healthy interactions. One way to accomplish this would be to switch to more interactive options for

conversation (e.g., video chat instead of text-based conversation would reduce miscommunications and remind people that there are other people with real thoughts, feelings, and emotions behind the computer screen). It remains to be seen whether any of the promises made by digital technology companies to address these issue will be implemented. As a faculty member, one issue I've also commonly noticed is how little time is spent on ethics and psychology as part of the typical software engineering course curriculum. The ethics of software development and the idea that technology should be designed to enhance people's well-being are both principles that should be stressed as part of any education in software design."

A sampling of quote excerpts tied to "digital distrust/divisiveness" from **anonymous respondents**:

- "The dominance of algorithmic decision-making and speed and reach of digital realms have proliferated cultures of misinformation and hatred. We have not yet adjusted to this. It may take a while for the political realm to fully engage with it, and for people to demand tech companies regulate better. I am more optimistic in the long run than I am in the short term."
- "People spend too much time online, often devouring fake and biased items. They grow hateful of each other rather than closer in understanding. Negative and harmful ideologies now have platforms that can reach much farther."
- "There will be an increase in isolation, further dependence on technology and an increase in unearned narcissism."

Digital Duress: Information overload + declines in trust and face-to-face skills + poor interface design = rises in stress, anxiety, depression, inactivity and sleeplessness

A swath of respondents argued that as digital life advances it will damage some individuals' sense of self, their understanding of others and their faith in institutions. They project that as these technologies spread, they will suck up people's time and attention and some will be overwhelmed to the point that they often operate under duress, in a near-constant state of alert.

Larry Rosen, a professor emeritus of psychology at California State University-Dominguez Hills known as an international expert on the technology and its impacts on well-being, wrote, "**1)** We continue to spend more time connecting electronically rather than face-to-face, which lacks essential cues for understanding. **2)** We also continue to attempt to multitask even though it harms performance. **3)** We insist on using LED-based devices close to our eyes right up to bedtime even though it negatively impacts sleep and our brain's nightly needs for synaptic rejuvenation harming our ability to retain information."

Susan Price, lead experience strategist at USAA, commented, "Mental health problems are rising and workplace productivity is falling. The tendency to engage with digital content and people not present instead of people in our immediate presence is growing, and small-screen trance has become an accepted interpersonal norm in the workplace. Culturally-induced attention-deficit behavior has already reached staggering proportions, and is still rising. The mini-serotonin payoffs we get when 'connecting' in this way are mildly, insidiously addictive and are squeezing out the more uneven, effortful, problematic real social connections we need for true productivity and intimacy."

Stowe Boyd, managing director at Work Futures, said, "Well-being and digital life seem so intertangled because of the breakdown between personal and public life… that digital tools have amplified. One significant aspect of public life is our relationship to work… We need to wake up to the proximate cause of the drive for well-being, which is the trap of overwork and the forced march away from living private lives."

K.G. Schneider, dean of the university library at Sonoma State University, wrote, "Anonymized discourse, it turns out, is not a civilizing influence, nor is having one's every thought broadcast in real time the best way for us to interact as humans."

Marcus Foth, professor of urban informatics at Queensland University of Technology, wrote, "Advancement and innovation of digital technology is still predominantly driven by the goal to increase and optimise productivity rather than people's quality of life or well-being. While proponents of an elusive work-life-balance may argue that you can always switch off digital technology, the reality is that is not being switched off – not because it cannot, but there is now a socio-cultural expectation to be always available and responding in real-time."

Jan Schaffer, executive director at J-Lab, wrote, "Overall, people will be more harmed than helped by the way the internet is evolving. People's trust in basic institutions has been hurt, perhaps irreparably, by conflicting accounts of what is true or not, online. People's productivity at work has been hampered by the distractions of social media. People's social and emotional intelligence have been impaired by the displacement of personal interactions with online interactions. "

A **digital strategy director** for a major U.S. professional association wrote, "Device use will lead to more social alienation, increased depression and less-fit people. Because it's still relatively new, its dangers are not well understood yet."

A **professor** wrote, "While there are many positive aspects to a more digitally connected life, I find that it is very difficult to keep up with the volume of spaces where one must go. I spend too much time answering emails, communicating in digital spaces and just trying to keep up. This causes a significant amount of stress and a lack of deliberate, thoughtful approach to information sharing. One cannot keep up with personal and professional email accounts, LinkedIn, Twitter, Facebook, Instagram and all the rest. Truly, it is just too much."

A sampling of comments about "digital duress" from **anonymous respondents**:

- "There is too much connecting to other people's anxieties and expectations."
- "We already know there are negative effects for everyone waiting for a 'like' or other similar kind of gratification."
- "I worry about mental illness and increasing social isolation as a result of more time spent with technology."
- "Increased digitalization is leading to more sedentary lifestyles in a society already plagued with obesity challenges. Social media use has also led to poor communication skills, even in face-to-face settings, people opt to burying their faces into the smartphone screens."
- "Some people are creating and then trying to live up to fake worlds they build with their phones."
- "Constant connections to electronic information feeds causes anxiety and damage to our eyes, brains."

Digital Dangers: The structure of the internet and pace of digital change invite ever-evolving threats to human interaction, security, democracy, jobs, privacy and more

A number of respondents pointed out that digital life opens the door to societal dangers that can affect individuals' well-being. They say the digital world's systems – the internet, the Web, the smartphone, all networked digital hardware and software – have evolved so rapidly due to their incredible appeal and the economic and social forces driving them forward that there has been little recognition of nor a real reckoning with the wider negatives emerging with the positives.

Anthony Rutkowski, internet pioneer and business leader, said, "Clearly – as DARPA's director noted in his seminal 2000 millennium article on this topic – the past 17 years have demonstrated how the DARPA internet, which was never designed for public infrastructure use, has resulted in all kinds of adverse impacts to people's lives and even the security of society. It has amplified the most outrageous behavior and alt[ernate]-truth as the new normal. See details of my position at http://www.circleid.com/posts/20170312_the_internet_as_weapon/" [Excerpt: "The existence of 'an open platform that enables anyone, everywhere, to share information, access opportunities and collaborate across geographic and cultural boundaries globally is fundamentally a weapon'… such

an infrastructure has inherent economic, operational, and political self-destructive properties that are playing out exponentially every day."]

A **longtime leader of research at one of the top five global technology companies** said, "I chose my career believing that technology would improve our lives. Seeing what has happened, I've grown pessimistic. Our species has lived for millions of years in small communities – bands, tribes, extended families. We are wired to feel valued and good about ourselves through direct, repeated interactions in such groups. These tight-knit associations are disappearing as our activity moves online. Relationships are replaced by transactions. If we avoid catastrophe, in the long run natural selection will produce a new kind of human being that is adapted for the world we are creating. That individual will not be like most of us. Living through the transition will be painful."

Aram Sinnreich, an associate professor at American University's School of Communication, said, "In general, people's lives will change for the worse over the next decade because of the internet. There are several factors I am taking into account here: **1)** The increasing prevalence and power of internet-based surveillance of citizenry by state and commercial actors. **2)** The catalyzing power of digital technology in exacerbating the gaps between haves and have-nots. **3)** The as-yet-undertheorized and unchecked role of digital disinformation in polluting the democratic process and news dissemination channels. **4)** The increasingly savvy and widespread use of the internet by crime syndicates. **5)** The increasing vulnerability of our social infrastructure to internet disruption and hacking. **6)** The environmental consequences of the internet, recently exemplified by studies analyzing the electrical power consumption that goes into Bitcoin transaction processing. This isn't to say there aren't many benefits to the internet, or that its impact won't net positively over the longer term. But I don't see any likely benefits outweighing the threats I outlined above over the next decade."

A **professor** based in North America said there is a public *perception* of well-being – crafted by platform builders and policy (or lack of policy) – while well-being is actually being damaged. This respondent wrote, "People may very well experience an increase in *subjective* well-being. The techno-social world we're building is increasingly geared toward engineering happy humans. While a life of cheap bliss, of satiated will, may yield more net well-being measured in terms of subjective happiness, it would at the same time be a rather pitiful life, devoid of many of the meaningful blessings of humanity. Brett Frischmann and Evan Selinger address the questions you're asking in a 500-page book, 'Re-Engineering Humanity,' due out in April 2018. One chapter, 'To What End?' directly considers the normative values at stake and the issue of what well-being means. Other chapters explain in detail the technological path we're on and how to evaluate techno-social engineering of humans."

Bob Frankston, a technologist based in North America, said, "The internet is not a thing but rather a product of the ability to use software to program around limits. It enables the creation of systems of technologies that work in concert. But the benefits will be limited to point solutions as long as we are limited to solutions that are profitable in isolation, until we invest in common infrastructure and have open interfaces."

Jeremy Blackburn, a computing sciences professor who specializes in the study of the impacts of digital life, wrote, "**1)** People will continue to be manipulated via targeted (mid/dis)information from a variety of sources. **2)** There will be an increase in online harassment attacks that will be mostly ignored due to their statistical weight (Google/Facebook/Twitter/etc. do not care if 0.1% of their users are attacked, even though the raw numbers are substantial). **3)** There will be an increase in extremists and their ability to recruit and radicalize vulnerable individuals. **4)** There will be an increase in information silos, eventually resulting in extreme polarization of information acceptance. **5)** There will be decreased concern about individual impact in the face of big data and large-scale machine learning (e.g., a 1% increase in revenue due to scale is worth it, even if it means a few people here and there will suffer). This will eventually cascade to large-scale suffering due to network effects. **6)** There will be an increase in the acceptance of opinion as fact due to the democratization of information. No one knows if you are a dog on the Internet, and no one cares if you are an expert."

An **anonymous respondent** commented, "What we are seeing now becoming reality are the risks and uncertainties that we have allowed to emerge at the fringes of innovation. One is the systemic loss of privacy, which is a precondition for deliberation and a sense of self-determination. Further, we already see how our critical infrastructures – ranging from energy supply to health systems and the internet itself – increasingly are at risk of failing us due to their openness for malicious attacks, but also due to the complexity of interrelated, networked processes. Due to the lack of traceability on the internet, there is no expectation that we will achieve accountability in such situations."

A **Ph.D. in biostatistics** commented, "The culture of anonymity on the Web is scary and seems to allow people to behave in ways they wouldn't otherwise (see recent news about 'swatting' in the online gaming community). Then there is the social media 'hive' that allows internet uproar to dictate what happens. There is no room for discourse, grey areas or mistakes. Lives can be ruined by the publicity of a simple mistake (and combined with people sharing home addresses this can also be dangerous)."

A **professor in the United States** commented, "My belief is that unless extensive regulation and user education occurs, we will see an increase in negative consequences of online activity such as violations of privacy, dissemination of misinformation, crime and displacement of jobs."

A **research scientist and internet pioneer** commented, "We have reaped great benefit from digital life over the past decades. My answer compares the next decade to the current situation, not to the time prior to the digital life. The negative aspects of the digital life are becoming more pronounced, and I think the next decade will be one of retrenchment and adjustment, while society sorts out how to deal with our perhaps over-optimistic construction of the digital experience."

A sampling of additional comments about "digital dangers" from **anonymous respondents**:

- "Election results will remain unverifiable and subject to digital manipulation by political criminals… Terrorists will recognize more ways to destabilize economic, social, political and environmental systems."
- "Security/hacking and manipulation online may cause more harm; e.g., the latest Intel bug."
- "People's well-being will be hurt unless we figure out the cultural and social and political solutions – and religious and economic ones – to life online. Every medium needs to be tamed. It will take a while for digits to be domesticated."
- "I fear government and private-sector security measures in 'protecting' individuals, and I fear the advancement of AI."
- "The loss of privacy as data sharing and integration continues will be highly problematic. Government, industry and hackers will all benefit."
- "We don't know the effects of electromagnetic fields (EMF) and radiation. It's not a mainstream idea to protect people from the negative health impacts of radiation."
- "Technology's beneficial effects (improved efficiency, access to information) are increasingly being overwhelmed by its negatives – distraction, disconnection from real in favor of virtual interactions, and how anonymity unleashes ugly behaviors such as misogyny, racism and overall nastiness."
- "Increasing surveillance and social control by corporations and their political representatives will reduce the standard of living and freedom for the majority of the citizens in a world of rapidly changing climate."

4. Intervention Ideas to Ease Problems

Respondents to this canvassing were asked what might be done to diminish any threats to individuals' well-being that are now emerging due to people's choices in creating digital systems and living digital lives. Whether they answered that digital life will be mostly helpful or mostly harmful, a majority of respondents said there are existing and foreseeable downsides that deserve attention. They discussed ways in which adjustments might be made to build a better future.

One particularly comprehensive answer came from **Aram Sinnreich**, an associate professor at American University's School of Communication, who listed several ideas: "The most important thing we can do to mitigate the negative social effects of the internet is to draw on social scientific and communication research to understand the multifaceted roles it plays in public and private lives, and to use both state and market regulatory measures to address these different dimensions separately, while maintaining a holistic understanding of its transformative potential overall. In practice, this means measures including but not limited to: **1)** Holding algorithms, and the companies responsible for them, accountable for their role in shifting and shaping social and political power dynamics. **2)** Developing a 'digital bill of rights' that privileges human dignity over the profit motive; **3)** Involving multiple stakeholders on a global scale in internet governance. **4)** Integrating digital media literacy more deeply into our educational systems. **5)** Regulating internet communications in way that privileges diversity of participation at every level and requires accountability and transparency to consumers and citizens. **6)** Investing heavily in post-fossil fuel energy sources."

There are those who expect that interventions may have a bit of influence but not enough.

Eric Allman, research engineer at the University of California-Berkeley, commented, "I do think there exist actions that can (and will) be taken to mitigate problems, but I am not confident that those mitigations will be enough to solve the problems."

Joseph Turow, professor of communication at University of Pennsylvania's Annenberg School of Communication, wrote, "Changes can be made to mitigate potential harms of digital life but, depending on what those harms are, the responses will require a complex combination of public education, government activity and corporate agreement. Some of the harms – for example, those relating to issues of surveillance and privacy – unfortunately result from corporate and government activities in the political and business realms. Moreover, government and corporate actors often work together in these domains. Their vested interests will make it extremely difficult to address privacy and surveillance practices so that they match the public interest, but advocacy groups will keep trying and they may make some progress with increasing public awareness."

In the next few sections we share respondents' ideas about the potential interventions that might help bring a better future for people living digital lives. They are organized under these commonly occurring themes: Reimagine Systems; Reinvent Tech; Regulate; Recreate Media Literacy; Recalibrate Expectations; Fated to Fail.

Reimagine Systems: Societies can revise both tech arrangements and the structure of human institutions – their composition, design, goals and processes

A large share of respondents said human systems tapping into human nature are to blame for many of the downsides of digital life. They argue that fixing those problems can make a difference for the better.

Alejandro Pisanty, a professor at Universidad Nacional Autonoma de Mexico and longtime leading participant in the activities of the Internet Society, wrote, "An open, public, civil, rational discussion of principles guiding systems design and implementation will become critical. All stakeholders must be availed a chance to participate meaningfully, in a timely and relevant manner. The most important intervention is to help, nudge or even force people to THINK, think before we click, think before we propagate news, think before we act. Some regulatory actions inviting information disclosure by corporations and government may be helpful but will fall on fallow ground if people are not awake and aware. Second: transparency to a reasonable extent will continue to be necessary, so the basis of decisions made by systems can be understood by people, and people and organizations can in turn test the systems and adjust their responses."

Giacomo Mazzone, head of institutional relations at the EBU/WBU Broadcasting Union, shared a number of specific targets for improving systems, writing, "**1)** New antitrust rules on a global scale need to be defined, and corporations that have reached far beyond their boundaries have to break up. The internet giants that immediately take over any innovation arriving into the market are becoming an obstacle to change and progress. **2)** The open internet needs to be preserved at any price. If we have separate internet for the rich and the poor, the reasons we have granted special status and exceptional treatment to the internet revolution have gone. **3)** Disruptive social impacts need to be adressed quickly – as the disruption process is identified and not afterward. Educational processes need to be redesigned, taking into account the notion of digital citizenship and the need for lifelong learning processes. **4)** A brand new 'social contract' should be defined and signed between ruling classes, business community, citizens; the notions of salaries, jobs, pensions and social security need to be redesigned from scratch."

Anita Salem, a human systems researcher based in North America, commented, "Potential risks can be mitigated by reframing the role of technology and reducing the power of corporations.

Technology needs to focus on the whole system, minimize unintended consequences and support big lives rather than big corporations. In addition to marketability, technology should be valued by how well it strengthens human relationships, preserves our planet, bridges inequalities and provides a livable wage, gives voice to the marginalized, develops creativity, supports mental and physical health and increases opportunities for leading a meaningful life. This however, requires a cataclysmic shift in our economic system."

Jillian C. York, director for International Freedom of Expression at the Electronic Frontier Foundation, said, "Interventions to mitigate the harms of digital life are possible, but they require a commitment to holistic solutions. We can't simply rely on technology to mitigate the harms of technology; rather, we must look at our educational systems, our political and economic systems – therein lie the solutions."

A **retired consultant and writer** said, "The digital environment enables platforms of near costless coordination – the benefits of which will require a 're-imagining' of work and society in order the harness these benefits. Thus, while every technology can be weaponized and incumbent rent-seekers will fight to remove protections and capture regulation for their own profiteering, the real power of the digital environment will require new forms of institutional innovation, new institutional frameworks and public infrastructures and more."

Sy Taffel, senior lecturer in media studies at Massey University, wrote, "Moving away from the corporate model of platform capitalism towards commons and public alternatives that are driven by a desire to build a more equitable and fair society rather than profiteering from the commodification of communication and systematic dataveillance would be a good start at addressing the systemic issues that currently exist. There are a huge number of areas where legislative activity to curb the behaviour of tech corporations can help, and the European Union has recently taken a lead in doing this in numerous cases, ranging from prohibiting the use of toxic substances in digital devices to how personal data can be used. The social harm that results from tech corporations' pervasive tax avoidance cannot be overstated either."

David J. Krieger, director of the Institute for Communication & Leadership, Lucerne, Switzerland, observed, "Generally society and its organizations should proactively move away from the established solutions to problems as they were defined in the industrial age and try innovative forms of networking, sharing and management of information."

Darlene Erhardt, senior information analyst at the University of Rochester, commented, "We certainly can create awesome, cool tech toys but we also need to pay closer attention to the moral/ethical/societal implications, benefits and effects. If that's not at the very core, the

foundation, then the cool new stuff that gets created has a greater likelihood of being used for negative things."

Jodi Dean, a professor of political science said, "Internet giants (Google, Facebook, Apple, etc.) can be collectivized, turned into public utilities so that capitalist dynamics don't guide the way they develop."

An **anonymous respondent** said, "An increasing focus on the role of the Big-Five tech companies will shape how they behave in the years to come. With increased pressure, these companies will address their responsibility for the content on their platforms along with other critical issues such as privacy, access and the potentially addictive nature of product design."

Mike Silber, general counsel at Liquid Telecom South Africa, wrote, "We need partnerships to deal with content issues. No one entity can accept responsibility; there needs to be a form of co-regulation between content creators, content users, platforms and governments to ensure that the freedom and openness allowed by digitalisation is preserved, while malicious actions can be mitigated… We run the risk of perpetuating digital echo chambers where independent thought will gradually disappear."

Some said that the teams of technologists who are creating the products of digital life lack the appropriate diversity – that the people constructing the ways of knowing and accessing knowledge and human connection should represent all of humanity.

Brenda M. Michelson, an executive-level technology architect based in North America, commented, "We need to improve how we build and introduce digital products, services, information and overall pervasiveness. On building, we need to diversify the teams creating our digital future. **1)** These future builders must reflect society in terms of race, gender, age, education, economic status and so on. **2)** As digital is integrative – technology, data, arts, humanities, society, ethics, economics, science, communication – the teams must be composed of individuals from across professions and backgrounds, including artists, scientists, systems thinkers and social advocates. On introduction, we need – desperately – to build information literacy and critical-thinking skills across the population and improve curation tools without impinging on free speech."

A **futurist** commented, "Awareness is changing and non-tech expertise is being integrated into the planning of technology being developed. There will still be unintended side effects, but with diverse perspectives from the start we have a better chance of minimizing – and even foreseeing – the potential ill effects and working toward better solutions."

Digital life is built from code-based technologies that are protected as intellectual property and thus their structures are generally not made public. This is seen as a danger by some who say there should be algorithmic transparency and openness to how and why tech tools are built as they are.

A **distinguished technologist at a major tech company** in the U.S. wrote, "As AIs [Artificial Intelligence systems] become more common and important, we need to have visibility to how algorithms are making decisions and what happens to our data."

Peter and Trudy Johnson-Lenz, principals of Pathfinding Smarter Futures, wrote, "Scientists need to find ways of listening to and valuing more diverse forms of public knowledge and social intelligence. Only by opening up innovation processes at an early stage can we ensure that science contributes to the common good. Debates about risk are important. But the public also wants answers to the more fundamental questions at stake in any new technology: Who owns it? Who benefits from it? To what purposes will it be directed? See 'See-Through Science: Why Public Engagement Needs to Move Upstream' by James Wilsdon and Rebecca Willis: 'Those advocating redesign and different ways of using these technologies must be given a platform to share their thinking so new products and services can be developed, tested and adopted. Ultimately, we need to have more 'see-through science,' to involve the public upstream in the development process to make sure science and technology contributes to the common good.'"

Some suggested that tech design can be mindfully built to lift individuals' experiences to be more beneficial to well-being just as easily as it can be designed to be addictive.

Brad Templeton, software architect, civil rights advocate, entrepreneur and internet pioneer, wrote, "The key action is to identify when things are not working well, do research, and then work to fix it in the design of the next generation of products. First generations will continue to tend to have unintended consequences. You can't have innovation without that."

Jerry Michalski, founder of the Relationship Economy eXpedition, said, "User-experience (UX) design dictates most of what we do. Place a big source of addictive content in the focus of attention and most people will slip into that trap. If our UX designers wise up, they can just as easily design wellness, mindfulness, self-control and other features into the devices we use. It's possible, but the business models that fuel these companies make such steps unlikely."

Micah Altman, head scientist for the program for information science at MIT, said, "Information technology is often disruptive and far faster than the evolution of markets, norms and law. This increases the uncertainty of predicting the effects of technological choices but doesn't render such predictions useless, nor prevent us from observing these effects and reacting to them… We know

enough to effectively design substantial elements of privacy, security, individual control, explainability and audibility into technical systems if we choose to do so. How will specific technology choices affect individuals and society? We do not always know the answers to technology questions in advance. But we can choose now to design into our systems now, the ability for society and individuals to ask these questions and receive meaningful answers."

Salvatore Iaconesi, an entrepreneur and business leader based in Europe, said, "Bring in arts and design to work not only on providing information and skills, but also to work on the dynamics of desire, imagination and emotion, which are the real behavior-changers."

Some respondents aren't so sure that progress in the ethical design and use of technology can overcome the influence of base human nature. **Frank Kaufmann**, a scholar, educator, innovator and activist based in North America, commented, "People are constantly improving, so technology naturally supports that. Unfortunately our race is blocked from true progress until people embrace the secret to dissolving and removing dominating self-interest. Tragically technology exacerbates that."

The overarching sentiment among these respondents is that people have to take action, not simply step back and let an avalanche of technology overwhelm human reason.

Marc Rotenberg, director of a major digital civil rights organization, wrote, "The initial hurdle in all such challenges will be to overcome technological determinism. This is the modern-day religion of acquiescence that stifles reason, choice and freedom."

An **anonymous respondent** commented, "We are ruled by a dysfunctional worldview that values profit over people; it skews what the internet does and what it can do. The internet has the power to be much more positive in people's lives but that requires a different political framework."

A sampling of additional comments about the "reimagine systems" theme from **anonymous respondents**:

- "A new model of education for our technologists and engineers should incorporate ethics and public policy. Better investigative journalism should be directed at tech."
- "Companies can't be allowed to just shrug their shoulders and say that people's safety on the internet is not their concern."
- "We need empowered technology ethicists. Profit should not be the only driver for technology-driven change."
- "Providers should be able to better control security and safety for users."

- "We need to provide strategies for disconnecting, which is as important as connecting."
- "A substantive rethinking of design principles and the true potential of these technologies, beyond the limiting visions of Internet of Things and social media, is necessary."
- "Companies like Facebook, Google and even Twitter need to recognize that with their power comes great social responsibility. This will be even more true as companies like Uber merge digital and physical worlds so that the risks people face are not just nasty messages but immediate physical danger."
- "We can apply experience and knowledge to keep us grounded in the physical world and continue the advancement of technology. An essential component of this is how we maintain the inherent democratic nature of a non-hierarchical internet."
- "Stopping gamification of everything is an obvious first step."
- "The fact that there are possible interventions for good does not guarantee that they will be effected or that they will not be countered by forces against good."

Reinvent Tech: Things can change by reconfiguring hardware and software to improve their human-centered performance – and exploiting tools like artificial intelligence (AI), virtual reality (VR), augmented reality (AR) and mixed reality (MR)

A number of respondents said technology fixes and emerging tech tools can be called upon to mitigate many current challenges to individuals' well-being.

Daniel Weitzner, principle research scientist, MIT Internet Policy Research Initiative, commented, "When interacting online, we need to know whether we are dealing with real people, and those people need to be held accountable (sometimes socially, sometimes legally) for the truth and integrity of their words and actions. As an alternative to censoring speech or controlling individual associations, we should look to increasing accountability while recognizing that sometimes anonymity is necessary, too. And, when platform providers (i.e., advertisers and others) operate platforms for profit, we should consider what mix of social and legal controls can provide the right measure of accountability."

Dan Ryan, professor of arts, technology and the business of innovation at the University of Southern California, wrote, "I would like to see a low-transaction-cost method for tagging ownership of personal information that would allow individuals to up-license use of their data (including the ability to withdraw the license) and potentially collect royalties on it. A block-chain-like technology that leaned in the direction of low transaction cost by design rather than trying to be a currency might allow this to work. Alternatively, third-party clearing houses that operate as consortia could control good/bad behavior of information users (e.g., if you continue to use personal info when license has been revoked you will be denied access to further information)

could make something like this possible. An extension of this to permanent transportable identity and credit ratings could make a big difference in parts of the world where those things are a challenge."

Bart Knijnenburg, assistant professor, Clemson University, said, "An important side-effect of our digital life is that it is observable and amenable to research. This aspect is slowly but steadily revolutionizing the fields of psychology, sociology and anthropology. The available data is so vast that we can now study subtle phenomena and small sub-populations (e.g., underserved minorities) in increasing detail. If insights from the 'digital humanities' can be fed back into the development of online technologies, this can help mitigate the potential harms of digital life."

Sam Lehman-Wilzig, retired chair, School of Communication and Department of Political Studies at Bar-Ilan University, Israel, wrote, "Social media will be forced by regulation, legislation and/or public pressure to limit some of the more deleterious elements within their platforms – this will involve artificial intelligence to aid in 'surveying' the constant, vast, flow of communication, a small part of which is harmful and even illegal."

A **distinguished advocate for the World Wide Web and policy director** based in Europe said, "Technologies such as artificial intelligence and blockchain have the possibility to greatly improve how we navigate through the world and how the world is structured. If these technologies are developed in a way that aims at increasing the greatest social good, then they have the potential to have an extremely positive impact on our economies, societies and politics. This would mean placing the individual at the center of concern and the problems that technologies are being developed to solve."

Alf Rehn, a professor of innovation, design and management at the University of Southern Denmark, wrote, "As always, information and education are key… Rather than building in limitations such as 'maximum allowed screen time,' digital tools should inform their users of good usage practices, allowing for considered choices."

Morihiro Ogasahara, associate professor of sociology at Kansai University, said, "Because users of platforms (e.g., Google, Facebook) hopes for these actions, platforms will have to respond to the huge demand. Of course the definition of benefits/harms sometimes depends on people's habits or cultural context and these have been shifting, therefore the actions will be necessarily temporal symptomatic treatments."

George Strawn, director of the U.S. National Academies of Science, Engineering and Medicine Board on Research Data and Information, said, "'Interventions' will be among the new tools and services that will continue the evolution of the internet."

A sampling of additional comments about "reinvent technology" from **anonymous respondents**:

- "As AI makes digital applications easier to learn, fix and adapt to us, it will greatly reduce the time learning how to use new applications."
- "Future technologies (e.g., AI, semantic technologies) have the potential to assure greater information/data provenance."
- "New technologies can mitigate harmful effects of digital technology. For example, dual authentication can enhance security. That said, good and evil will always be in a race."
- "A technology self-limiter needs to be pervasive, not app by app, or site by site, but rather something that's embedded in our culture."
- "The Web can generally move toward more human-centric designs that celebrate individuality rather than attempt to put people in pre-defined categories for ad targeting purposes… Advertisers themselves can demand it, as it would reduce the propensity toward trolling and extremism that we see today."
- "Moving away from incentive-based features that require constant check-ins is a good start."
- "Security could be fundamentally improved, sparing everyone a ton of annoyance. But it won't be, because that would require a fundamental change in the architecture of the internet."
- "Our digital 'diet' will become more apparent with new guidelines for healthy patterns of use. New apps will become more analytic, alerting us to the health of our financial affairs, personal health and well-being and in so doing liberate more time for personal enrichment, exercise, time with family and friends."
- "Tech is both our best and worst friend. Ways to make it our best friend: Make it stop if over-used. Initiate self-governing rules and self-learning AI rules to avoid things like bullying, etc. Deep-learning fact-checking to avoid fake news. Create social citizenship as part of any action relevance."

Regulate: Government and/or industry should create reforms through agreement on standards, guidelines, codes of conduct and passage of laws and rules

A number of people said they do not expect change without some sort of industry, government and public interventions – requirements, professional codes, rules, laws or other guiding structure that works to elevate the public good and individuals' well-being over profits without stifling helpful innovation.

Seth Finkelstein, consulting programmer at Finkelstein Consulting, observed, "It's too common to have any harms excused as an inevitable consequence of technology, when it's really a matter of policy. That is, a net benefit can be composed of many large positives and negatives… 'Digital life' can mean easily connecting with someone sharing your particular problem. But it also means an easy connection for anyone who has a problem with *you*. The flip side of 'supportive community forum' is 'social-media hate mob.' Having a world of knowledge at your fingertips also means having the world's distractions a click away. Doing business all over the globe brings being able to be scammed from foreign lands. Consulting with experts in another country means offshoring labor is practical. All of these effects, and more, do not take place in isolation, but are profoundly affected by governmental actions."

Rob Frieden, a professor of telecommunications and law at Penn State University, commented, "Leaving technology introduction and integration to an unregulated marketplace diminishes the benefits, because most stakeholders do not operate as charities. If governments conscientiously embrace their consumer-protection and public-interest advocacy roles – a big if – society can integrate new technologies accruing measurable benefits."

Tom Wolzien, chairman at The Video Call Center LLC, was among those who proposed specific steps: "**1)** Provide plain and simple notice to the consumer of the [owner responsible] for each site, app, stream or other material reaching that consumer on that web/app page or event. **2)** This is a legal editorial responsibility for the content presented (consistent with current libel, slander, defamation and rights laws covering legacy print and mass media). **3)** Application of anti-trust law to vertical and horizontal integration across all media, including all online media."

Narelle Clark, deputy CEO of the Australian Communications Consumer Action Network, said, "Increasingly regulators are finding ways to enforce previously accepted norms of requisite content quality – in areas such as unrealistic health claims on health apps, for example. Data-governance regimes are also becoming more widely accepted and enforced. While we will continue to see poor (and even appalling) examples of data mismanagement and misuse, new products and product-development approaches are starting to take privacy and good data management principles into account. With the regulators discovering better ways to enforce these matters we should start to see improvements in product quality, and, as a result, better outcomes for consumers of digital products. The booming industry of mental health apps illustrates the desperate need for broader availability of mental health care. Many of the current apps fail to contain appropriate attributions to their creators or to the evidence (if any) of their effectiveness, yet many make extraordinary claims. These apps also have the ability to prey upon vulnerable people through in-app purchases, inappropriate treatment and so forth. I welcome advances in apps that work, and in the efforts of

health practitioners and regulators to act against the predatory ones. If we can promote the effective ones, these apps and related services have the potential to deliver real benefits to society."

Justin Reich, assistant professor of comparative media studies at MIT, said, "As the largest communication platforms begin to function as monopolies, we may need to depend more on regulation than competition to curtail the most anti-consumer behaviors."

Oscar Gandy, emeritus professor of communication at the University of Pennsylvania, wrote about requiring companies take user well-being into account, "I have suggested that the market needs an aide to self-management in the area of news and information, where 'balanced diets' can be evaluated and improved by a trusted agent. In my view, Facebook is not a trusted agent, and its influence over our information diets is not healthy, in part because of its conflict over whose interests are supposed to be served. In the absence of the emergence of a successful information platform, regulatory oversight that includes assessments of individual and collective harms will have to evaluate the performance of market leaders and exact compensatory payments to support the development of such agents/services. I am hopeful that really smart people are raising questions and seeking policy responses to limit the harms that come from captured transaction-generated information. Time will tell, of course, whether the regulatory developments in the European Union will influence, let us say, counter-balance those in the U.S. and China."

An **anonymous respondent** said, "More regulation of online companies is needed to provide transparency into the algorithms that shape the information that we are fed."

Anne Collier, consultant and executive at The Net Safety Collaborative, said, "Regulators and governments need to show greater responsibility in three ways: **1)** Grow their understanding of how digital media work, of algorithms, machine learning and other tools of 'big data,' including the pace of change and innovation. **2)** Begin to acknowledge that, given the pace of innovation, regulation can't continue to be once and for all, but rather needs a 'use by' date. **3)** Develop more of a multi-stakeholder rather than a top-down, hierarchical model for regulation. In fact, we all need to think about how regulation needs to be multi-dimensional (including self- and peer-to-peer) and how all the stakeholders need to collaborate rather than work from an adversarial approach."

Dozens of comments mentioned the Net neutrality rules established by the U.S. Federal Communications Commission during the Obama administration that have since been slated for repeal by the FCC of the Trump administration. All who commented on Net neutrality said such rules are necessary for a positive future. **Ian Peter**, an internet advocate and co-founder of the Association for Progressive Communications, commented, "There are regulatory measures that

can assist with many other problems, such as fake news, algorithmic injustices, privacy breaches and market domination via breakdowns in Net neutrality or unregulated market dominance. All these things can be improved by regulatory measures; whether they will be is another matter." **Michael Everson**, publisher at Evertype, commented, "The *one* intervention which is important is the guarantee of Net neutrality worldwide."

Organizations are beginning to work together to possibly effect some positive change. New alliances are now being formed between non-governmental organizations and government entities, joining to address challenges raised by rapidly advancing digital technologies.

Sonia Jorge, executive director of the Alliance for Affordable Internet and head of the Web Foundation's Digital Inclusion Program, said, "There are many actions that can be taken to mitigate potential harms of digital life/interactions, and many organizations are working towards ensuring that those are designed thoughtfully and implemented correctly, including the Alliance for Affordable Internet, the Web Foundation, the Internet Society, the Association for Progressive Communications, some corporations and governments (with a number of Scandinavian countries and the European Union being good examples). Such actions include, for example, comprehensive data protection laws (the EU General Data Protection Regulation being a good example), or corporate transparency and accountability standards to increase consumer trust. Some examples include: **1)** A4AI has published Suggested Policy Guidelines to Make Public WiFi Work for Users. **2)** The Web Foundation has published a whitepaper series titled 'Opportunities and Risks in Emerging Technologies' which addresses some of these issues and suggests some actions. Other areas of concern are around legal frameworks to ensure that internet-based violence against women is addressed by law enforcement and other agencies. Without such frameworks in place to increase privacy and protection, women will increasingly question the benefit to participate in digital life, as the costs of access may be far too high for many. This is unacceptable, therefore, leaders MUST develop policy solutions to address such situations."

Like the technologies they may be created to rein in, legal actions can lead to some unintended negative consequences.

Shel Israel, CEO of the Transformation Group, said, "The issue becomes one of public policy and government regulation. My concern is the quality of such policies is dependent upon the quality of government, which at this moment in time is pretty discouraging."

Daphne Keller, a lawyer who once worked on liability and free-speech issues for a major global technology company, pointed out some potential negatives of regulation, commenting, "If European Union law compels platforms to build online content filters, for example, that will: **1)**

Foreseeably lead to lots of erroneous suppression of lawful information. **2)** Speed the day when filtering technologies are easily available to oppressive regimes around the world. **3)** Entrench incumbent platforms at the expense of new market entrants." She added, "Interventions to shape the law *can* mitigate harms to digital life. So can pressures on private companies and other powerful actors in the space."

Several respondents said codes of ethics and professional guidelines should be written and reforms should be suggested by industry and health associations.

Alan Tabor, an internet advocate based in North America, said, "We need something like credit reports for digital advertising," he said, "so we can see what our profiles are on the various media and who is using them and why."

Antoinette Pole, an associate professor at Montclair State University, commented, "[There should be a set of guidelines for] recommended usage by the American Medical Association for adults."

Some suggested that finding a way to eliminate complete anonymity online might reduce many types of damage to well-being.

Bill Lehr, a research scientist and economist at MIT, wrote, "Anonymous commentary has done great damage, on balance, to the quality of public discourse. Things like cyber-bullying and fake news would be less of a problem if those who offer opinions were more often held accountable for their thoughts. I am fan of First Amendment protections and recognize the importance of anonymity in protecting privacy, but I think we will have to give up on some of this. This is just one example of something immediate that could be done to improve digital life."

Some say regulation (and regulation in combination with other approaches) may come too slowly to match accelerating technological change. And some say regulators cannot be trusted to help society moderate connectivity to its benefit. A longtime **Internet Society and Internet Engineering Task Force leader** commented, "While there are interventions that can be made, most of them are likely to be worse than the disease, particularly putting more power into the hands of demagogues, those with no interest in listening to others, etc."

Garland McCoy, president of the Technology Education Institute, said, "As with everything, moderation is key; you want to avoid total immersion in what will clearly be an always-on environment linking your brain directly to the internet. So you will need to enable some 'off' switches – which may or may not be legal to obtain in the future. Obviously from the government

and private-sector perspective they would like to keep you connected at all times to monitor your every thought and move or to sell you something you just thought about."

A sampling of quotes tied to this theme from **anonymous respondents**:

- "As experimental technologies continue to break our 'body barriers' and become more biologically invasive, tech will need to be held up to rigorous standards and testing for health implications."
- "Governments need to take seriously the risks of cyberwar by governments and terrorism by non-governmental agents. Invest. Research. Prosecute."
- "Reinstitute something like the Fairness Doctrine. Or require labeling/standards for actual news."
- "Legislation should apply a minimum journalistic standard to social media companies to force them to track and rein in the worst abuses, or social media as we know it has to collapse and be re-invented."
- "Eliminate anonymity and the use of aliases on the internet. Make sure that everybody is as visible and known as in the real life. Uphold libel laws and hate laws in every country similar to those of France and Germany."
- "An international online code of conduct with some enforcement or rating scale would be useful, but that can of worms is so big, it almost breaks my brain."
- "Regulatory actions will be essential to continue to protect human rights online… this includes regulation of monopolies and of anti-competitive and anti-consumer behaviour."
- "Society needs to adjust to technological changes; this will come with time and experience, and hopefully *not* through regulation or over-reaction."
- "Like all market systems, the negative externalities require either social or regulatory action to prevent unaccounted costs to society."
- "Government intervention should place countervailing pressure on platform monopolists."

Redesign Media Literacy: Formally educate people of all ages about the influences and impacts of digital life on well-being and the way tech systems function, and encourage appropriate, healthy uses

A large share of respondents said people have to take direct action to cope with the impact of technology. They noted, however, that many users need help and that doing this well is vital to individual and societal well-being. They say education efforts are not fostering the appropriate depth of knowledge of the systems behind digital life or teaching methods so that people can mitigate problems.

Jon Lebkowsky, CEO of Polycot Associates, said, "It's a 'training issue' – our dependence on various technologies is way ahead of our comprehension. It'll probably take a generation or two to catch up with accelerating change."

Charles Ess, professor, department of media and communication, University of Oslo, said, "As a humanist and as an educator I think the central question is… us. That is, it seems very clear that as these technologies become more comprehensive and complex, they require ever greater conscious attention and reflection on our part in order to ascertain what uses and balances in fact best contribute to individual and social well-being and flourishing. In some ways, this is ancient wisdom – and specifically at the core of the Enlightenment: if we are to escape bondage, we must have the courage to critically think (and feel) and act out of our own (shared) agency. This is the virtue ethics approach taken up by Norbert Wiener at the beginning of computing and cybernetics… Fairly simply put: The more these technologies both enhance my capabilities and threaten my freedom (e.g., the infinite surveillance possible through the Internet of Things), the more I am required to be aware of their advantages and threats, and to adjust my usage of them accordingly, whether in terms of close attention to, e.g., privacy settings on social media platforms, software and software enhancements (such as browsers and browser extensions, PgP apps, etc.), and/or simple decisions as to whether or not some technological conveniences may simply not be worth the cost in terms of loss of privacy or 'deskilling', as in the case of offloading care to carebots. But as these examples suggest, such awareness and attention also require enormous resources of time, attention and some level of technical expertise. How to help 'the many' acquire these levels of awareness, insight, technical expertise? The Enlightenment answer is, of course, education. A version of this might be 'media literacy' – but what is needed is something far more robust than 'how to use a spreadsheet' (as important and useful as spreadsheets are). Rather, such a robust media literacy would include explicit attention to the ethical, social, and political dimensions that interweave through all of this – and highlight how such critical attention and conscious responsibility for our technological usages and choices is not just about being more savvy consumers, but, ultimately, engaged citizens in democratic polities and, most grandiosely, human beings pursuing good lives of flourishing in informed and conscious ways. All of that is obviously a lot to demand – both of educational systems and of human beings in general."

Annette Markham, professor of information studies and digital design, Aarhus University, Denmark, said, "We can help mitigate some of this stress and anxiety by engaging people to be more conscious of what's happening as well as – and this latter part is critical – more deliberate in establishing and maintaining better habits of digital media consumption. This means more work to develop effective media literacy (media, digital and data literacy), through strategic educational efforts or more informal consciousness raising, using feminist models of the women's liberation movements in the 60s and 70s. I've been wanting to figure out a way to have an international

holiday called 'memory day,' where we spend time sorting through our own personal 'big data' to see what we've collected and generated throughout the year, to clean up our files and throw away junk, but to also more carefully curate what matters to us. This sort of regular reflection help people recognize how much they click, store, and share, which can in turn help people reflect on what those activities mean to them. Sorting through one's data to commemorate what matters is something that social media platforms like Facebook are happy to do, but are they the best curators for our memories? Tracing, remembering, and commemorating can help us slow down, be more deliberative about our digital lives, and be more reflexive about the impact of the internet overall."

Justin Reich, assistant professor of comparative media studies at MIT, wrote, "Just as earlier generations of media-literacy practices explained to students how advertising strategies work, we'll need similar education to folks about how consumer technologies are designed to capture and maintain attention, to surveil consumers and other network actors to harvest vast amounts of data, and how to organize that data for targeted advertising."

Greg Shannon, chief scientist, CERT Division in the Software Engineering Institute at Carnegie Mellon University, commented, "Here are some education interventions that already show promise: *Digital literacy *Critical thinking in the digital age *Trust in a digital world. Society needs to demand a digital world that is more secure, private, resilient and accountable."

Lisa Nielsen, director of digital learning at the New York City Department of Education, said, "People are becoming more and more aware of how to successfully manage their digital lives. In particular this is also being addressed more frequently in schools with curriculum from Common Sense Education, EverFi's Ignition, and Google's Be Internet Awesome. Additionally, the International Society for Technology & Education has standards aligned to this goal and supports students in becoming 'Empowered Digital Learners.' There is also a parenting component that accompanies many of these programs. There is more awareness and mindfulness of what it takes to have a successful digital life… There are plenty of programs now to address the potential harms of digital life. These are being implemented in schools with programs that address cyberbullying and mindfulness. They are also being addressed more and more in the mental health world. People are learning techniques for being upstanders when they see others not treating someone right. Online spaces are getting much better at setting ground rules."

Frank Feather, a business futurist and strategist with a focus on digital transformation, commented, "Digital technology itself helps us to be more educated about its safe and productive use and application."

A sampling of additional comments about "redesigning media literacy" from **anonymous respondents**:

- "We need better education and people (mentally) healthy enough to withstand the seductions of immediate gratification."
- "We all need to be taught to be better consumers."
- "Digital literacies should be taught as a part of children's educational development, with a passing grade required.
- A comprehensive understanding of how it all 'works' is essential. VR/MR/AR can be adapted as both teaching and wellness tools."
- "12-step programs and services to help people cut the cord, so to speak, may help."
- "Employers should institute electronic communication vacations for the health of their employees."
- "Early education regarding the effects of physical inactivity is required. A reward system that encourages more activity even while using the internet would be great."

Recalibrate Expectations: Human-tech co-evolution comes at a price. Digital life in the 2000s is no different; people must gradually evolve and adjust to these changes

While all respondents agreed there are some concerns and most suggested that attention must be paid and solutions pursued when it comes to individuals' well-being and the future of digital life, many have confidence that humans can and should also take the initiative to evolve and adapt.

Stowe Boyd, managing director at Work Futures, said, "One of my abiding beliefs is that we are better off when we take a active and intentional approach to living digitally. Rather than being just a passive 'consumer' of digital streams, I feel people are better off through activity. To comment, argue, share and curate. Then, instead of being buffeted by the storms raging online, you can use the blowing winds to fill your sails and set a course."

Vint Cerf, Internet Hall of Fame member and vice president and chief internet evangelist at Google, commented, "We need to help people think more critically about what they encounter in information space (film, radio, TV, newspaper, magazines, online sources, personal interactions,..). This needs to be a normal response to information: Where did it come from? Who is providing it? Is there a motivation for the particular position taken? Is there corroborating evidence? We can't automatically filter or qualify all the data coming our way, but we can use our wetware (brains) to do part of that job."

Stuart Elliott, a visiting scholar at the National Academies of Sciences, Engineering and Medicine, said, "As with any powerful new technology, the internet brings important new benefits

but also various risks and side effects. As a society, we're still in the process of understanding and reacting to the risks and negative side effects. We would expect this to take time – on the order of a decade or more. As we understand the risks and negative side effects, we'll develop ways of addressing them, ranging from individual behaviors to group norms to government regulations. In general, it's reasonable to expect these various reactions will allow the technology to have a net positive effect."

Yasmin Ibrahim, an associate professor of international business and communications at Queen Mary University of London, said, "The problem is that as digital technologies become seamlessly part of our everyday engagement and mode of living we may not question actions or decisions we make online. Making the internet a healthy space means analysing our modes of being and everyday engagements in the digital realm, and this itself can be stressful. But keeping the internet a space of ideals requires us to do precisely that; to question every action and think about the internet architecture and how our activities are connected to a wider digital ecology of producing and consuming."

Mark Patenaude, vice president and general manager of cloud technologies at ePRINTit, said, "Digital transference over the last decade had little guidance or mentors to help modulate the overabundance of useless, immoral and fake information. Laws, governments and society in general are starting to understand the past effects of social media and mass media marketing techniques. Society will advance to a stage that new technologies will provide us with significant advances in security, privacy and content that becomes believable… The perceived dangers of advancing digitization are very real and people should be wary and cautious. Being afraid and skeptical will push our technologists to come up with ways that protect what we need protecting."

Hal Varian, chief economist at Google, commented, "Every new technology goes through a phase of euphoria, followed by a phase of retrenchment. Automobiles were a fantastic replacement for horses, but as their numbers increased it became clear that they had their own health and cleanliness issues. The same is true of the internet. A few years ago, freedom of the press went to those who owned one. Now everybody has a platform, no matter how crazy they are. But we will learn to live with this by developing better technology, better media and better critical awareness."

Dana Klisanin, futurist and psychologist at Evolutionary Guidance Media R&D, wrote, "We are now entering a phase when a larger number of people are beginning to take seriously the various impacts of digital technologies for good and ill. This 'being conscious' is the first step to taking control over our digital lives. The coming decade will see the advent of more 'Digital Detoxing' and 'Mindful Unplugging' but people will also be learning how to use digital technologies to benefit

their lives. By the end of the next decade we will see a more balanced approach in our digital lives – that, all on its own will be an improvement."

Pamela Rutledge, director of Media Psychology Research Center, said, "With every new technology, we have to learn the new rules of engagement. This only comes from understanding what the technology can and can't do and how that impacts our goals, behaviors and choices. To benefit from cars, we had to learn to drive, establish rules for the road and understand the benefits and dangers of such technology-enabled power. Today's technologies are no different. There are inherent and undeniable benefits, such as increased productivity, wider access to information, healthcare and education, greater and more resilient social connections independent of time and distance, the inability to hide bad behavior for those who abuse power and the psychological sense of empowerment that derives from increased agency. This does not mean that there aren't challenges to be managed, like equal access, privacy, misinformation and new avenues for criminal behaviors. Technology isn't going anywhere and it is without agenda. The choice of what and how to use technology is our own. As with cars, we need to learn to be good drivers. We need to develop new social literacies and behavioral rules that are adaptive to a digital world. However, these are recurring problems with every type of social change. Well-being is a psychological state that comes from feeling like you have the ability to take action, have impact, that you are capable of navigating your environment to meet your basic needs, and that you have meaningful social connection. Technology enhances all of these."

Laura M. Haas, dean of the College of Information and Computer Sciences, University of Massachusetts-Amherst, wrote, "People will adapt, learning to avoid negative use of technology. I see, for example, many younger people choosing to shut off their phones in social settings, or dramatically reducing their use of Facebook, etc. While not everyone will change, today's issues will be addressed in a variety of ways. I am also a realist, though: I believe as technology advances, new harms will develop. Any tool can be used for good or for ill, and today's technology is so complex that we cannot anticipate all uses or side effects… I expect the positives and negatives in 10 years may be quite different than they are today."

Gina Neff, an associate professor and senior research fellow at the Oxford Internet Institute, said, "Technology did not create the vast economic inequality that is shredding the social fabric of American life, but it can amplify it. If we don't address inequality then the potential harms of digital life will only worsen."

Claudia L'Amoreaux, a digital consultant, commented, "We've passed through the naive phase of internet optimism and utopian thinking. Issues are on the table. That's a good thing. I am encouraged by the work of people like Tristan Harris, Eli Pariser, Ethan Zuckerman, Sherry Turkle,

Yalda Uhls, Zeynep Tufekci to identify and present solutions to the potential harms of digital life facing us – harms to children and in the family, and harms to civil society and democracy. I do think more individuals are becoming aware of the challenges with 24/7 digital life. More people are calling for transparency – in particular, with algorithms. Some solid investigative reporting is happening (e.g., ProPublica's recent piece on discriminatory housing ads on Facebook). The fake-news crisis has sounded an alarm in education that young people today need critical digital literacy, not just digital literacy. And the hearings in Washington post-election with the leaders in the digital industry have exposed deep problems in the way business has been conducted."

Jim Hendler, an artificial intelligence researcher and professor at Rensselaer Polytechnic Institute, wrote, "There is much discussion starting around the ethical issues in new technologies, especially artificial intelligence, and in 'algorithm accountability.' I believe that as more algorithms gain some measure of transparency and people's awareness grows there will be a growing awareness that new technologies depend on people who deploy them and the public response, not just on the technologies themselves."

Daniel Berleant, author of "The Human Race to the Future," commented, "When human groups encounter new environments they must adapt… The process of adaptation will result in problems that arise, including maladjustments that people must learn to overcome as well as other challenges. Some people will be harmed but few will return to their old environment. As societies learn to exist in this new environment, humans will become better able to live in it. We will learn to cope with the new aspects while using the new opportunities it presents to enjoy improved quality of life. Thus there will be pluses and minuses, but over time the minuses will diminish while the pluses will increase."

Michael Rogers, a futurist based in North America, said, "We will certainly develop new ways to adapt to the digital environment. The key question: What is the balance of the real and the virtual that will keep us healthy in every sense? Example: I know one large company that now has a 'remedial social skills course' for certain new hires. Growing up with asynchronous communication methods like IM and texting means that some adolescents don't have as much practice with real-time face-to-face communication as did their parents. Thus, for some, tips on how to start a conversation, and how to know a conversation is over, and a bit of practice are helpful. It's not the fault of the technology; it's rather that we didn't realize this might now be a skill that needs to be taught and encouraged. I think we'll ultimately develop and teach other ways to overcome negative personal and social impacts. The challenge for older people in this process will be to ask ourselves whether, in these interventions, are we protecting important human skills and values, or are we simply being old fogies?"

Valerie Bock, principal consultant at VCB Consulting, wrote, "I see social norms developing to help us use technology in a way that serves our human connections rather than detracting from them… Just as families of a generation ago learned to employ the home answering machine to preserve the dinner hour, families of today are creating digital-free zones of time and place to manage our strong attraction to digital devices and social media and build their connections to one another. This is not to say that there are not real threats to well-being posed by the erosion of privacy, which is a central feature of current digital developments. The total-surveillance society described in Orwell's '1984' has been packaged by corporate digital interests as a consumer convenience and is being welcomed into our homes rather than imposed on them by a hostile and oppressive government. The more-pinpoint targeting of consumer desires enabled by these technologies threatens to overwhelm the defenses against over-consumption that we developed in the TV age."

Marshall Kirkpatrick, product director, Influencer Marketing, said, "We can all help create a culture that celebrates thoughtfulness, appreciation of self and others and use of networked technologies for the benefit of ourselves and the network. We can create a culture that points away from the exploitive mercenary cynicism of 'Hooked' growth-hacking."

An **anonymous respondent** wrote, "The adult work environment should be refocused to reduce the speed at which life is expected to travel. When everyone is meant to be 'on' and in frantic motion 24 hours a day, there is little time to rest, recover and/or allow valuable free-form thought and brainstorming. Stress has a myriad negative effects on human health and when stress lives in your pocket with an expectation that you will respond to it 24 hours of the day and within minutes, health and well-being will not benefit."

Nathaniel Borenstein, chief scientist at Mimecast, said, "Most obviously, rigorously enforced Net neutrality would prevent many of the worst outcomes. More positively, I think we can develop spiritual and philosophical disciplines that will help people get the most out of these technologies, and will help people develop in ways that minimize the chances that they become cyberbullies or other cybermisfits."

Matthew Tsilimigras, a research scientist at the University of North Carolina-Charlotte, said, "There is a huge personal and career-related cost to you if you are unable or unwilling to participate in digital life… Workplace protections need to be enforced so that employers do not feel like they have 24-hour access to employees, which many use as a crutch for their own poor management skills. It is also the responsibility of online forums themselves to moderate content produced and exchanged on their platforms so as to police bullying and other threatening behavior."

A sampling of additional comments related to "recalibrating expectations" from **anonymous respondents**:

- "A deeper understanding through additional research and scholarship of the socio-cultural and psychological effects of digital technology will inform our use of these technologies in the years to come."
- "Put the phone down."
- "You could unplug, but at a cost."
- "I hope places that jam cell phones become popular, that unplugging gets to be a draw due to popular pressure. Not counting on it!"
- "We need to propagate the idea that disconnecting, being more aware of one's uses and balancing activities is of social value."
- "The solution is not more technology, but the responsibility of the individual to navigate and decipher information and use it as a powerful tool to benefit themselves."
- "Social norms will push back trash talk, fake news and other click-bait into their own ghettos."
- "There will be a resurgence of people rejecting the overwhelming pervasiveness of digital in our day-to-day lives."
- "There are things that can be done but it won't be easy and it will require deliberate effort. I don't think our society will take the tough route. The lull of the easy road will lead them to harm."

Fated to Fail: A share of respondents say interventions may help somewhat, but – mostly due to human nature – it is unlikely that these responses will be effective enough

When asked the yes-or-no question "Are there any possible interventions that can help overcome the negatives of digital life's impacts on well-being?" a small share of respondents said no. Some expressed a lack of faith in the capability of humans' and human systems to effect the changes or fixes that might make individuals' well-being paramount. Another fear expressed by those who answered "no" to this question is that attempts to effect improvements may create unintentional negative effects or be appropriated to further certain agendas that are not in the public's best interests.

Cliff Zukin, a professor and survey researcher at Rutgers University, commented, "Simply put, I believe the technology governs. It is a variant of McLuhan's 'media is the message.' It continues the argument of Neil Postman's in 'Amusing Ourselves to Death.' People send the pictures and go on Facebook because they can, not because there is any real content involved. Over time, that becomes the communication and a new normal evolves."

Mark Richmond, an internet pioneer and systems engineer for the U.S. government, wrote, "I'm concerned that the more people try to fix things, the more problems are caused. Regulation, deregulation, censorship, openness, filtering, verifying, no matter what you call it. With the best of intentions, people have proposed requiring real identification for online posters, for example. The downside is the risk of repression, censorship, discrimination and marginalization. To make it worse, overcoming such a requirement is a trivial matter for anyone determined. It just makes it harder on the honest. Protections against the misuse of the technology must continue to be developed. Financial transactions, privacy concerns, all of those of course Revival. But that's a transactional change, not a foundational change. The foundation of the internet really must remain one of providing a billion soap boxes for a billion points of view."

Heywood Sloane, partner and co-founder of HealthStyles.net, said, "The risk of unintended consequences is higher than we can possibly understand or appreciate. Learning to use the best of it and avoid the worst of it – with experience over time – is quite possible."

Some replied that people-plus-technology is a threat that can't be completely conquered. **Colin Tredoux**, a professor of psychology at the University of Cape Town, commented, "Digital technology is just about uncontrollable. There are myriad examples. The internet was designed to be robust to local disruption (or control), and the many many examples of hacked banking, government, health, education sites show it is not possible to provide meaningful control except at the cost of draconian measures as in Iran or China, and even those will likely fail. Some military protocols now require computers to be offline. We will have to live with the bad while enjoying the good. It is not clear we can do anything meaningful to ensure that the good outweighs the bad."

Thad Hall, research scientist and coauthor of the forthcoming book "Politics for a Connected American Public", commented, "My concern is that the battle over digital life is a competition where one side is using addiction-psychology models to get people addicted to their devices and the apps on them and the ability of people to resist these temptations is questionable. In addition, the ability of people to use the technology for nefarious purposes – creating fake information, especially high-level information like video and audio – and the internet to spread this information is going to create ongoing problems that will be very difficult to address."

There were those who said most individuals will not make the adjustments necessary in their personal lives to rein in the habits that are causing them to suffer from nomophobia, FOMO, eyestrain, sleeplessness, isolation, deepening lack of social skills, Instagram-inspired envy, stress, anxiety and other effects.

Tom Massingham, a business owner based in North America, wrote, "I just can't think of a possible intervention. It seems like a creature growing, and out of control."

Alice Tong, a writer based in North America, said, "We all have free will, and if someone wants to do something we cannot stop them, not digitally. What will be important is to promote the idea of non-digital life to people starting at a young age. Make it known that also living a non-digital lifestyle is a must for balance."

A **professor at a major university in Australia** said, "I do not think we have the capacity to act as we need to. Ultimately this is not about what harm technology might represent to us but it is about what our capacity is for self-harm."

And some took issue with the idea of "intervention." **Chris Morrow**, a network security engineer, said, "I don't think that trying to 'intervene' is the right view. People need to realize that balance in their lives is important. Access and information at a wide scale enables people to see, hear, change many things, but at the end of the day they still need to interact with actual people and perform basic tasks in their lives. Trying to force this behavior will not work in the long term, people must realize that they need to balance their use of anything (digital access, food, exercise, etc.)."

A **professor based in North America** said, "The techno-libertarian philosophy is the lens through which people make sense of issues, so that collective goods like a balanced democracy or a vibrant community simply don't make sense. When coupled to a political system in which tribal political loyalties and campaign contributions erode even policies that have vast political approval (like Network neutrality) there aren't many effective institutions that can counterbalance problems created by policies that generate profits. Google would like to believe it does no evil, but when tens of billions of dollars of revenue are at stake, the social and political problems resulting from reinforcing polarizing social divisions will be ignored by the company, government and media."

An **information science professional** wrote, "We are, in the United States, a people who believe in our free will to live as we choose. There would be incredible resistance to any large-scale attempt to help people moderate their use of technology. Technology is so linked to commerce that suggesting people use it less would be decried as harmful to the economy. We are in a cycle where the ends justify the means that justify the end. We want what we want, and, from most appearances, personal risk or harm is not an acceptable reason to limit our access to what we want. Those who make money from our behavior are certainly not going to help us change it."

A sampling of comments about "fated to fail" issues from **anonymous respondents**:

- “The ship has left the harbor. Digital providers have too much power and control information. Technologists also naturally push capabilities without worries about negative impacts.”
- “The corporations who stand to make money off these devices and services will not be working to lose eyeballs in the name of what may be better for us.”
- “Perhaps the demise of Net neutrality and onset of associated volume-based costing for use may provide a positive unintended consequence.”
- “All you could do is make access more difficult, slower or unpleasant.”
- “There is no political motivation to make changes that would help the majority of people. The recent decision against Net neutrality is just one example. Short-term profit and stockholders’ interests are driving policy-making, innovation and regulation.”
- “There is a huge push from the economic side to use ever-more-digital tools in your life, and the means of regulators are really limited because of the global nature of such companies and activities. That is the biggest threat because needed regulation is extremely hard to enforce.”
- “The responsibility for using a digital service in the right manner, with the right intent and in a reasonable way lies with the individual.”

5. Key experts' thinking about digital life and individuals' well-being in the next decade

Following is a collection of comments by several of the many top analysts who participated in this canvassing:

We will soon interact with digital technologies less frenetically

Kenneth Cukier, senior editor of The Economist, wrote, "Many people are frazzled by the always-on internet, but this is a feature of our embryonic understanding of how to adapt it to our lives; it's still early days. Over the next 10 years, the industry will get better at making it more subtle rather than distracting, and people will develop the social norms and personal behaviors to interact with digital technologies less frenetically."

How do we preserve quality of life while pursuing our goals?

Michael Roberts, an internet pioneer and Internet Hall of Fame member, commented, "Harm' no longer can be defined in terms of history, either intellectual or physical. The spectrum of future human activities and lifestyles has been expanded immeasurably by knowledge about ourselves, and our newfound ability to replicate in digital automatons vast amounts of what used to be considered human work. Given a sufficient time horizon, a century or two, it is reasonable to assume humans can define whatever set of physical attributes and associated lifestyles they wish. The bottom-line issues are how to guide choices and achieve consensus, along with how to preserve quality of life while those goals are pursued. These are tough issues. Looking around at the end of 2017, one sees a human world of horrendous inequality and suffering, along with the worst political crisis in a very long time. My personal view is that the talent and energy contained in technology-oriented parts of society will push ahead, and, on balance, we will think we are better off 10 years from now, with 2027 technology, than we are today."

Don't allow the downsides to lead us to new laws and technologies that will serve as tools of censorship and surveillance

Daphne Keller, a lawyer who once worked on liability and free-speech issues for a top global technology company, said, "We will see declines in well-being in terms of people's real and perceived privacy, for example. And we are certain to see speech-related harms. On the one hand, online content ginning up racism, extreme populism or bias will likely expand. On the other, ill-conceived attempts to control this 'bad speech' will lead to the suppression of lawful and valuable 'good speech.' Laws and public policy in the European Union already incentivize platforms to remove legal information and expression posted by ordinary internet users. I predict that trend will expand to other democracies around the world. I think/hope that these harms will be

outweighed by improvements in well-being in other parts of the world. Many people in developing countries or oppressive regimes are only beginning to experience the internet's very real and very positive transformative power. Internet access can improve material prosperity, education, access to support for LGBT and other minority groups, government accountability, and much more. It's currently fashionable in the U.S. and Europe to see the internet as a force for harm. That's not wrong. But we should not let that blind us to the incredible benefits the internet has brought us in the past 20 years, and the benefits still to come – not just for us but for people around the world. Nor should we let our current pessimism lead to new laws and technologies that will serve as tools of censorship and surveillance in the hands of human-rights-abusing governments – wherever those governments may be or come to be."

Create policies for lifelong universal basic access to health, education, livelihood

Mike Liebhold, senior researcher and distinguished fellow at the Institute for the Future, wrote, "The most important civic actions to mitigate potential harms of digital life are: **1)** Continuous education for citizens on critical-thinking skills, and cyber secure behaviors. **2)** Continuous education for well-being professionals and practitioners on effective application of technology, best practices for privacy and security. **3)** Continuous education of technologies on designing and operations for quality of care, privacy and security. **4)** Government policies providing lifelong UBA (Universal Basic Access to health, education, livelihood)."

It's your choice: There are good and bad things with which to engage

William Schrader, founder and CEO of PSINet, wrote, "When we planned the commercial internet at PSINet back in the 1980s, we dreamt of all knowledge being at everyone's fingertips instantly, along with distance learning, distance medicine (including surgery) and happiness and peace. We blew it, so far, on happiness and peace. Yes, we knew that the weak would use the commercial internet to steal, hurt and manipulate to harm. Every communications medium does that. That is what we accepted. If Man is Good, then the commercial internet will eventually enable happiness and peace. But, if Man is Evil, we will have more of what we have had for the past 20,000 years. It's your choice, each of you. There are good and bad things with which people choose to engage. I suspect that the weaker people will choose the bad things and the stronger people will choose the good… The real good is when people decide to release themselves from that which has captured them (be it Web addiction, substance abuse, obesity, depression, sadness, laziness, self-deprecation, etc.) and choose to search the 'Inter-Web':-) for help by learning tai chi, taekwondo, yoga, reading the classic books (online free from local library) and simply finding work that may pay poorly but gives them satisfaction. Psychiatry will be fully automated on the internet, with quality psychiatrists standing behind those systems."

Some aspects of life will be better; some will be worse

Sara Kiesler, professor emerita and National Science Foundation program manager, commented, "There will be winners and losers, as occurs now, and for individuals, some aspects of life will be better and some will be worse. Winners: entrepreneurs who invent new services or products and successfully reach new customers; formerly isolated seniors who keep in touch with family and recruit them to visit in person; happy people who find a loving spouse online; language learners who practice (almost) every day online; people who can work at home instead of commuting two or three hours a day. Losers: people without the resources to take advantage of online health, education or financial services; people who use the internet as a substitute for in-person social interactions; people who believe everything they read, hear, or see online and never question these opinions. Better aspects of life: convenience of shopping online, streaming entertainment, telework efficiency, improved government services, more efficient everyday life and social interaction. Worse aspects of life: insufficient interpersonal (in-person) interaction; manipulation via algorithm of thinking and opinions; lack of privacy and increased distraction; proliferation of online harms with insufficient defenses; global warming and population increases threaten food sufficiency, natural environment, and wildlife and increase conflict and threat of warfare."

Believing things can be done better is the first step in figuring out how to get it done

Mark Richmond, an internet pioneer and systems engineer, wrote, "We have already seen the impact of lessening attention spans, 24-hour 'news cycles' and all of the social interaction breakdowns that result from the way things have become. I am hopeful that these declines will not continue. But I am pessimistic that the damage is already being done. There is no way to unwind the clock, nor to put this particular genie back in the bottle. Our best hope is that society, people in general, will adapt and evolve to better deal with the new reality. Society will never be the same as it was 50 or 70 years ago. It will be better. But what form 'better' takes, I don't yet know. I am hopeful that the new reality of ever-expanding connectivity can overcome the filters of repressive government, the language barriers and the cultural barriers that have kept people at odds for so long. The future may be brighter because of the same tools and technologies that have made it seem dim. My best hope is that this wonderful way of communication and interaction will somehow be used to improve the use of other technologies that can better the world situation. Believing that things can be done better is the first step in figuring out how to get it done."

Instead of suspending disbelief, we need to exercise it

Anne Collier, consultant and executive at The Net Safety Collaborative, said, "There are so many ways that connecting more and more of the world's people make things better for all of us – growing and broadening collaboration, helping marginalized or isolated people find connection

and get help, spreading opportunity and growing awareness of other perspectives and cultures, to name just a few. Yet we fixate on the negativity in media and political news. There are a bunch of reasons for this: Negative information is 'stickier' than the positive, and it's harder for our brains to go from negative to positive than the other way around. We are overwhelmed by the sheer volume of information coming at us 24/7. The pace and pressure of life in our society. Not being aware that it's the news media's job to report the exception to the rule, not the rule, not to mention 'what bleeds leads.' No one's telling us that all the negativity we're exposed to is not the norm in our experiences, that we should think twice before making what editors deem a 'big story' our story. Instead of suspending our disbelief, we need to exercise it! It's way too easy to 'believe the worst,' which is something in itself that's good to be aware of."

Digital life is enabling important work toward the 'Cancer Moonshot'

Bradford Hesse, chief of health communication and informatics research at The National Cancer Institute, NIH, said, "Although technologists and social scientists will continue to monitor the unanticipated, adverse consequences of digital transformations (e.g., safety issues, social media trolling), data suggest that in at least one area – the area of health and medicine – these digital technologies should provide an overall boost to citizens' well-being. At the end of 2016, the President's Cancer Panel (a legislatively mandated body) released a report titled 'Improving Cancer Outcomes Through Connected Health.' The report detailed areas in which digital technologies are poised to accelerate success against cancer in line with then Vice President Joe Biden's conceptualization of a 'Cancer Moonshot.' For example, data already suggest that by building an electronic safety net for patients in therapy it is possible to improve cancer outcomes, reduce unnecessary hospitalizations, and boost patients' quality of life. Advances in the Internet of Things, cloud computing and biomedical informatics are begin to allow scientists access to petabytes of data volunteered through biomedical sensors from patients in clinical trials. The resulting insights from these data will help biomedical researchers to create a public health environment that is more predictive, preemptive, precise and participative than its industrial age counterpart. Lifespans will continue to lengthen, as a shift toward a data-driven view of population health will help ensure that the benefits of this new medicine are delivered equitably across all populations."

When it comes to digital life benefits, your mileage may vary; figuring out the trust formula and better ways to adapt is important

Greg Shannon, chief scientist, CERT Division in the Software Engineering Institute at Carnegie Mellon University, commented, "Most innovations will have positive benefits for consumers and citizens – otherwise choices would have rejected the innovations. Yes, there will be growing pains, unexpected consequences and occasional exploitive innovations. Yet, on the whole, it will be positive. Fewer car accidents. More-efficient and effective medical treatments. More-personalized

services and products. Unfortunately, the well-being benefits for individuals will vary and the cognitive load may be high in order to maximize benefits and mitigate negative effects. What we need is more social/cultural capacity to adapt to change, to cope with change, to leverage/benefit from change. It will be all too easy for some to be vastly confused by, afraid of and (fruitlessly) resistant to digitally-enabled change. Trust is a key issue. To whom do each of us make ourselves vulnerable and are we comfortable with that? For whom are we trustworthy? These are choices we implicitly make every day in non-digital contexts. The digital world provides new and confusing needs to place trust in anonymous transactions, digital companies and creators or new technologies. This need to expand one's sense and understanding of trust will be challenging for all of us, especially given the lack of trust indicators online that we rely on in the non-digital world."

New tech will obviate old problems, create new industries, wipe away old ones

Louis Rossetto, founder and former editor-in-chief of Wired magazine, said, "The future is not pre-ordained. Of course, courses can be corrected. Will be corrected. It's part of human nature. Nothing is unalloyed good or bad. Indeed, the bad is an intrinsic part of the good. Digital technologies have net been beneficial. But the negative consequences of digital technologies can, are being and will be dealt with. Specifically, new technologies will obviate old problems, create new industries, wipe away old ones. As problems are identified, 'solutions' will be proposed. Some will work, some work. In extremis, political solutions will be applied. In all cases, unintended consequences will occur. In other words, evolution will continue, as it has, for billions of years."

Don't see humans as the problem and technology as the solution; align with humanity

Douglas Rushkoff, a professor of media at City University of New York, said, "The companies would have to adopt different profit models, based on revenue rather than growth. They would have to decide whether the future of the species is important to them. Most see humans as the problem, and technology as the solution. They seek to replace humanity before the environment is destroyed, or to get off the planet before that happens. If, instead, they decided to align with humanity, our species could indeed survive another century or more. If they continue to see humans as the enemy, we don't have much longer."

The public should question and reject the hegemony of digital media companies

Nicholas Carr, well-known author of books and articles on technology and culture, said, "The advertising-based profit models of internet companies encourage design decisions that end up harming the users of the companies' products and services. The companies, therefore, are unlikely to be the source of beneficial changes in design and use patterns. Ultimately what's required – and what's possible – is a broad countercultural movement through which the public questions and rejects the cultural and social hegemony of digital media and the companies that control it."

Focus on human health and happiness rather than commerce and consumption

Michael Kleeman, senior fellow at the University of California-San Diego and board member at the Institute for the Future, wrote, "We might begin by taking digital technology off its pedestal and portraying it as just another profit-driven part of commerce, albeit one that can separate us from those physically close and enable those at a distance to harm us. A focus on what contributes to health and happiness, literally health and literally happiness, as opposed to consumption might let us take advantage of the good and push down the negative impacts."

Empathy doesn't scale; and we really do need it to

Paul Saffo, a leading Silicon Valley-based technological forecaster and consulting professor in the School of Engineering at Stanford University, said, "It is tempting to list the myriad specific steps we must take, such as changing the rules of anonymity on social media and fine-tuning human abilities to discriminate the artificial from the real. However, all of those steps are but footnotes in a more fundamental challenge. We are tuned to feel empathy for individuals, but empathy doesn't scale. As Stalin put it, 'a single death is a tragedy; a million deaths is a statistic.' We must find a way to scale empathy. We must find a way to use digital media to cause individual humans to have empathy for the multitude, and ultimately for the entire planet."

We must continue to question ourselves about 'What is the Web we want?' 'What is the internet we want?'

Sonia Jorge, executive director of the Alliance for Affordable Internet and head of the Web Foundation's Digital Inclusion Program, said, "Humanity is constantly evolving, and the internet is yet another variable affecting the way we evolve as humans. As with anything we have faced through human development, it brings opportunities, allows for new ideas to grow, it brings challenges and certainly also not such good ideas, especially as people and institutions push for ideas that violate human rights and individual ability to determine one's agency. There are many benefits from internet access and these are well documented, but it is indeed concerning that so many of the harms we see increasing are a reflection of those we also see in the offline world, harms coming from humans that disregard basic rights of all individuals, their privacy, their freedom of expression, their ability to communicate freely, among many others. The good news is that we do know and are learning quite fast about what can be done to prevent those harms from increasing and affecting people's well-being, physical and mentally. But we need proper policies, agreements and safeguards in place to ensure that the internet continues to evolve in a way that benefits humanity that is based on human rights principles. We cannot allow the Web and the internet to become tools for further abuse, manipulation or violations of human rights. That the internet is a tool used by those who have always violated or tried to violate human rights, it is a reflection that we as humans have not been able to develop frameworks that protect humans

offline or online. Human well-being can indeed be improved if people can communicate and communicate privately as needed, if they can have new ways to find opportunities, and be sure their data is secure, if they can benefit from music, art and be sure they are not being followed because of their tastes. Without such safeguards and knowledge to use the technology, access to the internet could indeed become more harmful. We must continue to question ourselves about what is the 'web we want' or what is the 'internet we want?' The internet my colleagues and I work to protect and expand every day is one that can contribute to any woman, girl or boy's well-being, one where they can feel safe, be themselves, feel secure, and is affordable and reliable regardless of one's background, location, income, etc. An internet that is a positive variable to the evolution of humanity."

We have learned so much by leveraging this tech, you have to believe humanity can continue to mobilize these knowledge tools to do more good than harm

Greg Downey, a professor specializing in the history and geography of information technology and associate dean at University of Wisconsin-Madison, said, "On the whole, I remain optimistic that our growing digital infrastructure of invisible but human-mediated sensors, algorithms and interfaces will help us enhance energy conservation, health care delivery, transportation safety, citizen interaction, workforce engagement and educational access, as well as providing exciting, creative and transformative entertainment and social experiences. These are hopeful but not utopian predictions – similar to patterns we've seen over the last century of information infrastructure development, from the slow but steady global and local diffusion of wired direct communications (telegraph and telephone) to the more rapid and transformative diffusion of wireless mass communications (radio and television). None of these new information infrastructures resulted in the dismantling of inequality or an end to war (as was repeatedly predicted for each), but each helped contribute to a gradually increasing global standard of living and cosmopolitan condition of mutual understanding. Our current digital information technologies of data processing and algorithmic action – born largely out of the fervor of global warfare – have helped more of us across the planet to understand more about the nature of the universe, the patterns of social behavior, and the legacy of past cultures than was ever possible before. As a researcher, writer and educator myself, I have to believe that humanity can continue to mobilize these knowledge tools to do more good than harm."

'There must be a technical solution to the challenges of anonymity and trust'

John Markoff, a fellow at the Center for Advanced Study in the Behavioral Sciences at Stanford University and longtime New York Times technology writer, said, "Science fiction writers have done the best job of outlining the sociology of computer networks and their impact on society generally. Early on Vernor Vinge wrote 'True Names.' It is still one of the best descriptions of the

challenges that networks provide for identity and privacy. Reluctantly I think that there must be a technical solution to the challenge of anonymity and trust. Perhaps an answer lies in blockchain technologies. Also, recently, Danny Hillis, has proposed a semantic-knowledge tool that would allow the proving of 'provenance' if not truth. He describes this in a paper he is circulating as 'The Underlay.'"

Parents, teachers, mentors and others must work to guide and raise awareness of healthy uses of information technologies

Adriana Labardini Inzunza, commissioner of Mexico's Federal Institute of Telecommunications, said, "I am leaning towards an optimistic prediction when it comes to the use of internet and well-being. The outcome for each individual will very much depend upon the place, education level, socio-economic condition, age and individual skills and disposition to technology. For educated citizens with a good appetite for knowledge, language skills, learning new skills, productivity and shortening distances, IT will be an incomparable tool and ally only if the individual has also awareness of data-protection tools and privacy-protection issues as well. People with poor education and awareness who lack the resourcefulness to gain skills, culture and empowerment education will have more difficulty in using IT to empower themselves. Most everyone has an option today to gain some level of education, accessing information that was once unavailable to those in marginalized communities in poorer countries. The internet has brought easier access to information to billions, connected people afar, laborers and employers, citizens and governments, buyers and sellers, writers and readers. Those who have an education that is both analogue and digital can be skilled researchers and keen users of technology for productivity. It requires education, principled thinking, awareness and discipline to use the internet as a tool for development rather than a new way to waste time, alienate the mind and body, consume unnecessary stuff and become more indebted. In Latin America for instance, so far, internet is not making the impacts it could in increasing the productivity of people, of small businesses, of governments. It is being used in many small towns more as a tool to socialize, consume or video chat, not to fight poverty. In many other places it has brought the opportunity to obtain an online education and to become visible to customers who require individual services of plumbers, smiths, carpenters who can be hired upon an SMS or a call, which means earning a livelihood. What is badly needed is that parents, teachers, mentors and others work to guide and raise awareness of the healthy uses of IT and bring up children who know how to play, run, exercise, care for nature, live in contact with real human beings and limit the use of devices in childhood and adolescence because it is important to train mind and body and emotions in a physical world and learn how to protect oneself from phishing, fraud, spam, sexting, e-bullying and other forms of abuse of IT. Technology is agnostic; it is humans without a civilized way of living, without empathy, principles and culture who may make evil uses of technology. Technology can become an ally in communities

that train and provide for local champions at schools or to work at community centers or SMEs and NGOs – people who guide local people toward an intelligent and empowering use of technology to learn, be more competitive, get relevant information and produce – not only consume – digital products, works of art, services or goods and other innovative ways to improve the well-being of community members."

Things will improve, but watch for the unintended results

Jamais Cascio, a distinguished fellow at the Institute for the Future, said, "We will find a combination of behavioral norms, regulation and technology that will help to minimize or mitigate potential harms of digital social media. I'm equally certain that these changes – alone or in combination – will in turn produce unintended results that could be seen as harmful."

It's all about norms, not government interventions

Jeff Jarvis, a professor at City University of New York Graduate School of Journalism, said, "Every single one of us has the opportunity to improve the Net and the society we build with it every time we share, every time we publish a thought, every time we comment. Those are the interventions that will matter most as we negotiate our norms of behavior in the Net. I have long valued the openness of the Net but I fear I have come to see that such openness inevitably also opens the door to spam, manipulation and trolling. So platforms that value their service and brands are put in the position of compensating for these forces and making decisions about quality and misuse. I prefer to have users and platforms attempt to compensate for bad behavior and regulate themselves, for I do not trust many governments with this role and I fear that a system architected for one benign or beneficent government to act will be used as a precedent for bad governments to intervene."

We are at the beginning stages of blending and merging our identities and consciousness with digital tools and platforms

Barry Chudakov, founder and principal of Sertain Research and Streamfuzion Corp., commented, "The first thing that will enhance our well-being—this helps to resolve our sense of bewilderment—is to provide some context for where we are. We are at the beginning stages of blending and merging our identities and consciousness with digital tools and platforms. I believe people's well-being will be affected for good by changes in digital life. But more than being helped or harmed, we all will find ourselves having to adjust and re-adjust to new realities of presenting ourselves and responding to others on screens and in newer digital venues. This will likely alter our sense of who and what we are as we move from a fixed sense of self and identity to experiencing self in a flow of presentation and response. To consider how our well-being will be affected due to changes in digital life, it is useful to outline what those changes are likely to be:

1. **There is here.** Products, tools and experiences will become more immersive thanks to VR (virtual reality) and other advances. *Remote* and *near* will become quaint concepts as we connect to almost any place from anywhere.

2. **Reality gets realer**. More products, tools and experiences will seek to enhance, or bring something new, to improve sell, or convince us. This will include adding to digital encounters with relevant information, data, images and enhanced viewing for every experience from surgery and sightseeing to, of course, sex.

3. **Bots as pals.** Bots, virtual assistants (Siri, Alexa, etc.) will become more prevalent, more "real" to us, more companionable—and we will come to rely on them.

4. **Everyone knows me.** Recognition technologies (face, emotion, voice, etc.) will become remarkably accurate to verify, explain, and define who we are. These will also generate data profiles that will re-define and supplant more intuitive insights or perceptions.

5. **Showing up is a show.** Presentation of self in everyday life will increasingly move away from face-to-face interactions as we rely on tools and platforms through which we show and express ourselves.

6. **We are all living in *Toy Story*.** We will increasingly surround ourselves with intelligent technologies—things that think. Intelligence will be invested in all objects as the *Internet of Things* becomes everyware.

7. **Digital reorg revamps older structures.** Social structures globally will be affected—rocked—by connectivity, cooperation, and reorganization that follow the logic of newer digital tools and platforms, not older frameworks built by alphabets, literacy, laws, and religious injunctions from holy books.

8. **Life is an abstraction.** The abstraction of everyday life will continue as algorithms, blockchain technologies, crypto currencies, data tracking and profiling—combine to reduce people and experience to conceptual abstractions.

9. **Data determines.** In every area of life, from medicine to marriage, data flows and data summations will begin to guide our choices and decisions.

"Changes in digital life will land us in a quandary where two seemingly opposite things can be true simultaneously: digital tools will help us fight disease, increase productivity and assign menial and repetitive jobs to robots and algorithms. Yet these same digital tools alter our sense of self and our relationship to others. They may make us feel isolated, insecure, or lonely because we spend more

hours in screen time rather than face time. We are headed for increased competition for focus and attention, with a greater likelihood for blending and confusion of self and identity, especially among younger minds. The hints of what to come are there before us now. Two examples: *online dating*: in 2017 30% of U.S. internet users aged 18 to 29 years were currently using dating sites or apps and a further 31% had done so previously while 84% of dating app users stated that they were using online dating services to look for a romantic relationship. *Online shopping*: 51% of Americans prefer to shop online; 96% of Americans with internet access have made an online purchase in their life, 95% of Americans shop online yearly, 80% of Americans shop online at least monthly, 30% of Americans shop online at least weekly; Ecommerce is growing 23% year-over-year.

"Those who grew up with older media will look at the internet and digital tools as a *takeover of reality*. Younger minds will see and feel the Internet as *immersion that equals reality*. Today our digital life still has one foot in older traditions; we must prepare for the not distant future when digital life (and this will be someone's business model) becomes 'The Truman Show.' The internet and digital realities are simulations: we must be hyper-vigilant to ensure we are seeing the reality and not the sim: simulations are more easily manipulated, and more easily manipulate us."

About This Canvassing of Experts

The expert predictions reported here about the impact of the internet over the next 10 years came in response to questions asked by Pew Research Center and Elon University's Imagining the Internet Center in an online canvassing conducted between December 11, 2017, and January 15, 2018. This is the ninth Future of the Internet study the two organizations have conducted together. For this project, we invited nearly 10,000 experts and members of the interested public to share their opinions on the likely future of the internet, and 1,150 responded to at least one of the questions we asked. This report covers responses to two questions tied to digital life and individuals' well-being. The overarching, primary question was presented as this:

> ***Digital life's impacts on well-being.*** *People are using digital tools to solve problems, enhance their lives and improve their productivity. More advances are expected to emerge in the future that are likely to help people lead even better lives. However, there is increasing commentary and research about the effects digital technologies have on individuals' well-being, their level of stress, their ability to perform well at work and in social settings, their capability to focus their attention, their capacity to modulate their level of connectivity and their general happiness.*

They were then asked to respond to the question:

> ***Question: Over the next decade, how will changes in digital life impact people's overall well-being physically and mentally?***

They were given three options to choose from when considering their response. The answer options were:

- *Over the next decade, individuals' overall well-being will be* ***more HARMED than HELPED*** *by digital life.*
- *Over the next decade, individuals' overall well-being will be* ***more HELPED than HARMED*** *by digital life.*
- *There* ***will not be much change*** *in people's well-being from the way it is now.*

Then we asked:

> *Please elaborate on your response below considering these questions: Why do you think people's well-being will be affected this way? What harms or improvements are likely to occur?*

Some **47%** selected that individuals' overall well-being will be more helped than harmed, while **32%** said well-being will be more harmed than helped, and **21%** said there will not be much change in people's well-being from the status quo.

While about a third of the respondents expect that many individuals' well-being will be harmed, the overwhelming majority of these experts assume that – no matter what the future may bring – people's uses of and immersion in digital tools will continue to expand in influence and impact.

They were asked a follow-up question:

> *Do you think there are any actions that might successfully taken to reduce or eradicate potential harms of digital life to individuals' well-being?*

The answer options were:

> ***Yes,** there are interventions that can be made in the coming years to improve the way people are affected by their use of technology.*
>
> ***No,** there are not interventions that can be made to improve the way people are affected by their use of technology .*

Then we asked:

> *Please elaborate on your response about why you do or don't think there can be actions taken to mitigate potential harms of digital life.*

An overwhelming 92% answered that there are interventions that can be made in the coming years to improve the way people are affected by their use of technology; 8% said no and the remainder gave no answer.

We also asked respondents to share brief personal anecdotes about how digital life has changed their daily lives in regard to their own or their family's or friends' well-being. These responses were not woven in among remarks in previous pages of this version of the print report. The additional content of this expanded print report follows, on Pages 85-272; the anecdotes begin on Page 174.

The web-based instrument was first sent directly to a list of targeted experts identified and accumulated by Pew Research Center and Elon University during previous "Future of the Internet" studies, as well as those identified in an earlier study of people who made predictions about the likely future of the internet from 1990 to 1995. Additional experts with proven interest in this particular research topic were also added to the list. Among those invited were people who are

active in global internet governance and internet research activities, such as the Internet Engineering Task Force (IETF), Internet Corporation for Assigned Names and Numbers (ICANN), Internet Society (ISOC), International Telecommunications Union (ITU), Association of Internet Researchers (AoIR), and the Organization for Economic Cooperation and Development (OECD). We also invited a large number of professionals and policy people from technology businesses; government, including the National Science Foundation, Federal Communications Commission and European Union; think tanks and interest networks (for instance, those that include professionals and academics in anthropology, sociology, psychology, law, political science and communications); globally located people working with communications technologies in government positions; technologists and innovators; top universities' engineering/computer science, business/entrepreneurship faculty and graduate students and postgraduate researchers; plus many who are active in civil society organizations such as Association for Progressive Communications (APC), Electronic Privacy Information Center (EPIC), Electronic Frontier Foundation (EFF) and Access Now; and those affiliated with newly emerging nonprofits and other research units examining the impacts of digital life. Invitees were encouraged to share the survey link with others they believed would have an interest in participating, thus there may have been somewhat of a "snowball" effect as some invitees invited others to weigh in.

Since the data are based on a non-random sample, the results are not projectable to any population other than the individuals expressing their points of view in this sample.

> *The respondents' remarks reflect their personal positions and are not the positions of their employers; the descriptions of their leadership roles help identify their background and the locus of their expertise.*

About 79% of respondents identified themselves as being based in North America; the others hail from all corners of the world. When asked about their "primary area of internet interest," 27% identified themselves as professor/teacher; 15% as research scientists; 9% as futurists or consultants; 8% as advocates or activist users; 7% as technology developers or administrators; 7% as entrepreneurs or business leaders; 7% as authors, editors or journalists; 4% as pioneers or originators; 2% as legislators, politicians or lawyers; and an additional 15% specified their primary area of interest as "other."

About half of the expert respondents elected to remain anonymous. Because people's level of expertise is an important element of their participation in the conversation, anonymous respondents were given the opportunity to share a description of their internet expertise or background, and this was noted where relevant in this report.

Following is a list of some of the key respondents in this report:

Micah Altman, director of research for the Program on Information Science at MIT; **Diana L. Ascher**, co-founder of the Information Ethics & Equity Institute; **Robert Atkinson**, president of the Information Technology and Innovation Foundation; **Richard Bennett**, a creator of the Wi-fi MAC protocol and modern Ethernet; **Ed Black**, president and CEO of the Computer & Communications Industry Association; **Nathaniel Borenstein**, chief scientist at Mimecast; **Ildeu Borges**, director of regulatory affairs for SindiTelebrasi; **Stowe Boyd**, futurist, publisher and editor-in-chief of Work Futures; **Nicholas Carr**, author of "Utopia is Creepy" and "The Shallows: What the Internet is Doing to Our Brains"; **Jamais Cascio**, distinguished fellow at the Institute for the Future; **Barry Chudakov**, founder and principal at Sertain Research and StreamFuzion Corp.; **Narelle Clark**, deputy CEO of the Australian Communications Consumer Action Network; **Maureen Cooney**, head of privacy at Sprint; **Judith Donath**, Harvard University's Berkman Klein Center for Internet & Society; **Stephen Downes**, researcher at the National Research Council of Canada; **Ralph Droms**, longtime network scientist, researcher, architect and engineer; **Esther Dyson**, entrepreneur, former journalist and founding chair at ICANN; **David Ellis**, director, Department of Communication Studies at York University-Toronto; **Charlie Firestone**, executive director of the Aspen Institute Communications and Society Program; **Bob Frankston,** internet pioneer and software innovator; **Oscar Gandy**, professor emeritus of communication at the University of Pennsylvania; **Mark Glaser**, publisher and founder of MediaShift.org; **Jonathan Grudin**, principal researcher at Microsoft; **Seth Finkelstein**, consulting programmer and EFF Pioneer Award winner; **Jim Hendler**, co-originator of the Semantic Web and professor of computing sciences at Rensselaer Polytechnic Institute; **Dewayne Hendricks**, CEO of Tetherless Access; **Perry Hewitt**, vice president of marketing and digital strategy at ITHAKA; **Jason Hong**, associate professor at the School of Computer Science at Carnegie Mellon University; **Gus Hosein**, executive director of Privacy International; **Christian H. Huitema**, past president of the Internet Architecture Board; **Larry Irving**, CEO of The Irving Group; **Shel Israel**, CEO of the Transformation Group; **Jeff Jarvis**, a professor at the City University of New York's Graduate School of Journalism; John Klensin, Internet Hall of Fame member, longtime IETF and ISOC leader and innovator of DNS administration; **Bart Knijnenburg**, researcher on decision-making and recommender systems at Clemson University; **Gary L. Kreps**, distinguished professor and director of the Center for Health and Risk Communication at George Mason University; **Leora Lawton**, excutive director of the Berkeley Population Center, University of California-Berkeley,; **Jon Lebkowsky**, CEO of Polycot Associates; **Peter Levine**, professor and associate dean for research at Tisch College of Civic Life; **Mike Liebhold**, senior researcher and distinguished fellow at the Institute for the Future; **John Markoff**, author who recently retired from the post of senior technology writer at The New York Times; **Craig J. Mathias**, principal for the Farpoint Group; **Giacomo Mazzone**, head of

institutional relations for the World Broadcasting Union; **Robert Metcalfe**, co-inventor of Ethernet and founder of 3Com; **Jerry Michalski**, founder at REX; **Riel Miller**, team leader in futures literacy for UNESCO; **Mario Morino**, chair of the Morino Institute and co-founder of Venture Philanthropy Partners; **Gina Neff**, professor at the Oxford Internet Institute; **Lisa Nielsen**, director of digital learning at the New York City Department of Education; **Ian Peter**, internet pioneer, historian and activist; **Justin Reich**, executive director at the MIT Teaching Systems Lab; **Larry Roberts**, Internet Hall of Fame member and CEO, CFO and CTO at FSA Technologie; **Mike Roberts**, Internet Hall of Fame member and first president and CEO of ICANN; **Michael Rogers**, author and futurist at Practical Futurist; **Larry Rosen**, co-author of "The Distracted Mind: Ancient Brains in a High-Tech World"; **Louis Rossetto**, founding editor and publisher of Wired magazine; **Marc Rotenberg**, executive director of EPIC; **Eileen Rudden**, co-founder and board chair of LearnLaunch; **Douglas Rushkoff**, writer, documentarian,and lecturer who focuses on human autonomy in a digital age; **Anthony Rutkowski**, internet pioneer and business leader; **Paul Saffo**, longtime Silicon-Valley-based technology forecaster; **David Sarokin**, author of "Missed Information: Better Information for Building a Wealthier, More Sustainable Future"; **Jan Schaffer**, executive director at J-Lab; **Henning Schulzrinne**, Internet Hall of Fame member and professor at Columbia University; **Evan Selinger**, professor of philosophy at Rochester Institute of Technology; **Brad Templeton**, chair emeritus for the Electronic Frontier Foundation; **Sherry Turkle**, MIT professor and author of "Alone Together"; **Joseph Turow**, professor of communication at the University of Pennsylvania; **Stuart A. Umpleby**, professor emeritus at George Washington University; **Hal Varian**, chief economist for Google; **Amy Webb**, futurist and CEO at the Future Today Institute; **David Weinberger**, senior researcher at Harvard University's Berkman Klein Center for Internet & Society; **Daniel Weitzner**, principle research scientist, MIT Internet Policy Research Initiative; **Yvette Wohn**, director of the Social Interaction Lab and expert on human-computer interaction, New Jersey Institute of Technology; **Ethan Zuckerman**, director of the Center for Civic Media at MIT.

A selection of institutions at which some of the respondents work or have affiliations:

The American Association for the Advancement of Science, Access Now, Adroit Technologic, Aging in Place Technology Watch, Akamai Technologies, Alliance for Affordable Internet, American Press Institute, The Aspen Institute, Apple, Asia-Pacific Network Information Center, Berkman-Klein Center (Harvard University), Boston University, Brainwave Consulting, Carbon Black, Cardiff University, Center for Advanced Study in Behavioral Sciences (Stanford University), Center for Civic Design, Center for Educational Technology, CERT Division in the Software Engineering Institute at Carnegie Mellon University, Chinese University of Hong Kong, Cisco Systems, City University of New York, Clemson University, Cloudflare, Colorado State University, Columbia University, Comcast, Darwin

Group, Democratise, Designed Learning, DotConnectAfrica Trust, Echostar, Edison Innovations, Electronic Frontier Foundation, Electronic Privacy Information Center, Emory University, Ethics Research Group, Eurac Research, European Startup Initiative, Farpoint Group, FICO, Força da Imaginaçao, French National Research Cneter (CNRS), Gardere Wynne Sewell LLP, George Mason University, George Washington University, Global Digital Policy Incubator (Stanford University), GlobalSecurity.org, Google, Hanyang University, HealthStyles.net, Hewlett Packard, High Tech Forum, Human Computer Interaction Institute (Carnegie Mellon), Information Ethics and Equity Institute, Information Technology and Innovation Foundation, Institute for the Future, Intelligent Community Forum, International Telecommunication Union, Internet Corporation for Assigned Names and Numbers, Internet Education Foundation, Internet Archive, Internet Engineering Task Force, Internet Initiative Japan, Internet Society, ITHAKA, Jet Propulsion Laboratory, Johns Hopkins University, Lighthouse Foundation, Massachusetts Institute of Techonology, MediaShift, Michigan State University, Microsoft, Mimecast, Mindful Digital Life, Mobile First Media/Digital Healthcom Group, Nanyang Technological University, National Academies of Sciences, Engineering and Medicine, National Institutes of Health, National Research Council of Canada, National Science Foundation, Nautilus, Net Safety Collaborative, North Carolina State University, Netmagic Associates, New York University, NewPathVR, NORC (National Opinion Research Center, University of Chicago), Northwestern University, Open University of Israel, Oxford Internet Institute, Packet Clearing House, Parsons Inc., Peace Innovation Lab (Stanford University), Penn State University, Polycot Associates, Princeton University, Queensland University of Technology, Rethinkery Labs, Reuters Institute, Rensselaer Polytechnic Institute, Rice University Humanities Research Center, Rochester Institute of Technology, Sprint, Stanford University, Statistics New Zealand, StumbleUpon, Sunlight Foundation, Syncfusion Inc., Technology Education Institute, TechWomen.Asia, Telematica, Terebium Labs, Tetherless Access, The Millennium Project, The Mobile Alliance, The Values Foundation, UNESCO, U.S. Department of State, U.S. Department of Defense, U.S. Federal Government, University of California-Berkeley, University of California-Irvine, University of California-Santa Barbara, University of Chicago, University of Colorado, University of Copenhagen, University of Michigan, University of Milan, University of Minnesota, University of North Carolina-Chapel Hill, University of Pennsylvania, University of Southern California, University of Wisconsin, Vanderbilt University, Verizon, Volta Networks, Wava, Way to Wellville, Wired, Worcester Polytechnic Institute, World Wide Web Foundation, York University.

Complete sets of credited and anonymous responses can be found here:

http://www.elon.edu/e-web/imagining/surveys/2018_survey/Digital_Life_and_Well-Being_credit.xhtml
http://www.elon.edu/e-web/imagining/surveys/2018_survey/Digital_Life_and_Well-Being_anon.xhtml
http://www.elon.edu/e-web/imagining/surveys/2018_survey/Digital_Life_and_Well-Being_Solutions_credit.xhtml
http://www.elon.edu/e-web/imagining/surveys/2018_survey/Digital_Life_and_Well-Being_Solutions_anon.xhtml
http://www.elon.edu/e-web/imagining/surveys/2018_survey/Digital_Life_and_Well-Being_Anecdotes.xhtml

The sections above include the official report posted online by Pew Research and the Imagining the Internet Center in reporting about their 2017-2018 canvassing of experts about the future of well-being and digital life in the next decade.

Following this page are the bonus sections of this **Expanded Edition** of the report, including nearly 200 pages of additional replies by respondents.

Acknowledgments

This report is a collaborative effort based on the input and analysis of the following individuals.

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More answers about the many ways experts say digital life is helpful to individuals' well-being

1 - Connection: Digital life links people to people, knowledge, education, entertainment, anywhere globally at any time in an affordable, nearly frictionless manner

David J. Krieger, director of the Institute for Communication & Leadership, Lucerne, Switzerland, observed, "With increasing connectivity, free flows of information, participation and transparency, not only social services, but many products and services will become more personalized, efficient and intelligent. Of course, this will not occur everywhere, for all, or at the same rate."

Adam Nelson, a technology developer/administrator based in North America said, "We don't know what 'good' is but we do know that technology will extend lives and make it simpler to do more. The challenge will be with governments and other powerful forces leveraging technology for their own gains. Similar to rice and wheat being controlled for gain over previous millennia, the control of information will be paramount. This is why protecting the internet is so critical to liberty."

José Estabil, CEO of a biotechnology startup, said, "Technology has greatly helped society in many areas, and not in always predictable ways. Whether in the U.S., in the Middle East, in China, in marginalized neighborhoods and even in Cuba, we are still in the early stages of this change so it is often hard to understand its immensity. I once heard something about rearing children that reminds me of the growth of technology: The days are long but the years are short! Technology fundamentally posits 'utility' as its organizing purpose and its expression is all about creating tools that can free the human spirit to pursue other endeavors with the limited amount of time we are granted. Some confuse technology with morals. Others elevate (or denigrate) people that are fluent in it: sometimes technologists create echo-chambers and exacerbate these perceptions. Would one think about the combination of concrete and transportation, or roads, as good or evil? No. Or ink and paper, or books? (Well, roads and books were huge technologies in their day.) My point is that it takes a long time for society to see a technology for what it is; and why books, or reason, continue to be problematic for a few. I am hopeful, however, that the latency required for society to come to understand the utility of a technology is decreasing. I do worry that as we rely more and more on technology, two factors become more important: **1)** Assuring resiliency in our networks and the energy that supplies them. **2)** Assuring that access to technology does not become a privilege instead of a right."

Perry Hewitt, vice president of marketing and digital strategy at ITHAKA, said, "This has been a rough year for internet utopians. The technology that was supposed to break down divisions has heightened them, and we've seen everything from election tampering to the demise of Net neutrality. And the practice of using technology for citizen surveillance has not been limited to repressive governments but has become part of the tradeoff of engaging with popular platforms. My lens is education – the capacity for the internet to provide access to knowledge to the most people at the lowest possible cost. And while there are threats to this access, there remains vast potential for learning. We're far from the MOOC [massively open online courses] hype cycle peak of 2012, with many lessons learned along the way, and I am bullish about the internet as means to deliver lifelong learning to the many who need it."

L. MacDonald, CEO of Edison Innovations, wrote, "More and more applications and information will continue to inform. Freedom is a function of knowledge available. You must know what is going on to make useful judgments. Countries with less freedom will suffer under authoritarian regimes. It is hard to compete in business and technology if knowledge cannot be freely shared."

Karl Ackermann, a writer and researcher at WriteSpace, LLC., commented, "The impact will help people ONLY if society prepares for high levels of unemployment. The safety net will need to include an income for those who are not likely to find work in a highly automated world."

Ed Dodds, a digital strategist at Conmergence, listed several network advantages, writing, "1) Telepsychiatry. 2) Rural churches re-imagined as job-training and start-up accelerators. 3) Silver senility tsunami care-giver training in place via internet tutorials. 4) Folks with disabilities enabled to work remotely (less transportation hassle)."

David Wells, a CFO who lives and works in North America, said, "Digital connectedness – videoconferencing, texting, social media, etc. – allows us to stay connected to our friends and family in important ways that blunt the negative aspects of mobile markets. We move away from family more than we ever have, and these tools bring more benefit than harm. As we learn to better integrate these into our life, we can mitigate the more harmful aspects that are the worries of today. Remote health diagnostics and monitoring will allow us to spend less time visiting doctors as we age. This is just starting but has tremendous room for growth. Our children will learn to use the internet in new collaborative ways."

Denise Brosseau, a lecturer at the Stanford Business School, commented, "As digital access continues to spread to the far corners of the planet the good will far outweigh the harm as people have access to online courses and information about their health as well as platforms for

connecting with others to support their health and well-being. Telemedicine is also poised to explode, providing access to healthcare to far more people than ever before."

Jessamyn West, a respondent who shared no additional identifying background, said, "Economies of scale allow communication between and among people at a much higher rate than ever before. These allow people entry into arenas such as civics, volunteering, support services and simply enjoyment and entertainment. They allow people to interact with more sorts of people than they ever could before. They give people with disabilities a more level playing field to interact in more ways. At the same time, human decisions in this arena – particularly in the area of keeping people safe and keeping people's information private – is one of the more challenging areas where small missteps borne out of inattention, lack of caring or just bad choices, can have even larger repercussions than previously possible. I believe things are improving because I have faith that people can help improve things; I do not think these changes can come about without concerted actions and attention from people who care."

Adam Powell, manager, Internet of Things Emergency Response Initiative at the University of Southern California, wrote, "Technologies that succeed enable us to do more things more quickly and more easily, so that's a plus. The negatives – notably a decline in security and privacy – are already here in such strength that it's difficult to imagine it becoming that much worse. Of course the bad actors are really creative."

George Strawn, director of the U.S. National Academies of Science, Engineering and Medicine Board on Research Data and Information, said, "New tools and services will enable even more data, information and knowledge to be available to people. On the down side, many jobs will be automated, and it's not clear if or when new jobs will appear."

Sam Lehman-Wilzig, retired chair, School of Communication and Department of Political Studies at Bar-Ilan University, Israel, wrote, "The effects of the digital world will be complementary and complex, depending on several elements and variables: **1)** Age groups: the younger cohorts will continue to overuse social media; the older cohorts will become more aware of their deleterious effects and moderate their use. We also might see the start of government regulation, or the least, educational campaigns to limit some of the negative effects. Another, completely different online area is government services that can be offered digitally. That exists today; it will become much larger/better in the next decade. **2)** Online vs offline digitality: Offline digitality will be largely positive in many critical fields: health (more Big Data from the field will lead to better service and therapeutic solutions); urban planning and transportation will benefit greatly from sensors in all public places, leading to more efficient use of public spaces and resources. One could go on, but the principle is the same in almost all areas of life. The main

sticking point will be privacy concerns. However, the digital generation seems to care less about this than older folk, so that overall privacy issues will not much hinder digital progress on the public front."

2 - Commerce, government and society: Digital life revolutionizes civic, business, consumer and personal logistics, opening up a world of opportunity and options

Larry Roberts, internet Hall of Fame member and CEO, CFO and CTO at FSA Technologies, wrote, "The internet and other digital tools are starting to eliminate the stressful and costly need to commute into work each day allowing several extra hours each day to most of us. This also applies to travel to meet with people as video conferencing eliminates most of the need for travel. This also greatly eliminates stress and save huge amounts of time and cost. The use of email for sending PDF files is another large speedup in getting work done. There is so much more one can accomplish each day for one's business, shopping and play that the world is speeding up. We just need to keep from letting the speedup force us to become more stressed."

Robert Touro, an associate professor at Colorado Technical University, commented, "The internet is the greatest invention and technology of the 20th century. It has changed the way people function, think, communicate, learn, collaborate and conduct business in the now. The internet will continue to stretch the boundaries of everyone in good and bad ways, but hopefully the good will outweigh the bad and add capabilities for one and all that we cannot even fathom in the present."

A **public policy expert with a major internet company** said, "We should no longer talk about the Digital Economy but rather the Economy that is Digital. As the internet and cloud are adopted by even the least tech-savvy businesses, we have the opportunity for every company – no matter how small – to deploy leading-edge tools for e-commerce, customer engagement, supply chain management, work training, sales and marketing, and almost every core function of a modern business. By lowering the barriers to starting a company and enable it to reach global markets, new products and services – and well-paying jobs – will be created (provided government policies promote rather than innovation and trade)."

Bill Woodcock, executive director at Packet Clearing House, the research organization behind global network development, said, "Over the past 25 years we have, as individuals and a society, gained immense benefits from some technologies: satellite navigation; open source software; the online indexing, searchability, and archiving of public documents; global transaction clearing; ubiquitous portable computing; overnight door-to-door delivery. All of these things have made it

possible for people to engage in further role-specialization and participate in a more-efficient society. The cost of this has been increased fragility, interdependence of systems and a vast loss of privacy. I believe that the economic instability and losses in economic equality we've seen over the same period are orthogonal to the technology."

Morihiro Ogasahara, associate professor of sociology at Kansai University, said, "AIs and algorithms will help people to make choices more quickly, more beneficial and less stressful. Although such automization of choice does have risks that may erode their free will, it will be able to help them to focus more valuable decisionmakings on things other than trivial matters."

Mícheál Ó Foghlú, engineering director and developer, tools and signals at Google Munich, said, "All technology can be abused, but on balance internet technologies have, and will continue to, benefit us all."

Renee Dietrich, a retired professor, commented, "Information will be easier to access. Things continue to speed up. Online services for shopping for food, clothes, etc., have already changed retail. I can learn about and monitor by health more easily. Learning has/is changing. My concern is about individuals being able to interact with people of other races, values, religions, etc., in a community setting. The digital divide will grow along economic lines. Individuals with poor skills and low ability to learn will be left behind in the job market. However, there will be greater opportunities. Trust issues with accuracy of information will increase since it seems anyone can say most anything on social media without checking facts. I like that individuals can video events as they happen, both personal and public, and there is no waiting for an 'official' report and response."

Adam Montville, a vice president at the Center for Internet Security, said, "Well-being seems a broad topic with many facets. It is easy to say that an increase in screen time, sound bites and bite-sized political memes do not bode well for humanity. Technology can be used for those purposes, but it can also be used to treat disease, discover cures and increase productivity so we have more free time to spend with family and friends in leisure. The choice, it seems, is up to each of us. Do we want to stare at cat memes all day long (who doesn't love a good cat meme?) or would we prefer to engage technology in a more meaningful way? One perspective that gives me hope is watching my 8-year-old son use technology. Instead of learning touch screens after learning about keyboards and mice, he went – along with countless other children – the other way. We bought him a Lego Boost for Christmas, because he already loves his Osmo coding. I am truly excited to see what the next generation invents."

3 - Crucial Intelligence: Digital life is essential to tapping into an ever-widening array of health, safety and science resources, tools and services in real-time

Charlie Firestone, executive director of the Aspen Institute Communications and Society Program, said, "There will be some amazing advances attributable to digital technologies in healthcare, transportation, energy and just about every other aspect of our lives. This is not to say there won't be negative consequences. Many problems will arise, in part because of advances in hacking identities and cyber warfare. It just comes down to whether one is a cyber-optimist or pessimist. Certainly, there will be increasingly significant impacts both ways."

Gina Neff, an associate professor and senior research fellow at the Oxford internet Institute, said, "The next decade will see extraordinary gains in how data and technology are brought to solve health problems. The main challenge for practitioners is how to integrate insights from data into the everyday decisions in healthcare. The challenge for researchers now is to help guarantee that those gains benefit the people in society who need it most."

Steve Stroh, technology journalist, said, "When I was a teenager, I had an experience with cancer in my family. In college, I volunteered at a Cancer Information Service funded by the National Cancer Institute. It was a small call center where we could answer basic questions from (mostly very scared) people about cancer, treatments, outcomes, etc. The problem was that the sources were limited to very generic information from the National Cancer Institute and the American Cancer Society (and related organizations). In short, we couldn't offer very much useful information. With the internet… the sky is the limit with being able to research your health issues, not just 'big issues' like cancer, but many health issues which affect much smaller populations, including finding fellow sufferers of particular diseases. The downside is, of course, is that people can find their way to 'quack' cures and outright frauds (not immunizing your kids comes to mind). But, at least, the GOOD information about your health can be accessed on the internet."

Ross Rader, vice president for customer experience, Tucows Inc., said, "The bad gets all the headlines, and not a day goes by where we don't hear more about the negative impact that technology has on people, but we also can't forget that we live in a world where it is conceivable that a person born with mobility challenges might never need to rely on the kindness of others to buy them groceries because they will have access to their own self-driving automobiles. My son is in this position and the benefit he receives from technology is incalculable. Something as simple as 'Alexa, turn on the bathroom light' is a game-changer for many."

Heywood Sloane, partner and co-founder of HealthStyles.net, said, "The Internet of Things offers new tools to enable steps for monitoring and managing care, fitness and the wear on

virtually any items that require maintenance. It enables gathering massive amounts of information that hold the potential of testing insights and hypothesis with a high statistical significance in a fraction of the time it once took. Applying that to our biology and the physical world around us holds huge potential. Either offsetting or perhaps helping are positive social interactions between people. Much of that will depend on how well we learn to discipline ourselves, protect facts and evidence from distortion and carry common courtesy into the virtual world. Will we learn how to effectively bridge the gap between the dramatic images that drive communication in virtual worlds and the 'body language,' empathy and respect that drive communication in the physical world?"

Walt Howe, a retired internet consultant and U.S. Army education specialist, said, "Improvements in new technologies, services deriving from artificial intelligence, ubiquitous and always-available information and, particularly, advances in medical technology will have an enormous impact. The rate of change is accelerating, and it will create many changes in lifestyles. Education and training for life will take new forms, too, as a constant need to learn new skills will be ever-present. Education will necessarily be lifelong, not completed in one's 20s. Learning how to learn is as important as the specific skills and insights one learns at any time. The concept of privacy will be changing, too. What we protect and how we protect it will not remain constant, any more than anything else. Change is in itself disturbing to many. Learning is defined as change in behavior, and those who reject or resist change will have real problems adjusting to a constantly changing world. Those who embrace change, anticipate it, create and work with it will be most successful. A serious question, which must be dealt with, is the ability of governments to function in times of rapid change. I hope new generations of leaders learn to embrace change, too."

Andrew Czernek, a former vice president of technology at a personal computer company, wrote, "Well-being will be improved by more-responsive technologies that respond to voice and not just keyboards. We're already seeing the positive impact with products like Amazon Echo being an intimate part of the household. In addition, we have the hopes of seeing more accessible medical information and care, even the possibility of reducing medical costs via direct home access to patients. However, NO security technology has proved to immune to compromise and attack. And now we're starting to see technologies in the home that can listen to private conversations and even see into personal lives. This will be the major issue holding back the benefits of new technology."

Bob Brookshire, a professor of information technology at the University of South Carolina, wrote, "Advances in telehealth will enhance quality of life. Being able to access healthcare providers at a distance, improving compliance with prescription medication, remote monitoring of symptoms and other advances will improve healthcare."

Katharina Zweig, professor of computer science at TU Kaiserslautern, said, "For those in poorer countries, access to health information on the internet will greatly benefit them – given that the internet access will rise and will be affordable for all. For those in richer countries, who are often burdened by overweight and inactivity, sensors in our surroundings ('wearable health,' personalized training software, apps alarming us to take a break or counting the caloric intake, etc.) will help us to get healthier. This bears the risk of too much control by governments, insurers and so on. So, I expect an increase in health, but it might be at the expense of privacy if we do not design better and less centralized systems."

Srinivasan Ramani, a retired research scientist and professor based in India, said, "I do believe that people are smart enough to avoid overloading themselves by abusing their communication and productivity tools. I have a developing-country point of view about what can happen. Millions of pathology lab visits are made per year in a country like India. I believe that this information should be collated and made available to all those interested over the Web. For instance, I should know if there is an unusual prevalence of Dengue or conjunctivitis in my city during a given month. My doctor should know what micro-organisms are predominant that month, so that his/her first-guess medication could be more appropriate. I should be able to use the Web to decide if I should choose to live in a given city or not [based on data]. I should be able to see on a street map on the Web a prominent icon marking every place of a death from a recent traffic accident; such transparency is essential to ensure that city traffic managers do their work well. Servers on the Web dealing with fitness trackers should guide me to suitable action – for instance, alerting me when my heart-rate monitor detects any dangerous possibility. The Web was not created merely to make billion-dollar companies become 100-billion-dollar companies. The Web should also focus on socially valuable functions and not confine itself to powering more and more expensive toys for adults. I do believe these things will eventually happen; citizens' demands might make them happen in their own lifespan."

Laura Guertin, a professor of earth sciences at Penn State-Brandywine, said, "Although there are definitely some ways I can see digital technology causing harm (rapidly changing the way people communicate with one another in an uncivil manner, used to steal online identities and access financial resources, etc.), I have to hold out hope that we as a society will be better off with digital technologies in assisting with medical breakthroughs, natural hazard warnings and disaster recovery and overall digital applications to create a sustainable planet for future generations."

Jane Gould, Ph.D., an author and futurist, commented, "We are just beginning to learn how to use our smartphones to design mental health applications that make people feel more connected and less vulnerable. There have been strides in using the phone to monitor physical health; the next frontier is mental health."

4 - Contentment: Digital life empowers people to improve, advance or re-invent their lives, allowing them to self-actualize, meet soulmates and make a difference in the world

Many pointed out the pro's and con's as they opted to be optimistic. **Victor MacGill**, a North American futurist/consultant said, "It is certainly not a black-and-white answer. Among the good things to come will be improved health, transport, safety, communications, equal access to vast stores of information, education, community action and coordination. If we lose Net neutrality, then equal access to information is threatened. Of course there is also still a digital divide. And uses of the internet cause health problems and social-communications problems. Immediate access to information is convenient but it adds to the stressfulness of life. AI is closely linked to the internet, and that will change our lives; they will be unrecognisable when machines can do so many things better than we can. The internet directly and indirectly provides livelihoods for many millions, yet many will also lose their jobs through AI. Economics is more volatile because of the speed of transactions, and now AI getting in on the deal. Maybe I am just an optimist, but I think on balance there will be more benefits than disadvantages."

Bart Knijnenburg, assistant professor, Clemson University, said, "I had a hard time answering this question. Outside the U.S., and especially in emerging markets, I hope that internet innovations can significantly improve people's lives. I see the current advances in Internet of Things as merely superficially useful rather than truly transformative. Bringing devices online will seem enticing, but initially just be a cognitive burden. In the long run, though, these experiences may become more adaptive to our daily routines and actually relieve some of our daily burdens. As for other online services, I am afraid that the recent ruling against Net neutrality may unduly increase the power of large corporations in deciding the future of the internet. I don't think these corporations have improving our well-being as their highest priority."

Paul Rozin, a professor of psychology at the University of Pennsylvania, said, "Digital advances promise a net advantage in regard to the quality of life, but there are major risks. I hope that, as in the past with, for example, new medical treatments, we can contain or counter the risks, while profiting from the benefits. The plus side is obvious in terms of accomplishing mindless tasks (with possible negative implications for the work force), advances in diagnosis, access to information, reduction of some types of drudgery. What worries me is the increasing dangers of world catastrophes resulting from meddling with systems that can have very wide impacts, the lack of vetting for irresponsible but attractive views, the invasion of privacy and the curtailing of what to me is a central and sacred aspect of the human condition: direct interpersonal interaction. Bad actors, like harmful bacteria, can have a much wider impact now. We have to find a way to limit this."

Ian Rumbles, a technology support specialist at North Carolina State University, commented, "Digital technology in first-world countries will improve life by making tasks easier and faster. Improvements will include improved health by monitors and signals giving early warnings of potential issues. In the third world, digital technology will improve access to information and communication. This will provide young people great opportunities to improve their lives and, potentially, the lives of their parents. Mind you, there are negatives to the direction of our technology. There will be increased accidents due to distractions; families are becoming less social, which impacts the ability to be good parents; there are new addictions. The increase in digital technology means we are all more susceptible to hacks."

Marshall Kirkpatrick, product director, Influencer Marketing, said, "I believe digital technology will provide more opportunities for understanding ourselves, others around us and the world at large. I believe many, though not all, people will continue to take those opportunities. Awareness is a prerequisite for well-being, so the internet could prove an even bigger boon for those of us who embrace it with our humanity."

Allen G. Taylor, an author and SQL teacher with Pioneer Academy, said, "People's well-being will be increased in ways that cannot be imagined at present. New capabilities and resources will be applied to the challenges that people face, enabling them to better cope with those challenges."

Shahab Khan, CEO of PLANWEL and director of strategic development and international collaboration at Sir Syed University of Engineering and Technology, Pakistan, said, "The answer can be found if we consider the advent of the internet in our life. It has really transformed it for the better, even if we call it a double-edged sword. The point is that the world cannot remain stagnant and the digital revolution – with the advent of AI, robotics, AR/VR and all of the tools of the 4th Industrial Revolution – will greatly enhance our lives for the better."

Alex Halavais, director of the MA in Social Technologies, Arizona State University, said, "Of course, some will be worse off, and some better off. But on the whole, we are moving to an era in which digital technologies can take on ever-increasing tasks, and this will challenge us to rethink how we organize the distribution of goods, how we work and how we make use of our time. The transitions will not be easy; old social structures will do a poor job of managing the rapid changes brought on by automation. But on the whole, it will make people's lives better, removing sources of toil and creating more abundance and choice."

James Galvin, a director of strategic relationships and technical standards, said, "Long-term I believe that technology is good. It both improves the quality of life and it makes it possible to bring a better quality of life to those who more directly and necessarily need it. Unfortunately, in the

short-term, it also creates a society divided according to those who have technology and those who do not. This divide increases as those who 'have' keep moving forward and those who 'have not' struggle to keep up and catch up. This is perhaps the most significant challenge we all need to consider and work together to resolve. Another short-term issue is that among those who have technology, the dynamics of personal interaction have changed dramatically. On the one hand there are greater numbers of connections between more people for more reasons than ever before. On the other hand we tend to interact more with our technology than we do with each other. I don't think we fully understand the impact of this change on ourselves or our world. We need to consider this issue more deeply and make sure this change is for our mutual good, rather than bad."

Ildeu Borges, director of regulatory affairs for SindiTelebrasil, said, "In the next decade there will be a democratization of the internet access in the poorest countries. The people affected by this democratization, who will have access to this technology for the first time, will be largely positively affected by this."

Tom Barrett, president, EnCirca Inc., wrote, "The internet will improve people's well-being by providing people the information and tools needed to improve their health, safety and financial well-being. These benefits will advance society in many ways by disrupting old, established ways and occupations. There will be some harm for the fraction of people whose livelihood is disrupted or made obsolete by new technologies, but the vast majority of society will benefit from the changes."

Scott McLeod, a professor at the University of Colorado-Denver, wrote, "On the whole, progress in targeted genetics, nanobiology, artificial intelligence, bots, the Internet of Things, mobile computing and other technological advances will help make us healthier, improve our lives and lengthen our lifespans."

Chris Morrow, a network security engineer, said, "Overall, more access to information in a free and open environment will improve people's ability to learn, interact and expand their knowledge base. Additionally, fostering innovation through access to information and markets outside the person's immediate area will expand their ability to succeed."

Cliff Zukin, a professor and survey researcher at Rutgers University, commented, "It's an optimist's view, that we hang around on Earth. Digitization speeds things up, the pace of change, the diffusion of innovations. The more available information is, the lower the cost of information, the greater the potential for equalization and growth in less-developed societies. The pessimist's view is that increasing digitization allows for colossal failures on a scale imagined only in science

fiction (Azimov's 'Trilogy,' for example.) A failure of/attack on the energy grid; the homogenization of humankind and loss of individual cultures; the diversity of analogue life as something that cannot be manipulated or taken over by terrorists de jour through hacking. Digital unites everything, and there may be something to be lost in that happening."

Thomas Viall, president of Rhode Island Interactive, commented, "One only has to look at the past to see the many ways a 'digital life' has improved our lives. We can grab a ride share in minutes, see what nearby restaurants have the best reviews and stay connected to our friends and relatives across the world. In the future we will be healthier because of intelligent monitoring, our homes will be more secure and connections between smart things will make our lives easier."

Jeff Jarvis, a professor at City University of New York Graduate School of Journalism, said, "Eventually most every advance in technology yields an advance in well-being, once we are given time to figure it out."

Edward Tomchin, a retiree, wrote, "I see a future where all our needs and a lot of our desires are met by machines, freeing humanity to explore our creativity, our innovativeness, our unending quest to see what's over the next hill or past the next universe. There is a tremendous amount of hope available for humanity if fear weren't so dominant. The simple fact of our existence compared to the century past is more than ample evidence for our forward thrust. The 20th century was wall-to-wall war encompassing the two world wars and one long cold one which included coming face to face with armageddon in October 1962, and we're still here and moving toward the future. Confidence in our ability to rise above the worst problems we can throw at ourselves should be easy to achieve given our history. We're constantly on the leading edge of creating a world and then learning how to live in it, we are constantly having to make laws and regulations to stay ahead of our own failings. Those are not easy tasks, but we've succeeded at them remarkably."

5 - Continuation Toward Quality: Emerging tools will continue to expand the quality and focus of digital life; the big-picture results will continue to be a plus overall for humanity

Piotr Konieczny, professor of sociology at Hanyang University, and other respondents said humans and their technologies have generally evolved in mostly positive ways over time. He wrote, "Throughout history, technology has made us better off. While nothing is white and black, and one could find exceptions, the big picture is clear. Anyone who disagrees is welcome to live the life of 'noble savage' – watch half of his children die of starvation and disease and die himself before reaching the age of 30, uneducated, sick and likely murdered."

Eric E Poehler, associate professor of classics at University of Massachusetts-Amherst, commented, "The letter, the telegram and the telephone all had meaningful positive impacts on our lives, and it is today impossible to imagine going back to a social world without them. As individuals, we will experience greater well-being in many cases from new means of engagement with people, ideas and things. The pace of innovation will often feel exciting, but sometimes disorienting. On the other hand, our larger social structures, such as economic and political systems and normative cultural expressions, will see significant disruption due to this same pace of change. It is unknown what the impact of these more seemingly fundamental structural changes will be, thought I suspect they will appear and feel negative in the present for many. Although I believe, on average, the future of the internet will be positive in relation to our well-bing, I am also sure that negative impacts will fall upon groups who have been previously marginalized. We will surely replicate our failures in this new digital landscape unless we remain vigilant to the notion that we are creating this digital world, including its implicit biases and explicit injustices."

Yvette Wohn, director of the Social Interaction Lab and expert on human-computer interaction, New Jersey Institute of Technology, commented, "Technology is both good and bad, thus well-being can as easily be improved as it can deteriorate. Technology is part of our lives now, it is here to stay, and the thing we should be discussing is not if technology/internet is good or bad but when does it have negative/positive effects, why, and to what people in what situations."

A **distinguished technologist at a major tech company** in the U.S. wrote, "We will see the emergence of AI agents to perform routine tasks and simplify workflows, which should reduce the cognitive loads that people struggle with today when they are active online. To the extent that people are willing to use them, AIs could offer significant relief from distractions that negatively impact attention. Also, the development of chatbots and conversational interfaces will enable people to interact with technology in ways that are more aligned with natural human-to-human social engagement. AI bots have the potential to dramatically change the way that people manage their mental health and well-being in a positive way."

Richard Sambrook, professor of journalism at Cardiff University, UK, wrote, "Overall, AI, automation and technology have the capacity to greatly improve our lives and our well-being if managed well. The challenge for society and politicians is to adapt rapidly enough to ensure new developments are harnessed for good and potentially damaging effects are mitigated. We see this currently underway with the social and political response to widespread mis- and disinformation which was not adequately foreseen but which is now clearly under scrutiny and stronger management."

Maureen Cooney, head of privacy at Sprint, commented, "As we move forward with our use of digital and wireless devices our ability to more seamlessly use these devices to help us with daily life tasks and to be efficient with resources through Internet of Things products and services will expand. The possibilities for good include enhancing the lives of all ages in learning, communicating, feeling connected socially to others, and certainly can help the elderly and disabled as challenges would otherwise potentially isolate them or hinder their independence. I have confidence that as we use smart devices, we will also learn how to best use them and to be smart in our device behaviors and platform management, better mitigating risks about digital stress and phenomena such as the susceptibility to 'fake news.'"

An **account manager at a pioneering internet-based digital information service** said, "The era we live in now is an anomaly and not the norm, but we're taking a much-needed look into the role of technology in our lives with a new critical eye. All progress requires these periods of self-reflection. Technology, specifically the internet, has disrupted so much so quickly that it's worth the full review. The U.S. just went through an election where our social networks became carriers of fake news and misinformation. We took some wrong turns on the information highway that showed so much promise in its early years. The consumer Web landscape keeps consolidating to a smaller and smaller number of major companies, the new gatekeepers of the information age. Net neutrality is in jeopardy. Facebook has slowly become a place that doesn't connect us but leaves us feeling even more isolated. We're left comparing ourselves to a highlight reel of the lives of our friends, families and acquaintances. Automation in the workplace is leaving millions of people with skills no longer needed. But a correction will or is already taking place. At some point I foresee a new progressive age breaking up online media trusts like the railroad trusts of the early 1900s. How much will that change things for the better? I believe we'll all benefit from a more competitive landscape in this area. Advertising, the lifeblood of the information age, is long overdue for an overhaul. Internet service providers can only hold onto a monopoly for so long. If Netflix is the new network, there's surely room for others following their model. If automation does end up leaving millions of people without work, how much longer do we go on before we redefine the concept of work entirely? What about continuing education? If you zoom out far back enough, our fears are overblown (they almost always are) and we'll still look at the internet as a net positive for humanity."

Ted Newcomb, directing manager of AhwatukeeBuzz, wrote, "We will better-focus technology on being a tool for specific tasks that enable us to more effectively communicate and collaborate with one another. 5G will enable mobile devices to work as effectively as PCs while offering wider public usage, making the smartphone the device of choice."

Karen Yesinkus, a respondent who shared no additional identifying background, wrote, "We are quickly approaching the end of the first era of the internet and the evolution of digital apps and services that it has brought to everyday life. The incredible proliferation of devices and apps has contributed to a higher quality of life for the majority of people using them in both personal and business settings. This era has created many winners and ultimately many losers in choices, services and ideas offered to the public –which has been and continues to be overwhelming and disruptive. I believe the next decade will usher in a new era of digital life that is more settled, secure and ever-more integrated into daily life that will impact the quality of life positively and in ways yet to be seen."

More remarks illuminating perceived concerns and challenges of digital life

1 - Digital Deficits: People's cognitive capabilities will be challenged in multiple ways, including their capacity for analytical thinking, memory, focus, creativity, reflection and mental resilience

An **anonymous respondent** said, "The increased use of digital technologies has shortened attention spans, led to more shallow thinking and analysis, driven a dopamine-like addiction to instant digital gratification and allowed the growth of digital media where opinions are easily manipulated by unknown forces. These factors are likely to grow worse in the coming decade."

Sam Punnett, president of FAD Research, Inc., said, "Advances in monitoring, such as the ability to observe real-time brain activity, are leading to insights into the effects of media exposure upon brain function. The realization that digital media consumption is not benign will hopefully lead to greater awareness of the effects. Harm reduction in the form of distracted driving laws are a welcome measure. The effects of digital engagement are broad-ranging. They have changed the nature of interpersonal communications and social engagement. Excessive use by individuals appears to cause users to exhibit symptoms of both obsessive-compulsive disorder and substance dependence in some cases. Eventually the discussion will become a part of greater conversations related to mental health as we discover more."

Lucretia Walker, a quality improvement associate for planning and evaluation social services, said, "I'm worried that long-established social norms which allowed humans to connect with each other in a real way will be lost. I'm concerned about the real loss of and invasion of privacy and the fact that our every movement is recorded and accounted for… I see technology replacing more and

more jobs, and those who don't have technical or specialized skills being forced to try to earn a living in low-wage, service-related jobs. I'm concerned about a future when I currently see throngs of people 'engaging' alongside each other when no one even looks up from their device when talking to you. This unawareness started with everyone carrying mobile phones, and social courtesy seems to have evaporated, as people started out talking loudly and obliviously into their phones wherever they were and this has progressed to the point that people at dinner together in a restaurant are busier taking photos of their food than eating it or talking to the people they're with… Everything is etheral now; nothing seems concrete. I do love that because of this technology I can access information instantly and anywhere, but I cannot deny that I can't seem to access my ability to focus on anything for more than an instant because of it."

A **professor at a major U.S. state university** said, "Potential benefits are mediated by how individuals use technology (e.g., controlling excessive internet use, social media use, drawing boundaries between work/home/vacation, limiting distractions that have the potential to harm well-being, etc.). I teach at the university level, and data show that students' performance in the classroom is declining while their level of stress is increasing their ability to cope in a healthy manner with stress is not, in part because real support relationships have been supplanted with the perception of digital support relations."

Claudia L'Amoreaux, digital consultant, wrote, "People are up against designers trained in persuasive technologies and brain chemistry. It takes tremendous awareness to hold a steady course and navigate an always-on, always-amazing, always-something-new-and-fascinating, always-terrifying, always-important Ocean of Information and Entertainment. Children are not getting the guidance they need that will lead to healthy self-monitoring. We don't understand or appreciate the connection between insight, creativity and reverie. When is the last time you even heard someone use the word 'reverie'? It's too easy to click or utter a voice command to the various virtual assistants awaiting. We're not helping kids enough to discover practices to help them understand what they're feeling when they're stressed, anxious or lonely, and how to address root causes in ways that will lead to sustainable well-being. With childhood anxiety increasing and kids with powerful smartphones in their hands 24/7, we're creating a destructive positive feedback loop that drives them continually to their phones, perpetuating the cycle. Experiences available are compelling and educational, therapeutic and healing. But we need to take more care with transparency about the downsides and consider how to support people, especially parents and children, in when and how technology is helpful, and when and how it can harm."

Scott Johnston, a high school teacher, commented, "Because we can rely on it having the information when we need it, we will let the internet be our repository of knowledge and memories. The effect of this is that important ideas will not be in cohabitation in the single mind,

which means that the valuable happenstance of the collision of ideas leading to new thoughts will become beyond our minds' capacity."

A **pre-law student** based in the United States said, "Though technology brings a lot of ease and comfort to our lives, in the long run it is harming our ability to process information, pay attention, find gratification within ourselves and interact with other people. Digital technologies have imposed many changes on the mental capabilities and emotional states of the people using them."

A **university student** wrote, "A major trend that can already be seen is information overload. There is so much information on the internet; too much for any user of any intelligence level to competently intake and synthesize. To many, this plethora of resources is a great thing, but many do not realize that they are drowning in this pool of information. The vast amount of advertisements and other promotional content that is forced into the faces of consumers is part of the overload. This is contributing to deficiencies in mental capabilities, for instance a decrease in attention spans. The internet impacts our cognitive abilities and emotional health, often not in a positive manner."

Anonymous respondents commented:

- "With all the information available, it is hard to know what to focus on, what is actually important and what is useless information. Because of that, we don't focus on anything, or we focus on the wrong things. Either way, it negatively affects our brains, losing focus in the real world, or causing stress."
- "Online material is much more quickly accepted and posted/shared/believed without critical evaluation."
- "The more research I do on this area, the more I learn that the thinkers who created the internet did not foresee where users would go with their demand. We are faced with unforeseen biological changes related to our new technology."
- "People are disengaging from personal interactions and are losing the ability to concentrate."
- "The combination of fake news, the echo chamber and weak critical-thinking skills will continue to polarize the population, increase fraud and lead to bad national decisions."
- "Digital communication will continue to erode people's contact and ability to interact with persons who hold different views than themselves. Cyberspace will result in a bigger gulf between people of different viewpoints."

2 - Digital Addiction: Internet businesses are organized around dopamine-dosing tools designed to hook the public

An anonymous **college student** wrote, "Many people have gotten to the point where they can't survive without their phone or other smart technology. This addiction and dependence is unhealthy and causes poor mental and physical health outcomes. I fully believe that this behavior will continue to escalate. People will become more shut off from the physical world, and only interact with others through some digital platform. This lack of real human contact will be extremely detrimental to social skills and overall well-being of individuals and society. These addictions, dependence, and withdrawal from society are things that we have already begun to see happen in extreme cases. I predict that they will both intensify and become more commonplace."

A **blog editor** based in North America wrote, "The goal of information technology's design is just to capture and keep our attention. It's predominantly not on our side. It's not even equipped to know what our goals are a lot of the time. But that kind of information would be necessary for it to move us in the right direction. One standard I use is GPS. If a GPS distracted us in physical space in the ways that other technologies distract us in informational space, no one would keep using that GPS. Democracy assumes a set of capacities: the capacity for deliberation, understanding different ideas, reasoned discourse. This grounds government authority, the will of the people. So one way to talk about the effects of these technologies is that they are a kind of a denial-of-service (DoS) attack on the human will. Our phones are the operating system for our life. They keep us looking and clicking. This wears down certain capacities, like willpower, by having us make more decisions. A study showed that repeated distractions lower people's effective IQ by up to 10 points. It was over twice the IQ drop that you get from long-term marijuana usage. There are certainly epistemic issues as well. Fake news is part of this, but it's more about people having a totally different sense of reality, even within the same society or on the same street. It really makes it hard to achieve that common sense of what's at stake that is necessary for an effective democracy. The role of the newspaper now is to filter, and help you pay attention to, the things that matter. But if the business model is 'like' advertising, and a good article is an article that gets the most clicks, you get things like click bait because those are the metrics that are aligned with the business model. When information becomes abundant, attention becomes scarce. Advertising has dragged everybody down – even the wealthiest organizations with noble missions – to competing on the terms of click bait. Every week there are outrage cascades online. Outrage is rewarding to humans because it fulfills psychological needs. It could be used to help us move forward, but often, it is used to keep us clicking and scrolling and typing. One of the first books about Web usability was actually called 'Don't Make Me Think.' It's this idea of appealing to our impulsive selves, the automatic part of us, and not the considerate, rational part."

Scott McQuire, professor of media and communications at the University of Melbourne, Australia, said, "My concern is the dominant models that have developed around hyperconnectivity. Dominant internet business models that depend upon amassing user attention promote negative feedback loops based on competitive self-evaluation. They tend to commidify personal interactions. New models of data governance and new social protocols need to evolve, but I'm not confident they will."

An **anonymous respondent** said, "Market incentives are not aligned with mental health requirements. In addition, neither our understanding of digital addictions nor, most importantly, the governments' ability and willingness to regulate will be able to ensure a healthy transition into the new social norm. Perhaps a social backlash and the rejection of current digital behaviors by specific communities will moderate the high negative impact digital technology is having today on the psychological health of most of us. At least that is the hope."

Anita Salem, a human systems researcher based in North America, commented, "As we become more virtual in our relationships and activities, we will see decreasing physicality and our physical resilience will continue to deteriorate. We're already seeing youth with weaker bones and health deficiencies tied to this reduced physicality and poor diet. Reduced physicality, the physiological effects of using electronic media, the defocusing caused by multi-tasking and the pressure of keeping up with the flow of information will create widespread anxiety and alienation. This will cause increasing depression, suicide and addiction. Add to this the increasing power of corporations and you end up with populations 'chasing the dragon' who are easily manipulated and controlled for the benefit of the elite."

John Dorrer, a consultant based in North America, wrote, "Once again, we are taking taxpayer-funded, government-generated innovation and turning it over to corporations who will run the market and exploit the public. We are already suffering from such an indignity with prescription drugs. Our publically funded research and development should be also able to secure public returns. However, our bankrupt political institutions and emaciated regulatory apparatus will not serve the public."

An **anonymous respondent** wrote, "In the early years the internet was a life-changing phenomenon because only a few people had the skills to publish online and those people were using it with good judgment; truth and honesty was the norm. Now everyone publishes anytime they want. Our sources of truth in journalism have crumbled – mostly because of the internet – and there is no oversight over all the poor judgment, non-truths and manipulative tactics used by corporations, governments and individuals on social media and on the internet in general. There is no middle ground, no centrist views nor compromise. And the government is trying to do less and

less to take care if its citizens, so people our really on their own now. They have lots of communication but no truth or justice."

Janet Salmons, Ph.D., principal at Vision2Lead, commented, "I am concerned about corporate takeover of internet access and online content. The loss of U.S. Net neutrality regulations will spur this trend. I am concerned about the issues of digital privacy and protections for data such as banking, credit cards, etc. With more corporate ownership and power over the internet, risks for misuse of data or hacking due to lack of proper protections are exacerbated. I am concerned about the vulnerability of users who lack basic digital literacy, are unconcerned about posting personal information online, and are unable to discern fact from propaganda. When these issues start to impact elections and policy-making, citizens are more vulnerable to authoritarianism. Similarly, I am concerned about the domination of the Web by social media companies. Many users do not venture outside the familiar platforms such as Facebook, giving them too much power. (See my blog post: 'Social Media or Social Web?' on Discover Society http://bit.ly/2ziYiQr.)

Flynn Ross, associate professor of teacher education at the University of Southern Maine, wrote, "Social media is a tool that has great potential for connecting, networking and empowering, and it is a tool that has great potential for dividing, isolating and oppressing. Similar to other tools throughout history, the collective 'we' must choose how to use these tools in our individual lives as well as designing policies for how the massive data harvested from these tools may be used."

Mike Caprio, innovation consultant for Brainewave Consulting, said, "I believe that commercial enterprise and governments corrupted by corporations have adversely affected digital life in many major ways. There are not enough government-funded public-service and utility aspects of digital life; only a few forward-thinking municipal and civic entities have managed to make services that help people fully available to everyone. Mobile devices and the majority of digital services are walled gardens designed to maximize profit by trapping people inside and fostering compulsive addictive behaviors, just like casinos. There are not enough open-access mobile *computer* alternatives to the non-programmable, mobile passive consumption-focused devices. The majority of people on the low end of income, class and racial disparities are completely at the whim of the 'cloud-based' providers of digital services, who ultimately censor their communications and filter their digital realities to serve them advertisements. These digital services are also designed to empower the most nefarious and malicious people to target people by race, gender, sexual orientation or political affiliation for discrimination and harassment and propagandizing. All of these factors trend towards growing oppression of groups of people who have been historically downtrodden."

David Golumbia, an associate professor of digital studies at Virginia Commonwealth University, said, "Of course digital technology has many positive and negative effects on well-being. Evaluating the net impact of either of these, let alone both together, is nearly impossible. I answered that it would have more negative effects presuming that our attitudes and policies toward digital technology, and the practices of digital technology companies and advocates, remain largely the same over the next 10 years. Today, there is overwhelming evidence that digital technology companies take advantage of legal loopholes they themselves designed (especially Section 230 of the Communications Decency Act in the U.S., a regulation the major technology companies have turned on its head so that it shields them almost completely from responsibility for many of the worst effects of their technologies). Many of the wishes of the executives in these companies that are framed as making beneficial changes to the world need to be examined much more critically. Some of them are just naive (for example, Mark Zuckerberg's belief that 'community' is an inherently positive value), but others are more directly pernicious (examples are too numerous to mention). There is a strong desire among many in Silicon Valley, whether for their own monetary gain, or deeply-ingrained hateful attitudes, or both, to tear apart much of the most important social fabric. There are signs, today, that some people are starting to raise questions about these basic assumptions. Until we understand how fundamental they are, and how much they need to be brought under democratic oversight in a way that so far only the European Union seems to have much ability even to consider, the harms digital technologies cause will continue to outweigh their benefits."

An **anonymous respondent** wrote, "Access to the internet is a symptom of the wider economic polarisation which looks like it will continue to get worse because the logical construct of capitalism – especially as it is currently being deployed – is to accrue wealth to wealth and to progressively marginalise the population, making the economy less of a social phenomenon and something which only 'works' for fewer and fewer more and more wealthy individuals or entities… There is a tension between the democratic power of nation-states in service of the people and the interests of big money. This results in governments serving money instead of people or national interests. In this context, it is in the interests of money/power for everyone to be divided/angry/unable to organise constructively in a democratic sense because that seems to be something that they see as a cost rather than as a strength of a nation… When the internet distributes memes it is often for shock value and for short to instant content. This increases the volatility of communication and the probability that responses are reflexive and not negotiated ways of talking through issues, which makes us more divided."

A **senior product strategist** commented, "What is important to remember is that this is all still nascent, and the smartphones and the internet were essentially unleashed without trials as would be a new drug on a population. This is an enormous question, and I believe it needs our attention

as a society. There are the affects of our digital lives, and then there are the affects of those affects on our well-being…This needs to be unpacked, as our digital lives touch every vertical. What I would suggest to analyze first is the affect on our personal lives and relationships; how the 'liking' of a post or photo, might make me feel great, but creates a somewhat false sense of connection. We need to define harm in this context, but there are clues all around us. How many people feel more comfortable texting than talking? (One wonders if social skills will deteriorate over time as we stop using them.) Dare I ask, are we becoming less human in having relationships that are both fostered and supported by digital interaction? When was the last time you heard someone humming to themselves or whistling? It doesn't happen because we are being entertained by music in our ears. When was the last time you asked someone on the street for directions instead of pulling out your phone?"

A **professor at a major university on the West Coast of the U.S.** wrote, "One problem is increasing mindless dependency (some would call it addiction) to the smartphone and social media. The ongoing and often desperate need to check and monitor and respond and invade public physical and aural space is becoming a real social plague. Individuals are becoming more distracting and distracted, dependent, demeaning and disrespectful. This has negative implications for one's own well-being (as well as academic achievement, productivity and self-concept), but also for the well-being of those around that person. More use can foster greater access to resources and support, but also to more depression and other forms of decreased well-being. Then, too, there is the explosion and exposure to very bad human behavior through ubiquitous social media, not good for anyone or for our political and social environment."

A **university student** commented, "The internet impacts our cognitive abilities and emotional health, often not in a positive manner. The technology industry is mainly focused today on playing into user trends in instant gratification. This trend of tapping into taking advantage of people's dopamine-inducing click addiction has leaked into almost all areas of society. It has large impacts on the ways businesses are building platforms and the ways that new technological advancements are being programmed and developed and it contributes to many threats on human capabilities."

An **anonymous respondent** commented, "People learn what types of emotions are more or less acceptable in various social settings and calibrate appropriately. Most users know that different social networks have different tones and types of content. However, all of the major digital communities we have right now are part of for-profit businesses. Since they make money by getting regular users to spend as much time on the site as possible, they have strong incentives to promote content that gets people riled up. Many people rely on social media for news, but users disproportionately engage with outrage over cultural and identity grievances. Promoting the most popular posts may seem content agnostic, but it encourages an us-versus-them mindset as the

lowest common denominator of digital life. It's easy to put all the blame on the big corporate boogeyman, but I wouldn't let users off the hook that easily. Look at what's happened in the United States since Donald Trump announced his candidacy for president. Every time he says something outrageous, people who use social media to discuss politics drop everything else to respond to him. Trump provokes, and most users can't help but being provoked. They can't focus on their own political agenda. I can't help but wonder if most of us have little training in how to focus our attention, and digital connectivity is just exposing this weakness. Then again, many of my friends and family don't seem to want to learn how to focus better online."

A **research scientist** said, "It is clear that providing alternate realities not based on any ground truth to manipulate the masses is relatively easy to do in the digital realm. Homophily [the human tendency to bond with others who are similar to oneself] is a strong enough urge in humans even without the digital manipulation of the sort we have seen in Facebook, Twitter and other similar social digital portals. These social media outlets exponentially amplify homophily at the risk of nuanced discussion on a topic. I am afraid I don't see these media outlets policing themselves; insofar as they make money from advertisements, they will not question the source of the finances. They have shown this to be true in the past, and I see no reason to suspect that they will deviate from this in the future."

Anonymous respondents commented:

- "People's well-being will be harmed because addiction to digital technologies may lead to their inability to socialize with the world in an appropriate manner."
- "The industry's appetite for users and their data is bigger than their concern for people. Tech firms, with Facebook and Snapchat at the helm, use any psychological tricks, including gamification, to attain users and glue them to the screen."
- "The internet and technology as a whole are likely to disrupt and polarize our politics and economics in ways that may well be seriously detrimental."
- "The increase in sitting and viewing time and lack of human interaction a greater negative effect than the great benefit of increased access to more information."
- "Aritificial intelligence undirected by equalizing policies increases inequality. Corporate surveillance policies underlie business models and governments benefit from the 'invisible handshake.' Competition policies at a national level are weak tools to control practices of search, social media and broadband companies."
- "Parents need to keep kids from getting addicted, lead by example. However I don't see this happening. Adults are almost as bad as kids. I used to teach and except for while the students were taking exams, there was no way to, keep them off their devices. Also don't see how to get

people to, put down their phones in public. Even where there are laws about using devices in a car, people still use them. Maybe society will just adjust eventually."

- "Many people think these affects are nothing to worry about, but they can pose serious threats to our physical and mental health and to the ways human systems are evolving in the next decade and more."
- "Another potential scenario at this point is the continued medication of large%ages of the population and additional focus on symptoms rather than causes." [Record numbers of people are taking medication for attention-deficit, anxiety and depression.]

3 - Digital Distrust/Divisiveness: Personal agency will be reduced and emotions such as shock, fear, indignation and outrage will be further weaponized online, driving divisions and doubts

Douglas Massey, a professor of sociology and public affairs at Princeton University, wrote, "With the advent and dominance of social media, the internet has evolved in undemocratic ways that were unforeseen at its inception, when it was generally seen as a democratizing force. Wealthy ideological interests, well-funded government actors and shadowy non-governmental organizations have established alternative sources of news and information that systematically pump disinformation into the public sphere in a effort to boost authoritarian ideologies, undermine democratic institutions, influence the outcome of elections or simply make money by playing on people's darkest fears and prejudices. These efforts have been enhanced by the systematic manipulation of internet tools such as Google, Facebook and Twitter by bots and trolls propagated by many of these same non-democratic actors and interests, sowing distrust of democracy and democratic institutions and pushing public opinion toward authoritarian stances that reinforce the power and control of elites at the expense of the masses, leading to ever greater concentrations of wealth and income."

Adrian Colyer, a business leader/entrepreneur based in Europe, said, "The reasons I tipped in favour of an overall decline in well-being are: 1) The increasingly detailed monitoring and tracking of every aspect of individuals' lives, leading to increased opportunities to exploit/manipulate an individual's psychological state for commercial gain (history teaches us that not much seems to be able to stand in the way of a potential profit!). 2) The rapid arrival of a post-reality era where trust erodes even further because no image, video or audio source can be trusted anymore (photorealistic faking becoming a readily accessible technology). I think this will have a destabilising effect on society."

Clifford Lynch, executive director of the Coalition for Networked Information, commented, "'Our digital lives are conducted in a largely uncontrolled environment of ever-increasing surviellance and ever-more-pervasive deceit (propaganda and advertising)."

Mario Morino, chairman at Morino Ventures, LLC, wrote, "The reason I am more pessimistic than optimistic about the impact of the internet on well-being is the pervasive damage that is being caused by the promulgation of untruths, misinformation and the targeted damaging or destruction of digital information and its application. The concern is exacerbated by the lack of counter-efforts and what appears to be a public either not grasping or simply overwhelmed by the universal threat this poses."

A **retired public opinion researcher** wrote, "We are a species that evolved by utilizing social contacts for the maintenance of the individual as well as the group. Speech is a social contract as is stabilization of food and shelter resources. If technology limits social contracts, we must evolve experimentally. There is no assurance of survival without successful contracts."

Jonathan Irvin, a retail manager based in North America, said, "The intrusion of digital and on-line into more aspects of daily life has already begun to erode the cohesion society needs to function. Future developments in digital distractions will exacerbate the current trends in which people are increasingly isolated from one another except for narrow interests, attitudes or political stances. Our ability to see each other valuable members of society is being eroded and we see those who have different backgrounds, nationalities, religious convictions, political affiliations, etc., as 'others' who are not to be trusted, much less embraced as fellow human beings."

Gabriel Kahn, professor of journalism, University of Southern California, said, "This past year, two issues became crystal clear: 1) The internet is an oligopoly, and competition is an illusion. 2) These large tech companies operate with no sense of ethics. They have tremendous power and they operate in a largely unregulated environment."

Erika McGinty, a research scientist based in North America, wrote, "The smartphone already reduced the need for everyday interactions with people face-to-face; having the time and the Web in one's pocket made what used to be normal exchanges among citizens – asking for the time, for directions, for a particular store or restaurant – unnecessary and even unwelcome or suspicious. With social media and games and WiFi-connected public spaces, including urban transportation like the New York subway, the random, often life-affirming conversations with strangers have all but disappeared, making strangers just that much more strange. This has led to less empathy among city dwellers for the people physically around them. Then there are the issues of privacy, which affect some now and may affect many more in the future. Location tracking and digital-data

seizure are concerns. The Internet of Things strikes me as enormously ominous in its potential for malicious hacking but more so even for yet more data collection and lack of privacy from corporations/providers and the government. The increasing ability to monitor and control remotely, be it one's oven temperature, home-surveillance cameras, kitchen lights, I feel is leading to a hands-off mentality where ultimate control is in the hands of third-party providers and one's personal human agency is reduced. I find this trend to be very troubling in a society of individuals that must rely on one another, not suspect or divide one another. 'Security' has become an excuse for much of digital control, in an age when people are safer than they've ever been. Loneliness is also a big problem shown in research to be an outgrowth of the shift toward remote relationships with 'friends' and workplace and even one's own home. When Facebook recently launched Messenger for Kids, I laughed at the line to the effect of 'for parents to interact with their young children' as though it were a spoof. Of course, it's not a spoof."

Gail Brown, an instructional designer based in Australia, wrote, "Anyone can be anything or write anything on the internet. Many people, especially younger people, believe what they see or read. An online relationship is not a 'real' one - yet many teenagers believe that it is. *Not* everything online is trustworthy, yet many of us, adults as well as teenagers, are easily duped. This 'fake reality' is more ever-present over time, and takes away from real relationships, true information and communication, especially with those people most important in our lives. Sometimes, the internet can be helpful, and sometimes it's not - and people need to learn the difference. In today's world, this education and learning is not happening, nor effective."

Izumi Aizu, a senior research fellow at Tama University's Institute for InfoSocionomics, wrote, "There may be a greater divide in social life and less solidarity and social bonds than ones we have today may be generated, perhaps subconsciously and in the gradual long-term effect. People may become less tolerant, not as willing to understand and accept others who have different values, and seek instead more power and money within their own groups. This may happen – globally and locally – I'm afraid."

Katie Paine, CEO of Paine Publishing, said, "I believe things will change for the worse as more and more bad actors figure out how to better manipulate individuals, especially those without education. The Russians have been doing it for years, corporations like Amazon and Google have as well, what is to stop other nefarious characters from using digital screens to sow further chaos among civil societies?"

Craig J. Mathias, principal for the Farpoint Group, wrote, "The internet and the Web were intended to be tools, not the core of a lifestyle. And yet, for many, the internet today is just that – an essential element of their lives. This is not to say that the communications capabilities of the

internet are not of value, but many of the 'services' enabled by the internet, particularly social media, have become substitutes for thoughtful interaction and intelligent discourse. Social media has become so filled with vile, hateful and poorly-formed (and worded) 'speech' that I will no longer participate. Consider also the personal productivity lost as so many consider participation in social media to be a right and an essential element of their lives. Twitter interruptions, unsubstantiated comments (there is clearly an insufficient editorial or fact-checkering function at work on the internet today), way too much advertising and just plain rubbish lead me to conclude that that more people will indeed be harmed than helped by many of the services available on the internet today. The answer? Self-discipline and good manners. Both are in increasingly short supply on the internet today."

James Scofield O'Rourke, IV, professor of management at the University of Notre Dame, said, "Increasing dependence on digital life, the internet in particular, has removed an important level of person-to-person, human interaction from daily life. The internet, of course, is enormously valuable in facilitating commerce, education, social development, medicine and so much more. The young among us, however, do not see it in that way and do not use it in that way. The 'anonymity' provided by the internet offers an opportunity for the cruelest among us to criticize, terrorize and intimidate those who have no way to protect themselves. For every opportunity to connect with a friend or share a photo with an old classmate, there are a dozen opportunities to badger, intimidate and threaten others, all at [seemingly] no cost to oneself. Many things important to each of us – from our privacy to our personal security – are jeopardized by flaws in data gathering, storage and transmission. No one among us is secure. If our banking, educational, medical and personal records are subject to hacking, theft and demands for ransom, how are we now better off? If our postal service is now threatened by the existence of a digital service that seeks to eliminate it, how are we better as a society? If internet-enabled devices are built into every aspect of our lives – our telephones, our home entry systems, our security systems, our communication and photographic systems – how are we better off? If we are unable to prevent hackers, thieves and blaggards unwilling to work at an honest profession from cracking into our lives and taking whatever they wish, how has this technology improved our lives? I cannot protect anything I value, not because I am unwilling or unable to secure it, but because I've given it to others: my doctor, my banker, my university and the people I must trust; what measures can I take? What shall I do to protect what belongs to my family? The most valuable asset I have in an age of mass data accumulation and transmission, ironically, is my own anonymity. If I commit as little as possible to a digital database, if I install as few cameras and as few devices as I am able, then perhaps others will see me to be of little value and pass by. We must come to recognize these threats and balance them against the value provided by digital technology and the few, massive organizations that provide the devices, services and opportunities we all seem to value most."

Estee Beck, an assistant professor of technical and professional writing and digital humanities at The University of Texas-Arlington, said, "While people increasingly rely upon digital technologies for connection, tracking and easing the burdens of daily life, the surveillance state of the internet – led by corporations and governments – means increased intrusion into the private lives of millions of people in the United States. Rather than allowing people methods to opt out of data tracking or access to their data files each website collects on people to review, delete or challenge, companies like Google, Facebook and others that will emerge over the next 10 years (including Internet of Things companies and artificial intelligence companies) seek to harvest as much data about users for billions in profit with little compunction over invading the minute-by-minute lives of people. Under this framework, internet companies will continue to write the rules of collecting data online, with a lack of U.S. government oversight or regulation. This will lead to a worsening of people's well-being, as consumers will not have any recourse for adverse actions taken against them in financial, legal, health, educational and social sectors."

Thad Hall, a senior political scientist and co-author of the forthcoming book "Politics for a Connected American Public," wrote, "The internet has many positive attributes, including helping individuals organize, communicate to broad audiences, and facilitating conversations about politics and social issues. These positives are important. However, over the next decade, the social ills associated with the internet are likely to grow. One reason is that the wealth of data collected about individuals will continue to increase and these data will be used to influence and shape people's attitudes and behaviors. The big social media companies – i.e., Google, Facebook, Twitter, Snapchat – will continue to be platforms where personalized content will be delivered to selected segments in an effort to shape their behaviors. Some of these efforts will be a part of traditional advertising and persuasion (who Toyota or Nintendo target) but much of this will be political in nature, designed to manipulate voting preferences and social attitudes. The growth in data and data analytic techniques will be accompanied by the growth in new technologies to manipulate audio and visual media. It is already possible to take a small amount of audio from an individual and create totally new, unique audio from it. Video can also be altered as well. It is easy to imagine, in the 2024 elections, candidates being confronted with either audio tapes or video of them saying offensive things, where the audio and video is seen as 100% authentic but is actually manufactured. Social media will allow these seemingly authentic hoaxes to go viral before they can be disproven (if, in fact, they can be disproven). This type of event will bring into question what is actually true or real and further undermine public confidence in the media and in facts."

David R. Brake, an independent scholar and journalist based in North America, said, "As surveillance of self and others becomes ever more ubiquitous, both corporations and governments will be using algorithms to sort people in ways that (on past form) will be unaccountable, either because corporations keep algorithms private for commercial reasons or because the algorithms

are themselves too complex to fully understand and explain. One new danger is that a 'meritocracy' will arise of people whose behaviour has been deemed to show moral worth or simply credit-worthiness, and if you are on the wrong side of this you will have little or no opportunity to appeal against algorithmic judgments. Worse, you may even be unaware that these judgments are happening. Interpersonally as well, once people's moral lapses and errors of judgment are increasingly uncovered (and everyone has them) it may become difficult to get people to serve in political office for example and bullying will become easier."

A**ndy Williamson**, CEO of Democratise, said, "The internet and digital tools are tremendous forces for good, for the individual, our communities and societies as a whole. However, this will only be the case if we learn to integrate the positive aspects and to be more discriminating (and challenging) of the negative. The misuse of media for political gain or profit is nothing new but highlights the magnified effect of digital media and its immediacy. Today, we are living with future-pushing technology. If we can't develop a broad new set of skills, become information-savvy and manage the damaging effects of digital life, then the overall outcome 10 years from now is going to be poor."

Miguel Alcaine, an ITU area representative based in Central America, said, "In general, people will suffer more stress out of their inability to manage in a balanced manner their hyperconnectedness. If we as a society discover how to teach the new abilities required, especially to children and youngsters, we will be on the right track."

4 - Digital Duress: Information overload + declines in trust and face-to-face skills + poor interface design = rises in stress, anxiety, depression, inactivity and sleeplessness

Many of the most commonly occurring responses to the question on individuals' well-being fell into the category of digital duress – stress, anxiety, information overload and so on, and many of these were the respondents' personal observations about themselves, families, friends and others they have observed.

A **futurist based in North America**, said, "We'll see new psychological 'diseases of civilization,' parallel to the diabetes and obesity that have accompanied abundant manufactured food. These 'diseases of digital civilization' could include depression, social alienation, attention disorders, learning deficits, gaming addiction – phenomena we're already noting either anecdotally or statistically among the young. That doesn't mean the digital world is inherently evil. In another decade our species will almost certainly spend far more of our time in the virtual world than today. But this transformation has occurred so quickly compared to previous information innovations

(moveable type, the telephone, broadcasting) that we haven't yet adapted our social and educational systems to support ourselves and our offspring in this new environment."

An **anonymous respondent** wrote, "Psychological concerns – for instance, depression and anxiety – are increasing at the same time that use of digital technology is, so it seems highly correlational. This seems to be an early point in an ongoing trend that isn't likely to reverse course anytime soon."

Concerns about stress among young people were echoed in the response of a **college senior and social media professional** who wrote, "There seems to be a growth in anxiety and depression among young people in the United States that is at least partially due to their internet habits. Spending too much time in front of screens, absorbing sometimes-stressful information and interactions can be damaging. Just spending hours and hours every day taking in thousands of different short messages can be exhausting. It also seems to be doing more harm than good in the realm of physical activity. While I see friends benefiting from sharing their 5K runs and gym workouts, I see more of them sitting passively using screens most of their waking hours, which have been extended far too much for their own good by screen time that stretches far into the night. Via social media you are always connected to your friends' and acquaintances' highlight reels online. They can create the false perception that everyone is living perfect lives and make you feel that yours is a disappointment. For instance, Instagram has a feed of good-looking people doing amazing things. This can breed insecurity in viewers. This insecurity can have negative long-term effects for some people. Another aspect of digital life is the impact on memory. Being digital, today if you forget or you don't know something, you can instantly look it up. No need to remember anything anymore – just use your phone, your external memory. The need for instant gratification seems to be increasing all the time as well. If a Web page doesn't load in under a second or two, or a video is longer than a minute or so people move on. Few people read anything longer than a paragraph or even one line – it's a TL:DR [too long – didn't read] world. If a person doesn't answer a text message within seconds, you may become worried and stare at your phone, hoping for an answer. Notifications via audio noises or numbered logos continually interrupt people's lives, and they pay them more attention than they pay to the real life going on around them. We scroll through Facebook and other social media all the time, mindlessly taking in hundreds of messages and images in minutes and we consume tons of other information in big doses daily."

Tom Massingham, a business owner based in North America, wrote, "The expansion of digital technology will diminish the traditional human interaction people need to thrive, and the volume of false or misleading information available will grow and lead to misunderstandings, conflict and divisiveness."

A **professor** from North America said, “Among the negatives: There is a loss of interpersonal skills and the ability to connect with others face-to-face. There is increased anxiety and depression, as people view others’ seemingly perfect lives online. There is a disconnection from violence. And people believe in self-selected fake news.”

Richard Lachmann, professor of sociology, State University of New York-Albany, said, “The internet is a convenience and provides access to information while undercutting social ties and creating anxiety among younger users. The benefits already have been achieved but the costs in sociability and psychological well-being will continue to accumulate.”

Jenny L. Davis, a lecturer at the Australian National University’s School of Sociology, said, “it is important to address the relationship between technological advancements and mental well-being. This must be addressed primarily as an issue of design rather than user practice. That is, we should ask how technological infrastructures and interfaces evoke particular emotional trends, and for whom. Social media, which has been my area of research, has the potential to provide both comfort and provoke stress.”

A **college student** commented, “We are constantly presented with notifications by our digital devices to the point that any absence of signals from them for more than a few minutes makes us feel anxious. It is difficult to concentrate on work when you know your digital devices give you access to Facebook. Instagram, Netflix, games and more. These are dangerously addictive media platforms. A major issue is that young people seem to be much more insecure today than ever before. People have the fear of missing out (FOMO) when friends post that they are at an event without their friend, they worry they are not well enough liked, basing their self worth minute-by-minute on how many responses they get to their posts, and they have unrealistic expectations for how they should look based on photos they see. Some people are creating and then trying to live up to fake worlds they build with their phones. We have to make sure people’s mental health and well-being come as a first priority.”

Anthony Nadler, assistant professor of media and communication studies at Ursinus College, said, “Technologies’ impacts will be influenced by political choices and the contest among different social groups fighting for clashing priorities with technological development, use and regulation.”

Diana L. Ascher, co-founder of the Information Ethics & Equity Institute, wrote, “The repercussions of a(n inevitable) genetic data breach will have serious – and inequitable – consequences for millions of people. Imagine being denied insurance because your cousin sent his blood to 23&Me to trace his ancestral roots. Researchers like me are concerned with ensuring that digital technology innovators are equipped to make design decisions that promote ethical and

equitable information practices – finding balance between the potentially terrific gains and portentous losses."

A **student at a U.S. private university** wrote, "As the internet gradually becomes so much a part of us that it is literally a component of our brains, people will begin to process life like the platforms they use online. The internet and humans' brains will become one. This makes me quite nervous as to how it will affect our overall well-being. A problem at this point is humans' habit of comparing their lives to the lives of others. With applications like Instagram, YouTube and Twitter, people are seeing millions upon millions of images of seemingly 'perfect' people and finding their own lives to be 'less than.' Sadly, the public's levels of confidence and hope may plummet in future years due to this and to the constant attempts by many online messengers (politicians, companies, others) to generate fears or misunderstanding as outright tactics to influence buying, voting and other acts."

Mark Glaser, founder and executive director of MediaShift.org, said, "Many studies have shown that the more time people spend on social media, the less happy they are. This problem is even more severe among teenagers who prefer to spend time alone on their phones rather than in person with friends."

Lori Laurent Smith, an entrepreneur based in North America, commented, "If sitting is the new smoking, the internet is the chief enabler. There is a laundry list of diseases that are directly linked to inactivity, with the majority having a fatal outcome over time. Jobs in the digital economy are increasingly more intellectually-intensive (than manual labor) meaning more of us are sitting in front of screens for hours at a stretch for work. Then we come home and check our social media for a few minutes (or hours), slump in front of a screen to Netflix, YouTube, Hulu, Amazon or thousands of other video streaming services or maybe play video games with (virtual) friends. The internet lets us remain inactive while we click and buy … It's also not great for our collective psychology (as research continues to prove). Those in the rising generation (born after 1996) have grown up with the internet and spent their teenage years with smartphones and tablets, meaning they've had to construct their identities and discover their interests in a completely new way – in front of an audience of friends, family, teachers, neighbors and trolls. The American Academy of Pediatrics has warned about cyber-bullying and 'Facebook Depression' (referring to an adolescent spending too much time on social media, including texting). According to the Centers for Disease Control, suicide became the leading cause of death among people ages 15-34 in 2016. Ongoing studies among adults are increasingly showing that internet use, particularly social media, is related to an increase in mental health disorders including: anxiety, depression, panic attacks, ADHD and addiction. The last point is perhaps the most controversial; however, it appears to be present in people who spend excessive amounts of time using social media: neglect of personal life,

mental preoccupation, escapism, mood-modifying experiences and tolerance and concealing the addictive behavior. On the flip side, there is increasing research evidence that people who are overly dependent on digital devices undergo 'withdrawal' when they take a break from the internet. Many studies have focused on social networks, particularly Facebook, with its promise of instant social connections and groups of like-minded individuals, have found that instead of enhancing well-being (as has been proven with people socializing offline and joining support groups in real life), they appear to actually undermine well-being and increase a sense of social isolation. And the more social sites a person visits each day, the greater they *feel* their feeling of social isolation tends to be. According to psychiatrists, perceived social isolation (loneliness) is one of the very worst things for our physical and mental well-being. That's not to say there aren't great benefits to our well-being from the Internet. Fitbits and sleep monitors help us achieve fitness goals. Apps help us meditate, keep up on our commitments and be on time for meetings. But such a small percentage of the population use these tools consistently, the longer-term effect is overwhelmed by the negative effects from the 1-2 punch of inactivity and poor mental health. While the promise of self-driving vehicles to lower injury and deaths from traffic accidents is important to consider; artificial intelligence/machine learning brings with it more automation including drones to deliver things/run errands, the rise of robots to help look after our homes and family and the permanent rise of unemployment over the longer term. I can't help but think that the additional time freed up by these miraculous changes will cause us to spend even more time being inactive while we mindlessly scroll through social media-type sites, figure out what to watch (or otherwise be entertained), order everything for home delivery (including every meal) and slowly become aware that our well-being has been compromised by poor mental and physical health."

Daureen Nesdill, research data management expert based at the University of Utah, said, "People will be both positively and negatively impacted by the increase in technology. The negative is in a reduced knowledge and experience with social interactions offline leading to isolation, depression and an increased number of broken relationships within families, couples and groups. To a certain extant it is already happening. A second negative will be the increase in cybercrime we will be dealing with – financial and identity theft, ransom for access, manipulation of autos, robots, etc."

Mark Maben, a general manager at Seton Hall University, commented, "I have increasingly observed in my students the negative impact their digital lives are having on their well-being. This is especially true when it comes to work and social relationships. As interactions become primarily digital and non-verbal, misunderstandings of tone, intention and meaning are occurring with growing frequency. This in turns creates more tension and conflict between individuals that likely would not have occurred if the communication had been face-to-face. In addition, I am seeing use of digital technologies give rise to more anxiety, stress and depression in students and colleagues,

especially those who are heavy users of social media. While some digital tools are making us more productive, the growing levels of connectivity within our culture are harming the happiness and health of those who have a difficult time managing their digital intake."

An **anonymous respondent** said, "Yes, I can shop online easily, I can search for information much faster than in the old days, and I can connect with out-of-town friends and family more readily. But I'm not sure the tradeoff is worth it. I worry that the enormous amount of time people spend on the internet and social media – often as more than a habit or boredom than any true need – outweighs the many benefits of technology. You go to a restaurant and see an entire family of four sitting with their phones, not speaking or looking at each other during a meal together. Parents at playgrounds or waiting for a bus are not talking or interacting with their kids, instead they are just looking at their phones.

A **Ph.D. in biostatistics** commented, "It is common for people to browse on phones or watch shows before bed. Studies have shown these habits are disruptive to sleep (the light emitted interrupts our bodies' natural wake-sleep rhythms), which negatively affects our mental and physical well-being. I do not see this problem improving. Studies are also beginning to show the longer-term effects of looking at screens all day."

Serge Marelli, an IT security analyst, "People will be more stressed. Digital life, and 'digital everything' leads to a permanent state of mental, emotional 'excitation.' Our minds and attention are constantly requested (by smartphones, social nets, etc.). There are less and less periods of mental inactivity that allow for mind relaxation. Some will learn to switch off, at the possible cost of partial social exclusion (I see it in my life, many do not understand that one is not permanently available), while others will place social pressure above their life, and pay the price. I would expect we will see more burnout syndrome or effects."

Kathleen Harper, an editor for HollywoodLife.com, said, "While technological advances improve the logistics of our lives, they severely limit human interaction, which is arguably more important than having Google at your fingertips. Before smartphones, people lived perfectly happy and content lives, so it's very possible to be fulfilled without the internet in your back pocket. But without essential social skills and human interaction, which we're essentially trading technology in for, I don't believe we'll be as successful on an emotional level. For example, I have cousins who are Gen Z, and they're constantly on their phones – even during family gatherings when everyone else is talking face-to-face. On some level, technology has a way of giving us social anxiety when it comes to interacting with others in real life. As a result, I don't think we'll be as successful as we could be as a species… Like so many other things, technology helps and hurts. I'm not personally sure yet if the benefits will outweigh the negatives – I don't think *anyone* is."

A young **multimedia journalist** based in the U.S. said, "More people will be negatively impacted by technological digital advances and would be more harmed than helped mentally because people are thinking less. When folks use their brain power less or rely on technology more the movement of mankind plateaus. In order for generations to keep improving in years to come, folks need to remember basics that cause human nature to thrive. For example, happiness, love, laughter and – most importantly – relating to other humans allows us to feel and emote, resulting in a more positive mental and physical state. While technology can supplement some of these things, it's no perfect replica to what all humans can do."

A **digital strategy director** for a major U.S. professional association wrote, "It will be more harmful than not over the next decade because device use will lead to more social alienation, increased depression and less-fit people. Because it's still relatively new, its dangers are not well understood yet."

Mary Ellen Bates, president and founder of Bates Information Services Inc., commented, "We have seen plenty of studies on the negative impacts of social media on users' feelings of happiness and satisfaction, exacerbated by social media companies (whose revenue is dependent on advertising) developing more and more ways to keep users engaged on their sites. Virtual- and enhanced-reality devices will become commonplace, which further engages people in a low level of interactions with others. I foresee people becoming accustomed to the low-bandwidth virtual interactions rather than the face-to-face meatspace interactions that we humans instinctively crave."

A **professor/teacher** based in North America commented, "With respect to psychological well-being, the performance of identity in a public and surveilled forum leads to a brittle sense of self that imperils an individual's psychosocial development and ability to build resiliency. Recent research in teenage depression increasingly makes this relationship clear."

A **North American entrepreneur** wrote, "Several negatives: An idealized or false sense of reality is often portrayed by individuals online. This creates an unachievable standard for others to try to live up to or at best it creates a comparison that's unfair and unrealistic but can result an individual feeling as though their lives are not as meaningful or happy as those being portrayed. Time spent online is another factor has an impact on people's lives. Time spent using technology takes away from time available in the real world with live people in one's immediate family and life. People will continue to be harmed by misinformation. In general, exploitation of the vulnerability of others overall has great potential for harm."

Daniel Schultz, senior creative technologist at the Internet Archive, commented, "Digital literacy and best practices are not innate, it all needs to be taught. Risks and protections are also not fully understood around use of technology; what is a healthy balance of utility and risk? How do social feeds impact world views, et cetera? As we learn more, people with the resources and general network of support will be more likely to benefit from those lessons in the short term, while the average technology user will be at the mercy of where best practices can fit into capitalistic forces. Over the next decade I hope that we will identify better practices. I believe that it will require advocacy by organizations who want to make healthy technology use a mission, and to hold creators accountable for building those best practices into their tools. I do not expect that effort to be large enough to protect most users. For a case in point, look at the negative impacts of blue light. There were open source tools on the market to lower blue light on machines as early as 2009 but it took almost a decade for that technology to get built into iOS. Only the most educated and most technical, who also happened to be brought aware of the negative health impacts of blue light, were protected from the health hazards – and even today I would imagine the vast majority of technology users are still unaware. Extrapolate that to every single known and unknown health risk posed by technology and we see the potential for a serious technology-driven casual health gap."

Beth Kanter, an author, trainer, blogger and speaker based in North America, wrote, "I spent the year before this publishing a book on the topic of self-care leaders of nonprofit organizations and creating a culture of well-being in the nonprofit workplace, interviewing and surveying nonprofit professionals. I am now also teaching workshops for nonprofits on the topic of Technology Wellness. Because nonprofits are under-resourced and often their programs are under attack, these people are spending endless hours online, with news alerts going off, sleep interruptions, no boundaries regarding after-work emails and requests. I interviewed countless nonprofit leaders who made themselves sick, ended up in ERs and hospitals due to stress, with use of technology and social media as a contributor… As a social-change activist and someone who has strongly believed in the power of networks and social media to create good, the last year has been really disheartening. I have had more conversations about a wish to quit social media, especially Facebook, but realizing that it has become a roach motel in a way."

Jason Abbott, professor of political science at the University of Louisville, said, "Increased use of digital media has resulted in people being less present and mindful, more distracted and restless. resulting in more stress. As the number of digital platforms and social media applications increase this trend will only continue."

Erin Valentine, a writer based in North America, wrote, "From personal experience, I have noticed that when technology is not as prevalent in my life, I have a greater sense of well-being.

Technology brings a larger amount of anxiety to my life, as there is a sense to constantly be connected and working. However, I do acknowledge that technology has been incredibly helpful in my life and has become an essential part of my day-to-day routine."

Philip J. Salem, a respondent who shared no additional personal information, wrote, "1) Chatter is increasing, and conversation is decreasing. People are losing their abilities to sustain human communication. What happens on social media is most often a sequence of messages authored by different sources. In many instances, people will author a message and leave. Expression has replaced communication. 2) People are losing their ability to process with any depth. That is, we scan a lot, and we do not probe much. 3) The latest generations are risk-averse, especially with social relationships – friendships, romantic relationships. The slightest hint of hurt leads to leaving, no response, etc. Again, less depth, but broad, shallow relationships. 4) There has been a loss of community. The formation of sustainable civic groups has decreased with an increase of ephemeral activist networks. 5) None of this is irreversible, but it requires greater mindfulness to improve. 6) Some who are already skilled at a behavior have improved and will continue to improve those skills through Internet use. The internet, like all technology, acts as a catalyst to amplify already existing differences. The skilled will increase skills as the unskilled fall further behind."

A **professor of information studies and digital design** based at a major university in Europe said, "I anticipate continuation of the negative health impact because of ergonomics-sitting, immersion and the convenience of access to goods and services without leaving one's chair. Before this is properly addressed, the problem will continue to worsen for a few years… Anticipate greater stress because of the ability to be connected to innumerable outlets for news of crises around the world. The impact is already felt, but this will likely worsen if trends from the past 60 years are any measure."

Charles Ess, professor, department of media and communication, University of Oslo, said, "It is no longer dismissed as just a 'moral panic' or Ludditism to express concerns about loss of social skills (specifically, the virtues of patience, perseverance, empathy) that increased dependency on ICTs for communication seem to bring in their train (ala Sherry Turkle, 2011, but many more since). The recent spate of former social media designers and inventors who regret their contributions – e.g., as stealing attention, as fostering politically toxic filter bubbles and fragmentation, etc. – is also telling; as is the now open secret that the top executives in Silicon Valley, at least two of whom are Montessori products, send their own children to non-digital school environments (while happily continuing to sell devices to any every educational institution around). Surveillance and privacy issues are paramount here as well, as more and more of us seem to realize that good lives – as including friendship, intimate relationships, familial and other ties –

require private spaces in which to flourish, whereas such privacy is increasingly scarce, as the Internet of Things diffuses ever more completely in our homes and cities. The dystopian vision (here I think Neil Postman's 'Amusing Ourselves to Death' remains trenchant and prophetic) is one of a kind of digital-neoliberal feudalism, as most of us may become more and more inextricably enmeshed in a technologically determined lifeworld, the designs of which aim at efficiencies for the sake of maximizing profit (primarily for the benefit of the few) at the cost of human autonomy, creativity and sociality. I think the forces pushing in this direction are enormous and very difficult to resist, much less redirect or restrict. But it may be that as all of this pushes more and more of us into ever greater unhappiness – i.e., a lack of a sense of autonomy in our lives, of well-being and flourishing in both individual and shared ways, an increasingly obvious oligarchy only thinly disguised as democracy – there will be sufficient push back to make at least significant changes for the better. None of this will happen by itself, of course. We will need vision and direction – in the rising importance of virtue ethics broadly and specifically in design.

A **senior at a major private university in the United States** commented, "Hyperconnected life has dangers that are going to multiply and impact more people in the next decade, so we should be aware. When young children grow up spending most of their lives hyperconnected they are risking the development of important social and communication skills. It will be interesting to see how society is changed when those all-digital children become adults. Many people of all ages are experiencing at least some harm to their mental well-being already today. Marketers and others are learning to use newly emerging tools to manipulate people and their emotions – an example is how political players are twisting social media into a confusing setting that makes people too overwhelmed to even care to go out and vote. Things seem bound to get worse. Constant self-promotion by most individuals (can't show anything other than a good side and perfect life) has also become a huge part of the social media experience. Yet in the coming decades, if we can find a way to ride it all out, there are positive possibilities. Maybe the mental capabilities of humans will increase exponentially thanks to robotics and artificial intelligence. Humans are innovating and inventing new ideas and their uses on a regular basis. In the future, there will be even more advanced technologies created, and maybe even integrated into humans themselves."

Anonymous respondents commented:

- "There is a measure of anxiety, whether from being harassed by anonymous parties, from feeling a need to 'keep up with the Joneses,' or from the usual social issues that go along with having any connection with people."
- "The time spent and the many interruptions are a negative impact for many people. Studies show that a lot of activities online are detrimental to self-image and mood."

- "The digital world has become all-encompassing. I rarely call people spontaneously or at all. My life feels highly surveilled. It's difficult to describe. I worry much more about losing my phone than losing my wallet. That was not true 20 years ago."
- "While digital technologies provide capabilities, expectations for productivity are up; the information deluge and threats on privacy and security increase stress."
- "We perceive those with resources and control of the technologies will be able to increasingly manipulate the populace for their own economic and political gains."
- "It is common knowledge that the internet has, for the most part, led people to increasingly live in 'echo chambers' where their own viewpoints are reinforced rather than challenged.
- The internet has become a means of circulating ideas and so-called facts that are misleading and often dangerous.
- Society's ever-increasing reliance on networked information systems and the Internet of Things has made us very vulnerable to cyberattacks, hacking and other forms of disruption that can prove individually and collectively harmful."

5 - Digital Dangers: The structure of the internet and pace of digital change invite ever-evolving threats to human interaction, security, democracy, jobs, privacy and more

An **anonymous respondent** wrote, "People's well-being could benefit or be harmed from connectedness; it all depends on the social and cultural frameworks within which we live our digital lives. Given that, and current trends towards the privatisation and market-oriented nature of digital connectedness, these will continue to affect well-being more adversely than beneficially. Even the survey question appeared loaded with cultural artefacts – 'enhance their lives,' 'improve their productivity' – these terms reflect a social structure that is predicated on capital markets, individualism and the unequal distribution of social wealth. Yet we know that individual health is most affected by the social determinants of health, and despite some being better off (such as those most adapted to connectedness, and those most adept at using digital tools), where inequality exists, poorer health outcomes for society overall and individuals follow. If digital tools are used to focus on individual health and well-being in a market framework in which inequality is a central feature then digital connectedness will invariably result in poorer health and well-being outcomes across the board. The trajectory we are currently on (with state-to-state variations) premises a continued privatisation of digital connectedness which will also function to further establish and strengthen existing trends of inequality. As individuals employ digital connectedness within this framework they will contribute to its strengthening, further eroding well-being for society and individuals alike."

An **executive for a major internet business** wrote, “Social media and hyperconnectivity may have improved well-being up to some point, but the marginal returns are decreasing and may be negative. More ‘stuff’ on the internet, at higher speed, does not yield greater understanding. It’s like the difference between data and information: more data does not yield more useful information in all cases.”

An **anonymous respondent** wrote, “I worry about the impact on jobs that AI will have and the resulting exacerbation of polarisation in society. I do not discount the efficiency gains, but they have not filtered down throughout the economy.”

The **owner of a tech company** based in North America said, “Indications are that the impacts of social media, hackers, cybercrime and misinformation are impacting people’s behavior in ways that have not been anticipated and that we are slow to respond to. Indeed, outside of academic pursuits and the occasional media headline, there appears to be little will to address the impacts of social media and misinformation in particular. Overall, we are seeing a very rapid change in our social structures, from how where we get our information to how we shop, access services and socialize. This pace of change is accelerating, perhaps beyond the ability of humans to adapt. Transition to the Internet of Things has begun, and we have little, if any, idea how it will impact individuals or society.”

Mike Liebhold, senior researcher and distinguished fellow at the Institute for the Future, wrote, “The lack of large-scale system interoperability between tech systems and services trying to gain business or strategic advantage by gaming or controlling connections, APIs and formats, the disparate access to resources among excluded communities and pervasive cyber vulnerabilities across all layers and nodes of our digital networks, are inhibiting the value of digital systems to improve public well-being.”

An **anonymous respondent** commented, “With the current trajectory of digital technology development we are all being encouraged to rely on technology at a rate that is exhausting. This is making it harder to focus and the world feels more disjointed. Also, the persistent targeting and erasure of personal space and privacy is a major concern – and these concerns are not good for overall well-being. There is too much stress associated with being plugged in all the time or with fear of missing something when not tuned in. There are also huge ethical concerns with the sale of private information for the purpose of increasingly individualized marketing, which itself is another stressor. The bombardment of information and the pressure to keep up and engage, coupled with the decrease in access to commonly shared information and erosion of social skills that can follow are creating massive stress levels that are very damaging.”

A **futurist based in Europe** commented, “In addition to the increasing digital divide there will be a complete loss of privacy, increasing cybersecurity risks and vulnerabilities as consequence of cyber-dependency (e.g., critical infrastructure, bio/chemical (t)error events, etc.).”

A **professor/teacher** based in North America commented, “There is a preponderance of evidence that economic well-being of individuals in developed economies is worse off than it was a decade or two ago. Technology has driven many of the changes, linked to public policies that have led to an increasing wealth gap. There is no intrinsic reason technology must have this kind of effect. However, there is a lack of will to change this trajectory. It seems extremely clear that economic well-being will be harmed by technology more than helped.”

An **executive director of a tech innovation firm** said, “We may be seeing the last gasps of unregulated capitalism, and it won’t be pretty. In the long term I’m an optimist, but I think we’ll see some short-term hiccups.”

A **chief of staff for a nonprofit organization** wrote, “In the long-run digital will improve people’s lives, but in the next 10 years, it will be an overall negative. We are facing too many algorithms that have not accounted for humanity and are purely profit-oriented. In addition, digital life is on a trend to have a greater negative impact on learning, abuse, bullying, etc., overall than positive. I think this will be corrected, but not in the next decade to the extent that the overall result is a benefit.”

An anonymous **CTO and attorney** based in North America wrote, “Privacy will be further reduced and digital crimes will become more prevalent. The erosion of inter-human conversation will continue, along with further reduction in trust in information and tribalization. Advertising will be injected into every nook and cranny. In the longer term the internet will fracture into a world of insulated islands interconnected by well-guarded information bridges. Those ‘islands’ will be things like Facebook, China, Verizon. The internet will lose much of the so called ‘end-to-end’ principle that once allowed innovation to occur without permission at the edges.”

Stephen McDowell, professor and associate dean at Florida State University’s College of Communication and Information, commented, “Some major social and public policy issues associated with digital services and environments will need to be addressed to enhance well-being – challenges for speech, privacy, intellectual property and security. Since many areas of social, economic and political life are increasingly mediated in digital environments, some settled expectations will need to be renegotiated.”

Giacomo Mazzone, head of institutional relations at the EBU/WBU Broadcasting Union, said, "My predictions are for a negative impact in the next 10 years for three main reasons. 1) Most technological changes occurring today and those that will happen tomorrow are in answer to immediate needs and requests (for example, an app aiming to provide the solution for a given problem). Nobody knows what their impact will be on human behaviours and skills in the long run. Because of rapid change, long-lasting effects could be seen only later. 2) Developments based on disruptive processes are very difficult to regulate because the changes happen too fast; this is potentially very dangerous – especially understanding the impacts on society. There is nothing more dangerous than to create the prospect of a new world where the large majority of people have no idea of their future situation and social status. The last time this happened was during the first industrial revolution. A century of social turmoil and the end of absolute monarchy were the result. Could the digital world bring as consequence the end of democracy? 3) The industrial revolution saw the birth of monopolies and the rise of corporations stronger than the state. Antitrust legislation and the break-up of some of these monopolies were the national solutions. It could be that the appetite of internet companies and of the telecommunications companies will bring the end of the open internet. Could the antitrust solutions of the past be replicable in a global world where national jurisdictions cannot tackle global problems and multilateral tools are ignored or rejected by the stronger states? Not necessarily. After the industrial revolution a new balance of powers was established in modern societies: democracies and a new 'social contract' were signed. But it took more than a decade."

Riel Miller, team leader of futures literacy at UNESCO, said, "We are in a transition from the frontier status of Wild West to something else. Think cybercitizenship and recourse in cyberspace. Take for example the fact that P2P currencies, easily implemented with Public Key Infrastructure and the trust infrastructure of fiat currencies in 2000 but blocked by central banks, now are back on the agenda as crypto-currencies begin to undermine a number of justifications for advances in transaction systems. Same goes for verifiable identity and ownership of identity on the Net. Cyberscitizenship was mooted in OECD papers I wrote in the late 1990s, now the harm to credibility and verifiability and responsibility are becoming clearer through antics like those of Trump and bots, trolls, etc. So, well-being will be harmed because people need the Net for many reasons and it won't be able to meet those needs properly without an appropriate global infrastructure that nation -tates inherently oppose and multi-national organisations won't address. So the Net will be dysfunctional and inadequate for some time."

A **professor at New York University** wrote, "Like any human invention the internet can be used for good or bad of mankind. Alas, the last years have shown rampant abuse and misuse of this platform. As much as we praised global culture, democratization of tools + access to media my optimism has all but vanished. This misuse has also placed people outside of most countries'

legislation, and I do not see a unified willingness of all countries on Earth to address this problem. Media literacy may help, but only partially. At the same time, I could rather do without a fridge than the internet. Maybe the tools will mature to prevent most misuse. That would require legislation that forces the quasi-monopolies in social networking to heavily invest in R+D."

Laurie L. Putnam, an educator, librarian and communications consultant, wrote, "If current trends go unchecked, individuals' overall well-being will be more harmed than helped by digital life… Connected technologies that can be manipulated, attacked or misused will do more harm than good unless we recognize the vulnerabilities and do a better job of managing the risks. Stress levels rise when we lose control over our environment, and if we lose power over our digital lives, our well-being will be compromised. We are caught in a wave of rapidly changing technology, and many people are struggling, unsettled in the present and uncertain about the future. This is not about information overload; it's about a digital undertow that can pull away our time, agency, and even economic stability. When we live online, our credit card numbers are stolen, our private data is harvested and commodified, our sense of the truth and reality is called into question. Job security – and with it a family's ability to meet its basic needs – becomes a real concern when plans for automation don't include plans for workers. It becomes harder and harder to unplug our lives, and with the expanding Internet of Things, opting out will become virtually impossible. We need to find ways to adapt or tensions will grow and our well-being will be further compromised. It's important to note that the well-being of the individual is connected to the well-being of the community. If the weaknesses of digital technology damage our collective institutions and democratic systems, however unintentionally, the individual will suffer. I expect things will get worse before they get better. But they can get better, if enough of us are willing to put our collective well-being ahead of business interests."

John Sniadowski, CEO of Riverside Internet, Wales, commented, "Where you live and your social status will determine whether you are harmed or helped. The great masses are being milked by multinational companies such as Facebook and Google and others queuing up behind to exploit. Huge numbers of people are being excluded because of poor access, or bad or no education and wrongly influenced by fake news, social media pressure and thought-control by governments through surveillance and access control, e.g., the great firewall of China. Individuals will be helped by access to connected technology such as telemedicine, etc."

A **professor** from North America said, "I'm concerned that people will be even more trapped by always working – with constant connectivity how do you not work wherever and whenever? I'm also concerned about privacy. Even if I personally am not on social media my face and information are because of other people I know. Companies like Google and Facebook know more about me

than the government or my family, and I do not control that information. The flip side is that improvements to health probably will occur, especially related to chronic conditions."

An anonymous **head of research and instruction at a major U.S. university** wrote, "Despite the incredible usefulness of new communication, workflow, aggregation and other technologies, I worry that the accompanying downside is only growing. Specifically, I see the lack of privacy and control over information collected, the sociology of algorithms that are virtually invisible to users and the commercialization of personal data as having short- and long-term effects that are already radically changing norms. In addition, the conveniences of tools and applications in our hands are a tradeoff for remapping attention spans and information-literacy fluencies that seem – at this point, at least – to prompt anxiety and discontentedness over the longer term."

A **senior at a major U.S. university** said, "In the next decade, many individuals' personal well-being will be harmed by the pace, content and influences of hyperconnected life. We are already overwhelmed with information, advertisements and content. Teenagers and young adults are heavily influenced by social media… We are constantly connected, and our smartphones are basically another body part. In the next decade, our ability to stay connected and the technology available to us are only going to increase. We are on the edge of what Maurice Conti calls 'the augmented age.' Within the next decade, fast-paced developments in virtual and augmented reality and possibilities such as neural lace and robots put as at risk of losing our sense of reality and losing our jobs. People will begin to feel insignificant because they can simply be replaced by computers. AR and VR will make it easy for them to immerse themselves in online worlds, leading to the loss of social skills, loss of reality and the loss of 'alone time.' Nicholas Carr and Tim Leberecht have warned about dangers of people not spending significant time on quiet introspection, the 'loss of alone time' and taking time for oneself. Contemplative time spent alone, disconnected is vital for personal well-being. But in the coming decade in our hyperconnected world, alone time is not going to be seen by many as an option any more. I am expecting to see changes in the way we are able to socialize and the ways in which our children develop. Attention-deficit disorder won't be something that a few people have and take medicine for. It will be the norm… If we are so immersed in this technology that we use it to avoid other people or ignore problems in the 'real world,' this could have harmful effects on people's emotional states of mind. If we neglect our own inner peace and interactions with others that do not involve digital appendages, we lose those significant relationships and experiences."

An **anonymous respondent** said, "Thinking through the benefits of digital technologies that have emerged in the past 10 years or so, I see evidence that the benefits to well-being that have accrued from the widespread adoption of those technologies have been counterbalanced by harms.

For example, Facebook and other social media allow us to maintain meaningful connection with more people we care about more easily, and to form lightweight communities of interest that can cut across geographical and (to a lesser extent) demographic and cultural barriers. But this connectivity comes at the cost of filter bubbles, an erosion of tacit cultural consensuses that kept us civil to one anther, trust in the authority of institutions and subject-matter experts (especially scientific), and of course, in the unprecedented voluntary release of personal data to platform providers and third-party data brokers. Similarly, the internet itself provides unprecedented immediate access to information and has democratized the publication of information to a broad audience. These features can be huge boons for personal decision-making and social equity, respectively. But they also degrade trust in institutions and make it more difficult for people to assess the veracity of the information they read. Even more significantly, being on the internet – as a 'passive' consumer or an active participant/provider – exposes people to increased risks of personal physical, psychological and financial harm (through targeting by both state and non-state actors): doxxing, harassment, identity theft, malware and data collection for profit. A lot of the novel technology platforms and services we've adopted widely in U.S. society over the past decade or so increase convenience and immediate gratification of non-essential desires. This feels good, and makes solving some life problems ('how do I get from A to B without driving a car?') much easier. But it always comes at a cost in terms of privacy and attention. There are components of human well-being that are not easily translated into a profitable platform or service. For example, an app that helps you be a better father to your children; increases the quality of the time you spend with your romantic partner; provides practical support for an ailing parent who lives across the country; decides whether it makes sense for you to apply for a mortgage given your life goals and financial stability; identifies and addresses sources of anxiety or distraction. These don't get made or are designed deceptively to nudge people towards a particular outcome that is advantageous to the provider or are provided at the expense of other facets of well-being (especially privacy and attention). Given our current regulatory environment, I don't see the problems with the current digital landscape getting addressed any time soon. And we're just now seeing the beginning of the full destructive potential of the digital technologies we're already embedded in. We might be hitting diminishing returns in terms of benefits accrued from these technologies."

An anonymous **professor** based in North America said, "The changes connected with the internet work in conjunction with other political, economic and geographic changes. Over the last 50 years, we have seen a major increase in inequality, with 40% of wealth flowing to the top 1% pf humanity. This has been coupled with geographic inequality that isolates segments of the population into like-minded clusters. At the same time, the revenue sources of advertising and subscription that supported centrist journalism have eroded. Individuals at the median income see their quality of

life eroded. And the information available to them to frame their situation is increasingly polarized, reinforcing long-standing cultural attitudes. That is a recipe for deep social tensions."

An anonymous **research scientist** based in Europe said, "An environment is being created that we are not 'designed' to live in. The health of humans (and organisms of all kinds) is thereby damaged. Due to digitialization products are made in a way that make them more complicated to mend and very often not possible to mend at all. Even if they could be mended by an expert there is no service available. Therefore, lots of energy and material is used for things that are thrown away before they should be, and new products are purchased in their place. This increased speed of circulation increases the request for raw materials the processing of which leaks unwanted substances into the environment that circulate in both local and global ecological, aqua and atmospheric systems."

Ebenezer Baldwin Bowles, author, editor and journalist, said, "'Speak! I charge you!' Can I choose to be silent to the demands of digital technology? Not really. Is it good for me? Does this strange intelligence enfold and hold me, or does it drive me to distraction, delusion and despair? Should I remain an isolated and dogged individual, retired in the rural heartland, content in seclusion, or should I dare to speak to the universal? Should I even care? [This] survey, asking us to imagine the future of the internet in terms of personal well-being and general happiness, reaches me on the edge of an existential chasm of seemingly disastrous portent. I'm probably not alone at the edge. I'm thinking we are doomed. I may be reaching an end, but am I so self-consumed by the digital universe I've crafted that I can no more see the good in the ones and zeroes? Proposition: We have become so connected on the shimmering surface of things that we no longer have time to think beyond the fragments, most of us. We struggle to tear our attention away from the endless avenue of screens to slow down, look one another in the eye, and share a genuine moment or two of humanity. Have you tried to carry a conversation lately? The smallholder's individual website, the dream that propelled the World Wide Web just before and after the turn of the century, has fallen into digital deafness and self-imposed silence. Why? The mega-scroll of a few big players – why bother to name them? – under the banner of 'social media' breaks down the ability to focus beyond the moment or look deeper than a page or two. No amount of so-called original content or innovative creations can break free of the stranglehold on expression imposed by the major players. Choose one or two of their handful of platforms or choose absolute obscurity. The middle ground is disappearing. Search engines no longer honor original content but tout the latest deal, the purchased top ranking, the most manipulative keyword. OK. I've already waxed TLTR. The Web contracts and constricts, offering candy and symbol instead of meat and potatoes, pushing distraction and deflection upon We the Masses to exert greater and greater control over thought and emotion through digital life and, ultimately, over individual freedom. Can you honestly claim our lives as a community and as a nation are happier and less stressful because of

the smartphone, the digital subscription, the algorithm and the voice-activated assistant? So, if you're content to scroll your fellowship on the run, activate in a rush the monthly digital draft from your account to theirs, catch your news in cynically filtered fragments, and sink into the oblivion of binge media and increasingly fantastic cyber-realities, then yes, digital life will get better and better for you. You can even go rogue, be anonymous, and troll those sumofabitches to kingdom come. Here in the rural heartland, retired and withdrawn and licking wounds, we stand on the ledge and look into the darkness and prepare for the end."

Lynn Schofield Clark, an associate professor at the University of Denver whose work includes the Teens & The New Media @ Home Project, commented, "For more than a decade, I have been involved in research that has focused on young people and parents who experience some form of marginalization, whether that is from racial/ethnic or gender discrimination, socioeconomic disadvantage, dislocation and disruption, experiences with incarceration or differently abled lived experience. It has been an amazing privilege to observe and work with people as they have harnessed internet-related technologies to address collective problems, and I have witnessed the ways that such work contributes immensely to well-being. However, I believe that much of the advances in well-being I have observed have occurred in spite of rather than because of societal changes related to the internet. We are experiencing a tremendous widening of inequalities due to the U.S.'s collective inability to utilize its democratic institutions in a way that reinforces the common good. We face difficult challenges ahead, particularly with the demise of Net neutrality, the continued concentration of ownership in the internet-related media industries, and the current mode of distraction that obscures the realities of climate change and other forces of globalization that contribute to inequities worldwide. Still, I think that improvement in life circumstances is possible. I believe that the resources for positive change and for increased well-being are available to us, but they lie in the human spirit rather than in the systems we have created. To secure well-being for the greatest possible number of people, we must work together to align our systems with a vision that underscores everyone's right to live with dignity and respect. This will take a strength of collective will that is sometimes hard to see. But I know it exists, because even among communities that are hardest hit by today's injustices, there is evidence of resilience, strength and the determination to survive and thrive."

A **professor** wrote, "Issues related to data surveillance, data privacy and algorithmic justice are not being adequately tackled in law, policy, technology design and education. So while access to technology increases, positive usage of it will not. The agency and autonomy of people will disintegrate if they are not given control and a say in the design of their socio-technical world. Note that this response relates specifically to the U.S. context. Elsewhere, some positive steps are being taken. Europe and the UK have moved ahead with a strong set of data rights for their citizens while U.S. citizens continue to have few rights with regard to their personal data (including metadata).

Canada and other countries maintain Net neutrality, while the U.S. shuts down the pipeline to equitable access to information via the Web. In my own research, I am particularly interested in children and youth and their well-being in relation to technology so I highlight here a few broad issues related to young people. 1) Incredibly, as access to digital technologies grows and becomes more embedded in our everyday lives, media and digital literacy continue to play second fiddle to the traditional disciplines in K-12. School libraries, the natural venue for teaching young people the critical information/digital literacy fluencies needed in the 21st century, are closing down across the country due to funding cuts to public schools. This is certainly a counter-intuitive move in this age of digital mediation and data. 2) There is an emerging, rights-based discussion about children's well-being in relation to digital technology. The conversation has gone global and is framed by the UN Convention of the Rights of the Child (as witnessed by reports issued by the United Nations, UNICEF and scholarly writing in respected journals like Media and Society). Unfortunately, the U.S. has not ratified the Convention. Given that technology crosses borders, it is really a shame that the U.S. can't play a central, credible role in this global conversation; a missed opportunity. 3) Algorithms live in a black box and data gathering is happening from birth onward. The lack of transparency in technology development and data gathering, with seemingly little concern for the long-term effects on children's development, is breath-taking. Someone has to think of children's well-being. I do foresee a growing awareness of this situation, and some parents pushing back. But we need a proper movement for data privacy, initiated through public education."

Marc Brenman, managing partner at IDARE LLC, wrote, "Privacy is already disappearing. Public discourse is already coarsening. Hateful individuals find each other and form groups more easily. Cybersecurity threats continue to grow. Artificial intelligence and robotics are putting people out of jobs. At some point, AI entities may decide they don't need people on earth. Autonomous weapons can make misjudgments."

Llewellyn Kriel, CEO of TopEditor International, said, "Digital life is a reality and will increase throughout all facets of human life and across the world. Human beings need time to 'evolve' into 'digital beings' at ease with 'digitality,' able to interact with it as well integrate it into their lives. These processes will take time. Some groups, especially younger generations will find this easier, but will also need guidance when they feel uncommon sense of alienation, disjointedness and emptiness. It will take at least two decades for 'digiality' to become part of human existence – just as it has taken two decades for humanity to become comfortable with cellphones. The ever-present danger of course is the constant growth of the digital divide – primarily between rural and urban dwellers (and not rich and poor as commonly thought of)."

Mamie Anthoine Ney, an information science professional and director, wrote, "We are still in an era of significant technological change that is so rapid that people are just not able to keep up

with the pace of change or know how to fully adapt to change. It is just a part of our human nature. I do not think that another decade will allow us to solve the issues of civility, proper use of time and understanding the content of all that technology brings us. We are in a time of political discomfort that is drawing attention to much of what is bad about technology, rather than the good that it can do for us. Just think about how much we currently hear about uncivil tweeting, sexting, scamming and more compared with how technology can alleviate medical problems (3D printing of prostheses), connect rural areas to the rest of the world (cell service drones over Africa), and bring friends and families closer. If we were better able to concentrate on the good, rather than the 'evil,' the current state of upheaval could be conquered in less than the next 10 or so years."

A **technology developer/administrator** based in North America said, "I don't think we realize the impact of the increased amount of media we consume on a daily basis. Plus, all of our interactions online are being harvested for corporations to know more about our habits and patterns. While being online can help us solve some issues and maybe save time, we don't fully understand the impact of that big data."

Andie Diemer, journalist and activist user, wrote, "It's difficult to point out the negative aspects of digital in such congruent and specific terms as the positives. We know some things – like looking at blue light before going to bed is unhealthy – but we don't exactly know how the wavelengths of a cell phone affect our mental or physical state. It will take decades and dozens of studies to confirm specific impacts before we can even determine a solution. The persistent use of technology in our lives has not yet been studied over the full duration of an average human lifespan. We don't have the data to help us understand how to make the healthiest decisions for us, as individuals and as populations. As a society, it is best to be aware that there are drawbacks that can't be physically seen or touched, and our judgments with tech need to be constantly evolving. It seems as though self-driving cars will be here shortly, saving time and traffic and lives, but also allowing the government or another entity to track your every movement, and creating the potential for hacking and mass devastation that plugging into a grid system could provide. And we have only started to scratch the surface with AI, which is a prime example of something that could have an immediate positive payoff (increased automation/production/profits) *and* long-term devastating consequences (does a society where robots outperform humans makes humans almost obsolete?) It is crucially important for our families, communities and governing bodies to come together to set perimeters before we evolve to a point where we won't be able to return. It just takes one company, one person, to unleash something that can never be stuffed back into the box that will alter the lives of most people on the planet. If we aren't able to physically see how dangerous technology could quickly unfold, it could be almost impossible to get any large groups of the population to act beforehand to install regulation."

A **professor** based in North America wrote, "Technological advances will challenge well-being over the next decade because our governance mechanisms will not be effective for the digital age and public accountability will suffer."

Eric Allman, research engineer at the University of California-Berkeley, commented, "In the early days of the internet we imagined a world where people would be able to communicate more easily and hence deepen their understanding of others. Unfortunately that's not how it worked: it allowed extreme views to find havens that were essentially echo chambers, making interpersonal understandings go down, not up. In the next decade I believe progress will be made, but not before it gets even worse than it already is. Similarly, the rise of AI is going to put a lot more people out of jobs, including many people who think they are immune right now. At least in the U.S., I don't believe the social safety net will be able to cope with the rising demands. Also, the rise of the 'surveillance state' is going to seriously challenge our freedoms… I believe that if we try hard enough we can fix or ameliorate part of the problem and gain the benefits. But I'm not sure that we have the will to do so, since it will require some of the rich people to get less rich."

Su Sonia Herring, an editor and project coordinator based in Europe wrote, "The thing we need to worry about may not be so much digitization but the data gathered for commercial or political interests. The way billions of people's data is mined, packaged and sold, whether with or without consent, will shape the future. Algorithms that directly or indirectly influence our lives and make crucial decisions shaping it are mostly protected as 'trade secrets,' while the endless volumes of data we create as we are living our digital lives is monetized. Surveillance capitalism is growing in undiscovered territories, and we as digital individuals and societies need to be informed and vigilant about how we (via our data) are being traded as products while we have minimal say about the terms and conditions. People will adapt well to digital life but I am not so sure what will come of surveillance capitalism."

David E. Drew, Platt Chair in management of technology, Claremont Graduate University, wrote, "I am in the middle of writing a book about this subject. Computing technology is both an aid to us and a growing threat. In the next decade, the balance will shift so that the damage that is done by computing outweighs the benefits. The threats include the damage to human verbal and emotional interactions, especially among the young."

A **research scientist** based in North America commented, "If I had to guess, I would expect that new technologies would further contribute to 'hyperconnectedness' and make it even more difficult for people to disengage from technology during leisure/relaxation time and also detract from productivity at work because of so many distractions/competing demands on attention from technology. In addition, new smart technologies and the 'internet of things' introduce privacy

concerns that have not been adequately addressed. It seems like these technologies emerge and develop at a faster pace than the government/regulatory agencies are able to keep up with, and if companies prioritize innovation and profits over consumer protections it seems likely that consumers will be harmed, likely through lack of privacy protections. Finally, a related concern has to do with cybersecurity and ensuring that new technologies do not make individuals and nations more vulnerable to cyberattack."

A **technology consultant and expert on attention and workflow** wrote, "Technology is moving faster than wisdom. Computer science is being studied to the exclusion of social science, ethics and philosophy. The current U.S. administration is compromising universities' basic research funding. Moneyed interests are 'trumping' and compromising civil society. There are bright spots – the work of Saul Perlmutter, danah Boyd, Joi Ito, Reid Hoffman and others – but it'll take a lot to turn this 'ship.'"

Martin Shelton, a user research scientist for a top global technology company, commented, "In the Western world, we're more productive than ever before. Our lives are longer than ever before. But so are our working years. This is kind of a unique place in history. By taking advantage of these newly discovered years, we have the capability radically improve our lives by pursuing more fulfilling work and interests. But mostly, we work until we can't any longer, often on problems of questionable value. If you want an example of a place where we're not best applying our collective resources, look no further than the technology industry. Our most brilliant technologists are being put to work on encouraging you to click advertisements."

A **North American businessman** wrote, "In the short term, the current designs of the internet attempt to put people in boxes convenient for advertisers, marketers and influencers such as politicians to target demographics and micro-target personalities. As Jaron Lanier has written, this trend, in combination with the transient anonymity provided by platforms like Twitter, seriously dehumanizes users, leading to the prominence of troll activity and the dominance of extremist ideologies such as Nazism online. These trends in internet design are, and will continue to be, detrimental to human interaction. That said, should we survive this current phase and return to a more human- and individual-centric internet design, the overall democratization and dissemination of information will ultimately prove beneficial to people. The availability of information provides the raw material for innovation to more and more people. The propagation of diverse perspectives expands the worldviews of those without the means to change their physical environments. Overall, the closing of information gaps and asymmetries will, I still believe, prove beneficial for people in the long term, providing we return to a more human- and individual-centric design focus on the Web."

More experts' suggestions for potential interventions to overcome challenges to individuals' well-being

Most among the respondents who said digital life will stay the same noted that every technology has always had its positive and negative effects and that, on balance, things will probably stay about the same. A representative comment came from **William J. Ward**, president of DR4WARD, who said, "Overall there will be no change. Many people will become more immersed in their digital lives and suffer the negative health and psychological consequences of a sedentary life disconnected from a physical reality. At the same time, an equal number of people will wake up and recognize they have been wasting too much of their time on an imagined digital life. They will reinvest their time and efforts into positive physical activities and face-to-face human relationships and interactions, finding a balance or equilibrium where digital use declines to a more healthy and helpful level."

Every respondent noted that digital life has its downsides. Respondents were asked to share their thoughts regarding ways in which digital life could be improved. **Peter and Trudy Johnson-Lenz**, principals of Pathfinding Smarter Futures, wrote a comprehensive response: "Humankind has organized to create civilization to exploit self-preservation instincts that shut down our thinking in favor of quick, automatic fight/flight/freeze reactions. Those reactions come from the deeper, older parts of our brains that kept our ancestors from death and destruction so they could survive. Now, increasing hyperconnectivity and constantly accelerating change are confronting us with threats that trigger fear and anxiety all the time. Our civilization is not smart enough to survive the mess we've created because it's making us stupid with uncertainty, fear and helplessness. To foster personal and societal well-being, we need to learn and practice how to be present to what is, with each other, without fear. It's a tall order, but what else is there to do? This will take patience, love and practice, practice practice! There are three classes of actions that can be taken to mitigate potential harms of digital life: 1) Highlight the positive potentials and negative and sometimes unintended consequences of digital technologies as they evolve in order to provode and foster society conversations about how to orient their development… toward personal and social well-being rather than being shaped by market forces and profit… 2) Develop new apps and digital technologies for the express purpose of enhancing… career, social, financial, physical and community well-being… 3) Encourage and support education, training and practices of critical-thinking, respectful engagement, mutual trust, collaboration, conflict resolution and transformation and the like. Digital life is increasingly fragmented and polarized, further eroding trust, cheapening relationships and shattering community. At the same time, there are more programs, courses, examples and practices that point the way to a better future. Learning to

skillfully manage our scarce attention and our thinking for our own well-being and that of our circles of influence is key."

Rich Salz, principal engineer at Akamai Technologies, said, 'Intervention requires rigorous filtering of 'facts' and taking time away to make human connections. It is difficult."

1 - Reimagine Systems: Societies can revise both tech arrangements and the structure of human institutions – their composition, design, goals and processes

Many respondents to this canvassing pointed out a need to remake institutions or legacy systems. They also said technology design processes should be reconsidered and improved and that the composition of the technology teams in charge of creating and enhancing products and platforms should be more diverse and reflective of all members of society in order to better address the well-being of all.

An **anonymous respondent** wrote, "Technology is being allowed to develop and advance without adequate regard for its impacts on people, society, the culture of work, interpersonal communication, family relationships, child development and so on. Much as we have medical ethicists in our society, I believe we should have technology ethicists so that financial gain is not the sole determinant of the trajectory of technological development."

Gus Hosein, executive director of Privacy International, a London-based nonprofit, wrote, "We can't continue down this path because we can't continue to be this stupid. I'm mostly speaking at a security and privacy level but I also hope it applies at a competition level too. We are building a very unresilient socio-technical infrastructure that we are coming to rely upon ever more. This is insanity by definition as we've seen all these problems before and somehow we still invest with the thought that what happened before won't happen again: breaches due to inattention and lack of care of systems, domination by few companies who have vast access to insights into our lives and markets, governments intervening only to advance their own interests to gather intelligence."

A **CPA based in the U.S.** predicted, "As the technology gets better and better… will content providers build in automatic shutoffs? Will an underground market develop for content that won't shut off? In the next decade, there will be unexpected actions that will reduce certain risky aspects of digital life and there will also be unexpected actions that will be extremely harmful and society won't be prepared. Virtual reality immediately comes to mind."

A **director of a technology graduate program** commented, "Technological change cannot be disembodied from the values of the people who design and use technologies. Technological change

will be a force for social good if values that foster positive social change are embedded in the technologies."

Sasha Costanza-Chock, associate professor of civic media at MIT, said, "We absolutely need to take actions to mitigate digital harms. Actions are possible at every level, from the personal (adopting better digital security practices), to the interpersonal, to organizational shifts, as well as for entire communities, municipalities, governments and so on. Harm mitigation can be accomplished through shifts in practice, regulation, policy, litigation, code and design and norms. For example, there is the growth of the #designjustice approach: Design justice explores how the design of technological objects and systems influences the distribution of risks, harms, and benefits among various groups of people, or in other words how design both reproduces and is reproduced by the matrix of domination (white supremacy, heteropatriarchy, capitalism and settler colonialism). Design justice is also a growing social movement that focuses on the fair distribution of design's benefits and burdens; fair and meaningful participation in design decisions; and recognition of community based design traditions, knowledge and practices."

James Galvin, a director of strategic relationships and technical standards, said, "I worry that as technology 'replaces' people, it will in fact 'replace' people. Technology is a tool and should be used as such. In all places where it is deployed it should be the case that life is improved for people. It should never be the case that people are displaced. Business in particular needs to embrace the use of technology, but they need to continue to support their employees in the process. This is not an easy problem. It's not as simple as retraining employees for another job, nor is it as simply forcing employees to find another employer. It is a society problem, not just the problem of any individual business that wants to improve its efficiency. Every business has a role but so does every person in the development of a long-term, mutually satisfying solution."

A **deputy director at a nonprofit** based in the United States wrote, "To date, 'digital life' has literally been built by human activity, across academic, government and commercial entities. That human agency means we can choose to make different apps, services, devices and approaches to applying technology in different sectors of society. None of this is foreordained or fate. The technology giants of today and tomorrow can and should recalibrate to encourage conscious consumption and intentional use that leads to meaningful, positive experiences and offline connections instead of incentivizing passive consumption of the curated feeds of others and demanding attention. Employers, schools and families will need to develop and encourage healthier social norms that integrate the use of phones and wearable computers into modern life in ways that bring people in from the cold."

Beth Kanter, author and speaker based in North America, wrote, "We can't just put this on the backs of individuals. The tech companies have to take responsibility, too – they are the tobacco industry of today. Tristan Harris has been a leading voice on the ways that technologies are being designed to create behavior addiction, and the motive is so they can sell our attention to the advertising buyer."

If companies develop technologies that are certain to be used to upend society shouldn't there be industry and public processes to assess them during design and prior to launch? **Andie Diemer**, journalist and activist user, wrote, "There are small but realistic steps we can take as a society to mitigate potential harms of digital life. There is research available to form an outline and guidelines for technology consumption by age. We can teach children healthy boundaries with devices. We can recommend tactics to change behavior and specific accessories to preserve our physical senses. However, as a society we are also at the whim of private businesses that can deliver various forms of technology without studying how it impacts consumers." **Vincent Alcazar**, director at Vincent Alcazar LLC, wrote, "We must absolutely remain vigilant for the unintended consequences wrought by technology. An example is Adobe's VoCo technology, which if commercially developed – as it most assuredly will be – will fully, perhaps violently, upend all that this society and civilization holds as truthful with regard to human voice and motion veracity."

A **blog editor based in North America** wrote, "A lot of things need to happen at the level of business model, regulation, corporate company organizational design and operation, prioritization. One of the most important things we can do in the near term is come up with good ways of talking about the nature of the problem, because it's harder to advocate for change without the right language. Sometimes it's talked about in terms of distraction or attention, but we tend to associate that with more immediate types of attention, not longer-term life effects. I don't think it will happen overnight, because a lot of it involves changing the way we talk about human nature and interaction. So much of the way we talk about it, especially in the U.S., is rooted in discussions of freedom of choice. My intuition, and this is just intuition, is the more we can get away from talking about it in terms of choice and start talking about it in terms of chance – which outcome was preferable and which actually happened – the better. Choice is such a messy thing to dive deep into, because then you realize that nobody knows what it means to choose. In terms of individuals working at these companies, I'm still heartened and optimistic, because everybody who's a designer or engineer is also a user at the end of the day. Nobody goes into design because they want to make life worse. The challenges, generally, are structural, whether it's about the existing business models of companies or the way in which certain forms of corporate legal structures don't give people the space to balance some of these more petty, immediate goals with more noble kinds of things. It's hard to say, in terms of the longer-term of tech evolution, whether we can be optimistic or not. I'm hoping that there will be a point where, if we don't restrain things or turn the

battleship around, we realize the unsustainability of it, from a business point of view but also in our own lives."

A **research scientist and internet pioneer** commented, "There are many things that could be done, the question is whether they can be achieved… More attention to reducing complexity and other barriers to use should be a high priority, but I don't see the private-sector creators of the internet experience motivated make this a priority; the addition of new features (which adds complexity) seems more important to them than ease of use. Disciplining online misbehavior will call for thoughtful reconsideration of how applications modulate the internet experience – a careful balance of accountability and freedom of action is required. Again, I do not yet see a motivation for the private sector to give this priority, although this may change. Overall, I do not see the private-sector battle for market share aligned with the steps that might address some of the negative impacts on well-being."

David S. H. Rosenthal, retired chief scientist of the LOCKSS Program at Stanford University, said, "The only possibly effective intervention would be the aggressive use of anti-trust action to break up the oligopolies that dominate internet service and the applications that run on it. But, given the power of increasing returns to scale and network effects, even if undertaken it would likely have only temporary success (see AT&T). Given the lobbying power of the incumbents it is extremely unlikely to be undertaken."

Mike Caprio, innovation consultant for Brainewave Consulting, said, "Internet access is a human right and steps must be taken to give every person everywhere unfettered access to networks. Democracy and social mobility will increase everywhere that digital life is allowed to flourish away from the negative influences of vast commercial monopolies and overreaching governments corrupted by corporations. Public funding must be applied to create infrastructure that is not owned and manipulated by corporations, and net neutrality must be the principle applied to all networks. Publicly funded alternatives to walled-garden digital services must also be implemented, with data freedom and portability for all users – people must control their own data at all times."

Fay Niker, postdoctoral fellow at Stanford's Center for Ethics in Society, wrote, "As a political theorist, I think that there are grounds for the public regulation of our digital environments, based on the harm principle and/or on asserting and defending a freedom of attention. Governmental regulation is required, because we cannot trust the self-regulating efforts of the firms themselves and we should not be responsibilizing individuals when it comes to dealing with the harmful effects on their lives and society of systemic issues. That's not to say that individuals have no role and responsibility in the management of their digital lives, but that the main burden should not be held by individuals within the current system."

Marcus Foth, professor of urban informatics at Queensland University of Technology, wrote, "Whether the design of blockchain and distributed-ledger technology – and robotics, and AI and other digital technologies – advances us toward dystopian or utopian futures will have a tremendous impact on people's well-being. Continuing to work just in our little square and not seeing the bigger picture, can do harm. The bigger-picture disciplines such as humanities and especially axiology are called on to guide the way. I believe actions can be taken to mitigate potential harms of digital life. However, this depends on a number of factors, including political and ethical direction and framework. 'Ethics can't be a side hustle' – https://deardesignstudent.com/ethics-cant-be-a-side-hustle-b9e78c090aee. Take blockchain and distributed-ledger technology as an example: There are many downsides and challenges that if they are not overcome can be detrimental to people's well-being. The exponential energy use can accelerate fossil fuel use, depletion of rare earth metals, e-waste production, etc. The technology can produce dystopian futures (see 'Black Mirror'). Money could become programmable, so the issuer of your salary or welfare cheque could determine how you can and cannot spend your income. On the other hand, the technology has the potential to do good, kill off the neoliberal nastiness of our current capitalist system through disintermediation, and bring about radical changes to society – universal basic income, direct/representationless governance and democracy, e.g., http://www.mivote.org.au)."

Devin Fidler, a futurist and consultant based in the U.S. commented, "Network technologies are destabilizing forces, no question, and they are not impacting everyone in the same way. At a fundamental level there must be more cultural, entrepreneurial and policy focus on actively 'humanizing' these new tools. Beyond this, while it is fashionable (and often even useful) to point out all the ways that technology is negatively impacting people, it is worth remembering that at this very moment many, many, more people around the world are being given new opportunities in the wake of internet growth than are having them taken away. Expect continued ambivalence from the global 'winners' of the original Industrial Revolution, just like the ambivalence of the noble gentry 'winners' of feudalism before them. They will continue to see their traditions broken and their status challenged."

A **post-doctoral fellow** based in North America wrote, "Actions that can be taken to minimize harms start with those in charge of distributing the technology. For example, Facebook has supposedly good intentions by wanting to connect the world to each other, but they are taking advantage of basic human psychology and using attention metrics to determine how successful they are as a company. In the future we'll need to ensure that companies are not capitalizing on the flaws of the human mind to get people engaged and instead have those in charge focus on improving humankind. If all of those seeking to change digital life started with a positive, humanitarian goal (rather than a capitalistic one), there could be widespread benefits. Educating

the public and ensuring that the drivers of digital life are abiding by code of ethics that the majority of users can agree upon, we could definitely minimize the harms associated with digital life."

Richard DeVries, a respondent who shared no additional identifying background, said, "New ethical dilemmas may result regarding the definition of quality of life and well-being issues, however clear thinking and consensus beyond academic and strictly profit-motivated voices need to be taken into account to resolve such disagreements. If this is the approach taken, technological advances will find a balance between the various constituencies providing market-driven incentives for innovation and agreed-upon ethical standards by which new technologies may be broadly implemented for the greater good."

Philip Gillingham, Australian Research Council Future Fellow, said, "Human need needs to take the lead in technology development. We need to think through what the unintended consequences of particular technologies might be."

Adrian Schofield, program consultant at the Institute of Information Technology Professionals-South Africa, said, "Vulnerable people of all ages should be protected from harm perpetrated through digital systems. All people should be educated about how to protect themselves from such harm. Policing the digital world should be the same as policing the physical world – protecting the innocent, catching and punishing the criminals. The key is ethical and professional practice in the creation, construction and application of digital systems."

Tiziana Dearing, a professor at the Boston College School of Social Work, said, "Interventions might include increasing our understanding of social empathy and including it in design. Working extremely hard to mitigate inherent bias in design. Setting out to develop our norms as carefully, thoroughly and rapidly as we develop the digital technologies that change them."

Jan Schaffer, executive director at J-Lab, wrote, "I've judged enough SXSW Accelerator competitions to believe that engineers live to solve problems, especially is there is a financial reward at the end of the rainbow. It would be my hope that the tech giants will be moved to embrace problems that preserve civil society and democratic values."

Laurie Orlov, principal analyst at Aging in Place Technology Watch, said, "Boost investment by tech firms in protecting identity more effectively. Begin charging for access to technologies that are useful – and reduce dependency on advertising."

Diana L. Ascher, co-founder of the Information Ethics & Equity Institute, wrote, "Actions certainly can be taken to mitigate the potential harms of digital life, but to do so will require

moving beyond partisanship and (re)defining the values by which we wish to live. Legislative moves that make it possible for powerful entities to limit the capabilities and opportunities of the powerless, such as repealing the common-carrier classification of internet service providers, have disproportionately negative effects on under-represented populations."

Ross Rader, vice president for customer experience, Tucows Inc, said, "We will see more and more social pressure employed on companies as to the secondary costs of their innovation, and companies – the good ones – will embrace this as a social responsibility and work to absorb those costs to the extent feasible. We – society on Earth – are developing an awareness of what secondary costs look like, why they can be negative and why they can't be left untended. As we are learning how to mitigate these costs in legacy markets like agriculture, energy and finance, I believe that we will apply those lessons in other sectors and avoid the huge sunk-costs problem that we've let develop over the last few hundred years as our population has ballooned."

Darlene Erhardt, senior information analyst at the University of Rochester, commented, "As with anything, if the driving force behind the latest/greatest developments in technology is based on creating things for the betterment of society, taking time to consider the implications, establishing/refining 'Good Practices' to go with them, than I think the outcomes may be more positive."

Theodora Sutton, a Ph.D. candidate at the Oxford Internet Institute, wrote, "We do need guidelines for technology design to prevent companies from exploiting users in the realm of personal information and the attention economy. Implementation of guidelines like this is possible and likely to happen."

John Skrentny, a professor of sociology at University of California, San Diego, wrote, "There are two key problems with digital life today. 1) Digital media. 2) Digital platforms for services. First, social media and search engines harvest data about users and monetize that data for advertising, insidiously destroying privacy. Even if we are aware of this, we forget about it in our daily lives. Social media and search engines (Facebook and Google) should have paid models where, for a subscription, users can have access to these sites but *not* have their data collected and monetized. I know many who would pay to use these services and protect their privacy. Second, platforms like Uber, Lyft and Taskrabbit should be public utilities that extract the minimum amount necessary to maintain themselves. These companies are exploiting people and I believe it is beneficial for all to make these public and non-profit. Bonus suggestion: Net neutrality is a non-negotiable. It is appalling that we have lost this. Second bonus: Internet access should be a public good, like water, and we should not be at the mercy of monopolies to provide the internet."

Jennifer deWinter, associate professor of rhetoric and director of interactive media and game development at Worcester Polytechnic Institute, said, "This is one massive open box. Companies can create reasonable technology policies about communication technologies. Germany has just passed a law that requires platforms to remove hate speech from their sites. This is good. We need to seriously interrogate what we mean by digital democracy and create policies that support and nourish online democratic engagement – one that cannot be policed if that is what we think is valuable. We need to think through policies of hate and online harassment. These things have real health effects on people, yet our justice system doesn't really have a way to intervene, research and prosecute others for offenses. We need to think through privacy and data and be explicit when talking with people and educating them about what their rights are. They should have rights. We need to think through geographical power and access to these technologies so that power is not concentrated in certain areas but is dispersed. We need to give people input and control over the algorithms that overdetermine content. [We need to address] the issue of Net neutrality."

Some people don't expect technology companies to focus the public good. **Ebenezer Baldwin Bowles**, author, editor and journalist, said, "A citizenry already trained to accept limits on freedom in the name of safety and security will eventually enter motor vehicles designed to block microwave signals and shut down their personal digital assistants. We are moving inexorably toward absolute control of digital life by global corporate entities, abetted by bought-and-paid-for public servants and government leaders co-opted by business. These controllers will define by decree the harms of digital life and then mitigate these harms through the extreme threat of blocking access to data-delivery systems."

Laurie L. Putnam, an educator, librarian, and communications consultant, wrote, "Tech companies, universities, governments and other influencers can broaden the scope of their thinking when it comes to digital technologies. Tech companies – the digital creators – need to think more broadly about the use and impact of their products. For the next phase of digital development, we need to understand not just the user, but the user in context. Digital tools don't exist in isolation, especially if we're talking about social media or the internet of things, and the impact of these tools can go far beyond individual users and user communities to permeate the very fabric of our society. We can't fully understand the effects of our digital tools and toys just by looking at the technology. We need to think outside the technology. While companies like Facebook and Twitter and Google can pack a meeting room with high-powered engineering talent, they need to balance the table with social scientists and anthropologists and futurists who can look around and behind and beyond the technology. There will always be unintended consequences, and we need more people watching for them. Digital creators need to pay more attention to the broader circles of impact their products have on society and the information ecosystem. Where hardware is involved, especially as the internet of things is embedded in our infrastructures,

manufacturers need to think more about product lifecycles, including reliability, serviceability, and recyclability – all of which, ultimately, affect our daily life and well-being. At the same time, universities need to incorporate information issues more deeply into technology and business programs so that future creators will have more nuanced perspectives on the purpose and impact of their work. Policymakers, too, need to make space at the table for futurists and others who see the world from different angles. An effective democracy needs people who can think broadly, study potential scenarios, and inform policymakers before the big decisions are made – especially big decisions about technology, which is probably not their area of expertise."

An **anonymous respondent** said, "Many of the harms are a subset of wider economic harms… Stupidity as a distracting entertainment is masking serious issues the United Kingdom, U.S., Australia and probably elsewhere. We need a different economics. If we can use the internet to generate an inclusive ecologically-grounded and humane economics, it would underpin a shift in the mentality of the internet and the wider media as an information space… There are challenges around identity, people pretending to be other real people in order to use a spoof account to defraud or otherwise con people… Tensions between freedom of speech and hate, racism, bullying and false information are hard to curate effectively and fairly. This is a mirror of wider issues in society. 1) Youth – the freedom to express themselves and also be safe with each other as well as with the wider community. 2) Gender – the freedom to express themselves and also be safe with each other as well as the wider community. 3) Faith communities – the balance between rights to believe and tolerance of others… Governments have been defunding objective expert scientific opinion because the opinions they are responding to are donors, sponsors, multinational money and not in the public interest or ecological interest. Funding becomes more directly commercial for science, which causes tensions for objective science… Negotiating a shift from capitalism into something with a real planetary equilibrium is the task for our generation. Perhaps the internet can help with that. Some governments have been co-opted and cannot deliver. It is probable that the internet as a tool for change is the reason why they are blocking Net neutrality despite the fact that this would be bad for business."

Stephen Abram, CEO of the Federation of Ontario Public Libraries, wrote, "The digital industry needs to invest in:

- Tools to label potential propaganda, fake news.
- Tools to address hate speech/distribution against any group.
- Tools to address 'fake' actors and accounts on social media.
- Better tools for addressing hacking, attacks, viruses, ad purchases (such as by the Kremlin, etc.) that disrupt life the real world.

"All of this needs to be done in a way that allows the content to exist and remain findable and addressable. However this content should not be search-engine-optimized to the top page or pushed, boosted or promoted over higher-quality information. Governments (in concert internationally through the UN or WIPO etc.) need to invest in:

- A statement of principles and policies that are agreed to internationally with consequences – for example, words should not be banned to disrupt search. Content should not be locked down – especially content that doesn't align with the governments' in power political views (e.g., climate change, abortion, civil rights, etc.)
- Laws and treaties in all countries protecting the right of access as a human right."

Dana Klisanin, futurist and psychologist at Evolutionary Guidance Media R&D, wrote, "The science of the impact of digital life on our physical, emotional, mental, spiritual and communal lives is in its infancy. This is an area requiring interdisciplinary and transdisciplinary scholarship, and we need more of it. We will use what we learn to mitigate the harm and enhance the benefits."

2 - Reinvent Tech: Things can change by reconfiguring hardware and software to improve their human-centered performance – and exploiting tools like artificial intelligence (AI), virtual reality (VR), augmented reality (AR) and mixed reality (MR)

Many respondents to the canvassing expressed the hope that technologies can be implemented to solve current and future issues tied to concerns over digital life and individuals' well-being.

Daniel Schultz, senior creative technologist at the Internet Archive, commented, "Technology is built by humans, and in the best cases it is designed for humans. There are some areas where unintended consequences of certain design decisions have become so dramatic that the fabric of our society feels like it might unravel (e.g., social media/Twitter/bots and vitriolic interactions/etc.) but I feel confident that it is possible to correct these problems through changes to the technologies themselves to account for newly discovered needs as well as a newly recognized need for a more informed/trained user base. I imagine that people weren't driving 70 miles per hour when the Model T came out; society had time to adapt and evolve. We haven't had this luxury with the internet, but that doesn't mean it's too late for us to catch up with the pace of innovation."

Ellen Detlefsen, associate professor emerita at the University of Pittsburgh School of Information Sciences, commented, "I look forward to the use of machine learning and artificial

intelligence tools that have the potential to screen and remove destructive or harmful Internet activities."

An **executive director of a tech innovation firm** said, "There could be more awareness and removal of the filter bubble, even proactive connections to alternate viewpoints. There could be rigorous prosecution of information warfare and more transparency."

James Scofield O'Rourke IV, professor of management at the University of Notre Dame, said, "If technology has placed us in danger it can remediate, obviate or eliminate that danger. I have great faith in technology, but somewhat less faith in the nature of the humans who employ it. I remain ever hopeful, though, that we can invent our way out of the dangers we have created."

Katharina Zweig, professor of computer science at TU Kaiserslautern, said, "We need to develop devices that learn from local information in a truly anonymized way. We also need regulation on how insurers can and cannot incentivize the use of health sensors. Of course, this is only one tiny aspect of the wide field of digital life and health. Other aspects will have to be analyzed in detail as well, e.g., benefits and potential risks of VR and other topics will be of great interest in the future. In general, I am a strong believer in the scientific method to firstly identify chances and risks and to secondly find meaningful ways to steer towards the chances and away from the risks. For me, this is the most promising approach to mitigate the potential harms of any kind of technology."

Dewayne Hendricks, CEO of Tetherless Access, said, "Most folks forget that the Internet is a 'network of networks.' Autonomous networks choose to peer with other such networks. I believe that it's time to do a reset on the global internet and move to a model where trust between peers can be achieved. That is NOT the case now. I personally am spending more time in much smaller peering networks, where you can choose to peer only with those whom you trust. The TCP/IP protocol suite makes it possible to create a multiverse of internets. There need be only one. Time to explore just what a trust-based internet would look like. I don't believe that the current global Internet is sustainable."

Internet Hall of Famer **Bob Metcalfe**, a professor of innovation at the University of Texas-Austin, wrote, "'Interventions' are not what's needed, but a competitive evolution of the tools, now ongoing, with Facebook and Twitter [for instance] defending their flaws."

Mario Morino, chairman at Morino Ventures, LLC, wrote, "There is promise in developing algorithmic and human-based countermeasures to detect, escalate awareness and even blunt or directly attack data pollution/polluters."

Gary L. Kreps, distinguished professor and director of the Center for Health and Risk Communication at George Mason University, wrote, "Efforts are underway to improve digital health information tools to make them easier to use and more informative, adaptive, interactive, personalized, relationally sensitive, interesting, private and mobile. New digital health information systems are being built into societal infrastructure to provide automatic access to needed information and support in homes, cars, schools, stores, businesses, clinics, public transportation, clothing, roads, the human body and other parts of everyday life to provide easy access, automated delivery of information/support and specialized functions."

Doug Breitbart, co-founder and co-director of The Values Foundation, said, "Technology developed in service to human beings' experiential generativity and collaboration holds the potential to materially enhance the quality and depth of human connection and mitigate the current isolation and antisocial behavioral imprinting currently reflected in our culture by its use today."

Marc Brenman, managing partner at IDARE LLC, wrote, "Ethical constructs can be introduced into artificial intelligence devices. But this is not likely to work well, since there is no unanimity on what 'ethical constructs' are. A 'veracity application' could be used as a filter to judge the truth of an internet posting. Prosecutors could charge those who threaten on the internet. Internet service providers and others could be required to provide much better service. The U.S. could introduce a 'right to be forgotten,' as Europe has. Net neutrality could be required."

Lisa Padilla, CEO, NewPath VR, wrote, "Technological advances with help wellness by far outweighing the negative effects. Although, for example, there will be cases of video game addiction, there will be exponentially more people helped by way of wellness applications being created today by developers who will create games that decrease anxiety, remap understandings, resolve relationships, condition for pro-social behavior and empower users with self-compassion, to name just a few."

Ethan Zuckerman, director of the Center for Civic Media at MIT, wrote, "The platforms we use are often actively hostile towards attempts to make them kinder and less harmful for users. A new category of innovators is starting to build complementary systems that allow users of these systems to improve how they use them. I see great promise in users taking responsibility for their health within the systems we use."

A **doctoral researcher in communication** based in North America commented, "There is no such thing as technological determinism. If we can get designers, entrepreneurs, ethicists and humanists to work together, we might be able to produce technological advancements that avoid

the worst harms and provide the most benefits. But it will take critical thought before, during and after the design and launch of new products and systems, as well as critical analysis of the infrastructures, regulatory regimes and educational contexts within which they are developed and implemented."

A **professor** from North America said, "At the moment messages come into my (mobile/cell/handy) phone unmoderated and this can be stressful. In the future, messages will be moderated by a system. The system will use environmental factors such as am I driving or being driven, what is my mood like, how fast I've been handling previous messages and the content and metadata of the message stream to determine when a message should be delivered. The content will be analysed using Reputation, Attention and Trust (RAT). What is the reputation of the sender in my circle of colleagues or industry or society? If Elon Musk sends me a personal message I'll want to see it straight away. My attention is valuable. Will the delivery of this message serve my current goals? Trust analysis is applied to the message and the sender. Sometimes my close friends play pranks."

John Sniadowski, CEO of Riverside Internet, Wales, commented, "It should be possible using machine learning neural networks to provide personal digital assistants (PDA) to individuals to help them cope with online interactions. Machine learning can help prevent the distribution of fake news and warn people of poor content. However, personal digital assistants themselves will need a large number of built in safeguards to prevent personal information being disclosed to unauthorised third parties. How PDA's can be implemented is something of a challenge. They should probably be provided by not-for-profit companies that are either paid for by the individual or subsidised by ISPs or government support. There should be a global registry of companies providing such services and they must under no circumstances provide free services based on the individual concerned giving up any control of their personal information."

Jordan LaBouff, associate professor of psychology at the University of Maine, commented, "In short, the idea that we can't shape our behavior to be more helpful and less harmful is just wrong. We can always investigate a situation, recognize harms and work to reduce those – and we should."

Kevin J. Payne, founder of Chronic Cow LLC, said, "One of the surest ways to influence behavior is simply to alter the environment to one that rewards 'positive' behaviors and punishes 'negative' behaviors (although, of course, there's an endless debate surrounding which behaviors to label as positive or negative). There's also quite a bit of research yet to do to understand which factors we can manipulate and how in order to optimize success. Not to mention the ethical dilemmas that arise. However, with big data and intelligent, adaptive, prescriptive algorithms, we should

technically be able to achieve the required, targeted nuance. The question remains as to whether we should. And, if so, how far we should go and who would oversee."

Eelco Herder, an assistant professor of computer science whose focus is on personalization and privacy, Radboud Universiteit Nijmegen, the Netherlands, wrote, "The main intervention needed to be taken to mitigate potential harms of digital life is to prevent or limit current interventions that partially lock us in a filter bubble… I believe that users need to be more in control regarding content that is currently largely automatically selected from them. We do need information filtering, but each user needs to be able to influence how this is done."

Jenny L. Davis, a lecturer at the Australian National University's School of Sociology, said, "Critical attention to design and evidence-based assessments of how technical design decisions affect diverse populations will be key to generating socially responsible technologies that attend to the potential benefits and harms of digitality."

Rich Ling, professor of media technology at Nanyang Technological University, said, "It is my hope that tools like AI will be able to address some of the abuses that we have seen in, for example, the Russian involvement in the U.S. elections."

Michael Roberts, an internet pioneer and Internet Hall of Fame member, commented "Politics is a lagging indicator, and politicians are just beginning to grapple with the threats posed to democracy and quality of life by the misuse of powerful digital technology and globe-spanning networks. Most politicians are not well-equipped to deal with the task of translating rules and laws developed for an analog world to the emerging digital reality. Many jurisdictions are already well launched into defining behavioral norms for cyberspace and considering appropriate penalties for criminal acts. The social media giants have discovered their original 'hands off' approach doesn't fly when individual users have no ability to deal with the bad guys on their own. Bottom line – steps are already being taken."

Avery Holton, an associate professor of communication at the University of Utah, commented, "We're already seeing a push toward regulating and vanquishing mis- and disinformation and those who spread such discourse. That can greatly decrease levels of stress, confusion and anger that build around such information. We're also seeing a sort of overlap in available app technology, meaning that we'll likely be faced with fewer, not more, apps in the coming years. As Facebook and Instagram adopt the technology of Snapchat, and in some cases of themselves, there are less apps competing for our attention. They are also searching for new ways to enhance individual and collective engagement, moving ahead of the experimental curve we've all had to deal with. Sure,

this might create a sort of monopolistic view of apps, but it also helps to streamline user experiences."

Garland McCoy, president of the Technology Education Institute, said, "New private-sector tools continue to enter the market that help people manage their online experience and their interactions with smart devices to provide a better/safer 'digital' environment. I don't think government intervention will help. Additionally, with government interaction there is always the risk of unexpected collateral damage and the inevitable regulatory creep."

3 - Regulate: Government and/or industry should create reforms through agreement on standards, guidelines, codes of conduct and passage of laws and rules

Charlie Firestone, executive director of the Aspen Institute Communications and Society Program, said, "As tech companies get bigger and bigger it is really only government that can form an effective counterforce. At every level, government programs, ideally in partnership with business and civil society, have a role. 1) In cyberwarfare, government is our first level of protection against state-level (or equivalent) attacks. Hacking of the Internet of Things could shut cities down and have other disastrous consequences. In cybercrime (including identity theft), we need government to protect and enforce laws aimed at protecting citizens and businesses. We also need antitrust and regulatory enforcement against abuses in business such as anti-competitive behaviors, fraud, misrepresentation and discrimination. 2) Another major area to think about is advances in artificial intelligence, genetics and robotics. We need vigilance on how these technologies are advancing, but the point of governmental intervention is very difficult. We don't want to stifle innovation or investment, but can't wait too long to avoid a disastrous outcome. We need more attention to that issue. 3) The question of data ownership is extremely significant to both business models and individual autonomy. I am hopeful that blockchain technology or other means will enable a move towards more personal ownership of our own information, recognizing at the same time that we can't and perhaps even shouldn't control all public information about ourselves."

A **research scientist working on tech innovation** commented, "Policymakers need to be at the forefront of these innovations. Some of new technology that is being created is existing in loopholes and acting in areas where there is little policy oversight. There should be. Policy should work towards constructing the frame on which technology sits, rather than being reactive, after the harm has been done."

A **data analyst** said, "To reach the point of policymaking requires society to have discussions within itself about how these new technologies are to be received and used even if it is just teaching people (adults and children) how to behave. It's the human element that needs to be considered as we continue into the digital life. As life becomes more digital, a lot of potential harms can be mitigated or removed by having conversations about what the existing technology means and creating actions and policies from those conversations. One of the looming issues that will need to be dealt with is the sheer amount of WiFi-connected devices that have no built-in security. All it takes is one device to be hacked on a network to give someone access to everything. This is something that can be addressed BEFORE a device is put to market and can be reinforced by policies creating a standard level of security the product must meet."

A **research scientist** based in North America commented, "Increased collaboration between technology firms, regulators and public-interest groups could help us better understand the pros and cons of new technologies and develop regulatory frameworks that support innovation while at the same time ensuring appropriate consumer protections."

Sheizaf Rafaeli, a professor at the University of Haifa in Israel, wrote, "Digital is powerful. In the hands of ill-meaning people, corporations, governments or groups, it can be used to leverage crime, violence, oppression. Everything that can be done, including regulatory acts, citizen and social action, scientific and technical effort, should be put into reducing these ill effects. I do not believe that the market, left to its own devices, will suffice. So governments, NGOs, the public, have to take responsibility and intervene. On the other hand, I do think that progress is being made."

Andrew Czernek, a former vice president of technology at a personal computer company, wrote, "Absolutely critical is the implementation of a digital key that can be tied to each individual to eliminate the shoddy security that email/password 'soft' security provides. In addition, Congress and our state legislatures need to pay much closer attention to protection of personal privacy. Indeed, at some point we may need a Bill of Rights for digital privacy."

Su Sonia Herring, an editor and project coordinator based in Europe, wrote, "Making business practices of technology companies more transparent and accountable is a must. The same transparency must apply to government's use of technology, especially when related to privacy, access and security of big data. Cooperation and dialogue between all stakeholders is key as the technology and the internet are virtually borderless. This practice of information exchange on good practices and diverse experiences would help create useful and flexible policies. Dated laws, non-transparent decision-making and over-regulation are not the best way forward."

Hanane Boujemi, a senior technology policy expert based in Europe, commented, "In order to benefit from the internet in the future, safeguards to consumers' rights must be guaranteed by existing legal mechanisms and possibly a code of ethics based on which the internet industry ought to adhere to. Users are to be made aware of the implications using their personal data and they should also respect the rights of the others while interacting in the virtual space."

Simeon Yates, professor of digital culture at the University of Liverpool, wrote, "I would have once argued vehemently against this, but we need to start looking at how we regulate the internet. It is not just the horrors of hate online, nor 'fake news,' but more importantly how we chose to solve social problems with (in part) technology. As I have argued repeatedly in my recent secondment and joint research with UK government and local government agencies – technologies are never the solution. Technologies embedded and developed with appropriate regulation are the key to delivering good outcomes. For example, how will we regulate aspects of automation. What will be our goal in regulating it or not (profit? well-being? risk?). Again context is for kings – we need to know from a strong evidence base specific potential impacts and the contextual limitation of regulation and policy."

Erika McGinty, a research scientist based in North America, wrote, "More regulation is required to safeguard against privacy and security breaches, constitutional violations – venders could include consumer-advocacy information with their products. And government applications should be evidence-based before implemented."

Richard Sambrook, professor of journalism at Cardiff University, UK, wrote, "It is hubris for technology companies or their evangelists to think they are beyond regulation. They have acquired huge market and social power – it is the place of politics and society to ensure that is managed for the collective good. I believe there will be regulation and other measures introduced to ensure the market power of these huge companies is not abused or misused (and currently it seems to me there are many examples of current misuse which are coming under scrutiny)."

David Golumbia, an associate professor of digital studies at Virginia Commonwealth University, said, "Serious government regulation is needed at both the national and international level. It is possible, despite the many tools Silicon Valley – building on other industries like oil and gas and tobacco and finance – have developed to prevent it."

Bradford Hesse, chief of health communication and informatics research at The National Cancer Institute, NIH, said, "The National Academy of Sciences maintains a Board on Human System Integration, whose responsibility it is to leverage the capabilities of human factors specialists in monitoring the unanticipated consequences of complex technological systems. The

Board also reviews and curates the methods that can embedded within complex to promote safety and system improvements. In Silicon Valley, these methods are often referred to as 'User-Centered Design' or more colloquially 'Design Thinking.' Unfortunately, resources are not always allocated within the most vital sectors of the economy to self-correct when negative consequences are detected, or more importantly to embed the data-based signal processing systems needed to prevent negative consequences early in their life cycle. My hope is that resources will become more available as the negative consequences of not engaging in cybernetic, sociotechnical monitoring becomes apparent."

A **professor at a major university on the East Coast of the U.S.** wrote, "**1)** Strict liability needs to be placed on the sources of cyber risk, not simply shifting responsibility for risk remediation to consumers. **2)** Basic technologies should be developed to remediate software development processes that preserve vulnerabilities at the level of language primitives (e.g., require type safe languages be used to develop applications used in critical infrastructures), and create new oversight mechanisms allowing non-specialists to make more informed risk decisions. **3)** Government must ensure that market incentives do not propagate vulnerability because of externalities and other misaligned incentives of both IP owners and computer equipment manufacturers (speed to market and features vs. security). **4)** Governments need to ensure the security of critical infrastructures from deliberate cyber disruption. This means that they need to be informed and proactive in identifying risks, measurably mitigating them (or requiring that industry do so), and proactive in assigning intelligence assets to tracking state and non-state actors that seek to exploit cyber vulnerabilities. **5)** USCYBERCOM and the Department of Homeland Security need to undertake better coordination for the cyber defense of the United States. The U.S. should seek collaboration with like-minded countries to internationalize these measures, defending an open internet from authoritarian states seeking to impose 'sovereign control' over data, IP and transport."

Bill Woodcock, executive director at Packet Clearing House, the research organization behind global network development, said, "The European General Data Protection Regulation [GDPR] is the first sign of regulators waking up to the need to protect the public interest in cyberspace. Privacy and control over personal information have been the worst victims of our rush to move everything into the cloud. I believe that the current conflict between state currencies and 'cryptocurrencies' will need to be resolved by regulators soon, and the role of privately mediated transactions will need to be clarified. I believe that one of the most insidious threats we face is the monetized exploitation of our own psychological weaknesses: the creation of AI and deep learning devoted to extracting money from people's needs for social acceptance, addictive behaviors, or insecurities is, essentially, the breeding of predators for whom we are the prey. Five years ago, this basically didn't exist. Now, such systems extract money from the very young, the very old, and the

very credulous; but they're learning quickly, and five years from now, all of us will be within their reach, unable to determine whether we're talking to a real person or being scammed by an AI. This is an area that looks to me to be completely unregulated right now, and the area which most needs regulatory attention."

A **research leader** at one of the top five global technology companies said, "Although we can't restore the world for which we were designed by evolution, we can certainly mitigate our painful transition to the new world and cushion the shocks that we have begun to experience. Restoring Net neutrality could be an example. The EU's GDPR initiative is an experiment in pushing toothpaste back into the tube and bleeding the large tech companies that are rocketing us into the future; we will see how it plays out."

Thomas Streeter, a professor of sociology at the University of Vermont, said, "The protection of an individual's data should be defined strongly as a right, alongside the right to life, liberty, etc. Clearly voluntary 'opt in' to personal data sharing should be the only allowable way for commercial enterprises to gather data, and it should be required by law to be for limited times only (e.g., after three months, the permission to share automatically disappears and the data must be erased). This would change business models, and might cause some businesses (e.g., Facebook) to implode. That would be fine. And yes this would require an enormous amount of aggressive political intervention in the economy that might seem unlikely and would be completely politically unprecedented. The same was said about the likelihood of the election of Donald Trump."

A **postdoctoral fellow at Stanford University** commented, "Create multiple, robust Webs so that we are not reliant on a Net that isn't neutral. Regulate surveillance of content and gathering of metadata beyond simply asking for consent. Encourage the development of communication tools by and for demographics that are generally not served to benefited by them – this needs to be a not-for-profit project and it needs to involve women, minorities, activists and the Global South (these projects exist and they need more funding). Support labor-organizing and rights for workers in the factories making the devices. There should be transparency and audits of hardware and software."

A **technology developer/administrator** said, "More regulation and best practices can help reduce the impacts of cybersecurity events. Creating some set of liquidated damages regulations for industrial equipment and power grid operations should cause insurance companies for these entities to force them to more-secure systems."

A **leader who works at one of the leading global internet administrative organizations** wrote, "Security and authentication measures (e.g., fingerprint or facial

recognition) will improve and be more-user friendly thus allowing stronger measures to be used without unduly burdening the user. Privacy protections should benefit from improved data-protection measures at the software and hardware levels. Legal privacy protection measures will add to a trend toward protecting users' rights."

A **business leader based in North America** wrote, "Adherence to privacy laws, firewalls, role and context authentication, dual authentication and continuously updated encryption and data protection."

Kelly Quinn, a clinical assistant professor at the University of Illinois at Chicago, wrote, "Many digital tools are provided in exchange for personal data – both about the individual and about the individual's activities. More action can be taken to protect the privacy and integrity of this information, both in its collection and in how this data is used. Unfortunately, the proprietary nature of technology development and internet provision has shrouded the ways in which personal data is collected and used. The argument to 'just don't use' digital tools (or the internet) is not an effective means of regulating the power imbalance between providers and users."

Matthew Tsilimigras, a research scientist at the University of North Carolina-Charlotte, said, "We are now beginning to appreciate the potential for harm and possible solutions to address the harms brought about by the increasing presence of digital life. The next decade will see a net improvement in people's well-being when it comes to digital life as this knowledge becomes widely disseminated and actions are taken by cultural, commercial and legislative forces… However, the digital divide is still present and we run the risks now more than ever of alienating and subjugating those without to a bleaker, and bleaker second-class citizen status if access to high-speed, reliable internet is considered a luxury rather than a right."

Guy Levi, director of innovation at the Center for Educational Technolgy-Tel Aviv, said, "Privacy issues should be changed to adjust to the new reality. Behemoths like Google, Facebook and others should be limited and regulated. Education must change for more personalization, etc."

Seth Finkelstein, consulting programmer at Finkelstein Consulting, wrote, "We desperately need legal protections to redress the imbalance of power between large corporations and ordinary people. We're at a stage for 'connectivity' now comparable to the early days of 'industrialization.' Back then, there was the idea of 'If you accept the job, you accept the risk.' That meant if you were maimed or killed by factory machinery, too bad. It wasn't the problem of the 'platform owner,' err, company. And a corresponding type of establishment apologist would similarly offer tips and exhortations to always be watchful in dangerous areas, but eventually just wring their hands that nothing could be done about carelessness or bad luck, and anyway to even try would kill precious

start-ups, err, industrial spirit. An illuminating example of not believing in technological determinism is the issue of copyright. Just as an observation, without taking a position myself on whether the ultimate result is true or not, big media company owners of copyrights believe very many things can be done to migrate the effects of digital life on their business model. They are not simply throwing up their hands and saying nothing can be done, and we shouldn't even try for fear of consequences. Only the little people get that line. The fact that the United States has an extremely weak labor movement, and a press where there's little besides corporate interests, means that this discussion takes place in the U.S. in a very skewed way. It becomes a very financially oriented framework, such as proposing property rights for individuals in their data, or viewing the harms as a market opportunity for other companies. Privacy and data protection laws run into the problem that fundamentally they restrict the ability of a large corporation to profit somehow, which is difficult when politics is dominated by money. But on the other hand, there are frequent calls now for monopoly media companies to use their immense power to directly marginalize fringe ideas. After years of hearing hucksters touting the Internet as letting everyone have a voice, I find it darkly amusing that it's become a moral panic the instant such hucksters weren't the ones shouting loudest. There's not enough space to do a full analysis here. But briefly, I think that conflict is a symptom of a dysfunction in what's supported overall by the social system. If there's only an economy of attention-seeking outrage, that's the problem itself, not having someone pick the correct winner among all the outrage-mongers."

José Estabil, CEO of a biotechnology startup, said, "It depends on what is meant my an 'intervention.' Society has decided – almost everywhere really – that the construction, maintenance and improvement of roads and bridges should be delegated to a government or a public trust. We have not (yet) achieved a similar kind of mechanism for technology. But I hope we do. And soon."

Joe Raimondo, digital CRM leader at Comcast and former CEO, said, "Eventually the need for fair and intelligent propagation of rule sets will take over – slowly and not in an organized fashion. But eventually."

Perry Hewitt, vice president of marketing and digital strategy at ITHAKA, said, "We're now living with a structural lag between the rapidly advancing technology and the means to regulate it – as a society and as individuals. As the risks become more quantifiable, both governments and individuals will take action."

Steve Stroh, technology journalist, said, "Organizations that choose to acquire personal information that is not voluntarily disclosed, should be held liable if that information is leaked / stolen. I'm thinking of the many recent hacks of retailers, and especially the recent credit bureau

debacle. I did not agree to have a retailer retain my (bank) credit card information. I did not individually disclose to a credit bureau my personal information (for them to retain). In most of the cases that I've heard of, the disclosure of personal information was due to negligence on the part of the organization – they were lazy, or cheap, or incompetent. If they were held liable – by regulatory agencies, or sued in a class action lawsuit, *then* they would start caring."

Jamila Michener, an assistant professor of government at Cornell University, wrote, "As far as mitigating potential harms the most important steps are as follows: 1) Rigorous research (qualitative and quantatative) to identify harms. We cannot assume they exist or speculate about what they are. 2) Rigorous research to test the effectiveness of various interventions in reducing said harms. 3) Once we have identified real harms and useful interventions, educational institutions, government and others in positions of power need to disseminate information and resources to parents, educators and ordinary people so that they can implement those interventions to the extent possible."

Joseph A. Konstan, distinguished professor of computer science and engineering at the University of Minnesota, expert in human-computer interaction, commented, "We need to restore a commitment to Net neutrality. We also need to think about re-architecting the internet to remove anonymity from public postings – let's consider what the internet would be like if all messaging were publicly traceable – how well would that help beat back bullying and hate groups? We need tools that allow individuals to see the variety of 'possible digital spaces' they might be in, recognizing the different products, news, commentary, etc., that are out there and prominent to others. We also need tools to help individuals and families set rules around availability and interruption – rules with the flexibility to support emergencies yet the automation to restore levels of human interaction."

Michael R. Nelson, public policy expert with Cloudflare, said, "The most important government intervention is to avoid regulations or lawsuits that would lead to less competition in the IT and telecommunications sectors. Competition drives innovation and leads to more solutions to meet the varied needs of consumers. Too often governments try to pre-select a favored solution, when finding ways to encourage competitive markets that deliver competing solutions is a much better goal."

Adrian Colyer, a business leader/entrepreneur based in Europe, said, "There are actions we can take, but they won't be popular and I think they will need to come in the form of laws and regulations – nothing else will be strong enough to stand in the way of commerce. I'm thinking of privacy and security regulations for example (such as the forthcoming GDPR, and its successors)

as well things like requiring clear labelling or disclosure when media has been digitally manipulated."

4 - Redesign Media Literacy: Formally educate people of all ages about the influences and impacts of digital life on well-being and the way tech systems function, and encourage appropriate, healthy uses

Adriana Labardini Inzunza, commissioner of Mexico's Federal Institute of Telecommunications, said, "The real challenge is reinventing education, learning and teaching programs, reinventing pre-scholars first encounters with IT, educating for the benefits of digital life but also for the risks and perils of an ill use of digital products, combining physical, artistic, athletic, manual skills and training millennials' senses and sensitivity to keep their body, mind and spirit alert, active, receptive and skeptical, to balance online and offline lives and activities, to learn to produce and create works of art, science, technology rather than being consumers only. To innovate, to solve social or collective problems to use digital products as tools not as ends. New education programs, new skills and guidance for parents, employers, entrepreneurs, government officials, should be designed and put in use in order to help humans bring the best of humanity with the aid of technology, with ethics and empathy, with new golden rules of the digital era, to encourage critical analysis, time management, creativity and empathy serious lectures on privacy and data protection and new laws and regulations that may efficiently, if at all possible, create incentives for a healthy lawful use of digital tools and deter harmful, unlawful and abusive use of it to the detriment of society. Education may prove more effective than law enforcement but insufficient, to persuade people in their own best interest to make a responsible use of IoT, AI, digital transactions among others. But a 180-degree change in the law (torts, criminal, labor, copyrights, procedures, class actions, antitrust law) and culture should be implemented to address the challenges and risks of an automated society and economy if humankind intends to remain human, free and civilized."

A **head of research and instruction** at a major U.S. university wrote, "Understanding the strengths, drawbacks and underlying structures of technologies and their applications is crucial – especially for younger people, who might not have alternative mental models, and those less-familiar with tech. But attentiveness to changing habits and what kinds of spaces aren't being created is integral to interventions that will lessen their effects or help recapture kinds of attentiveness that might be otherwise lost."

David Ellis, course director of the Department of Communication Studies at York University-Toronto, said, "There certainly are actions that can be taken to mitigate harms in our digital lives. The challenge is takeup. The first and most important of these actions is: educate thyself. The less

people know about the technologies they use, the more likely they are to be victimized in some fashion or constantly confused and frustrated trying to get what they want. The items needing some helpful explanation range from misguided beliefs about privacy, like 'I've got nothing to hide,' to why VPNs are useful and how they work, along with perspective adjustments about which actors pose a real threat to online welfare. Should hackers top everyone's threat-modeling list or should we leave room up there for Facebook and your ISP? Learning about any technology is tough. Digital technologies are especially so not only because they're mostly hidden from sight, but also because of the industry's big value proposition; ignorance is bliss, whether it be about privacy policies or the details of how services actually function. Consumers have become so accustomed to hearing that their digital life, indeed all of life, must be effortless in every way that little incentive is left to dig for details, even if doing so might improve their welfare."

Brenda M. Michelson, an executive-level technology architect said, "We need (desperately) to build information literacy and critical-thinking skills across the population and improve curation tools without impinging on free speech. Broad education on information literacy and critical thinking can help people discern the validity of information, view multiple sides/perspectives of an issue and consider the motivations of content creators/providers. There should be a developing/refining of our individual habits. Turning off notifications. Giving ourselves digital breaks with other people, doing outdoor activity and so on. Essentially, regaining our attention. As well, we can choose devices and interfaces that augment our everyday experiences while being a present participant in social/work/family situations."

Beth Kanter, an author, trainer, blogger and speaker based in North America, wrote, "We can do a lot more education on the harm that uses of Facebook and our mobile phones can do to our mental and physical health. Folks like former Google design ethicist Tristan Harris and others from the tech industry have brought a lot of this to light. There are also scientists who are studying this, like Gary Small, an author of 'iBrain: Surviving the Technological Alteration of the Modern Mind' and his lab. In addition to educating people about the dangers of improper use of online tech, we need to understand when we're getting addicted and how it is impacting us and learn techniques in how to practice technology wellness. We also need to educate in the workplace as well as in homes and schools. More workplaces in America need to set better limits on employees' after-hours communications. Maybe we should follow France's lead and make after-hours emails and messaging illegal. Schools also need to teach tech wellness to kids, especially today's screenagers."

Silvia Majó-Vazquez, a research fellow at the Reuters Institute for the Study of Journalism, said, "Digital literacy should be a priority in education systems all over the world to enhance

people' skills to cope with potential threads of the digital domain but most of all to make the most out of the digital sphere."

Bouziane Zaid, an associate professor at Al Akhawayn University in Ifrane, Morocco, wrote, "We can educate people more on privacy issues, on how to protect their information and be aware of what they sign off on when they click 'agree' to terms and conditions. We can also pressure governments to be more judicious in their surveillance activity and pressure them to establish mechanisms of oversight to limit any potential abuse of power."

A **professor based in Oceania** wrote, "Technology education must be upgraded and people need to learn the tricks of scammers; hackers; fakers; call-center, email and advertising, scams. All people must have equal access to the same education in hardware, software, skills, knowledge and teachers. All people must have equal access to ISPs, computers, hardware, software, etc. Information technologies must become a human right, just like a living wage must become a human right. [It could be managed by a] worldwide, honest, unbribeable group who will be paid very well – a forensic-audit financial group not controlled by countries or vested interests (not a FIFA or UN) but with equal and diverse numbers of male and female members from across various disciplines. They each must have high level of proven, honest knowledge in their specific area. They might effect recovery of unpaid taxes and stop scams, money laundering and all illegal/dishonest/unethical wealth creation and storage."

Daniel Pimienta, an internet advocate and activist from the Dominican Republic, commented, "The answer is simple: education! The answer is not only simple, but heavily urgent. Without comprehensive information literacy programs people are going to be more and more confused by information technologies."

Erika McGinty, a research scientist, wrote, "Revolutions like the Internet of Things should be better explained, and by neutral or consumer-friendly parties, not just by vendors who dream up stuff to make a profit, whether it's useful or not. There needs to be more education from journalists, nonprofits and government as well as consumer watchdogs about the implications for social interaction, privacy, self-censorship, fear, isolation, safety, empathy, personal control, citizenship, etc., from installing things like Google Voice or Amazon Echo or surveillance cameras or smartphone apps that allow one to control one's heating, radio and so on."

Eileen Rudden, co-founder of LearnLaunch, wrote, "Just as 'digital literacy' is now taught (for example, how to recognize biases in media), so can digital citizenship and digital friendship."

Ginger Paque, a lecturer and researcher with DiploFoundation, wrote, "We, the users, are learning that we have to manage our online lives, and take responsibility for this part of our life. We are learning to teach our children, to evaluate needs and priorities instead of automatically accepting new technologies that are thrust upon us. We might not read every word of the fine print – and too many of us click 'I agree' too easily – but we will demand terms of service and privacy policies in plain, comprehensible, transparent user language and we must begin to make appropriate choices. We are learning that 'free' services are not free – we make sacrifices in return – so we must consider the options before we decide. We will take control of our data, and start making better choices, even though sometimes we really don't have control (e.g., in the U.S., ISPs can sell our browsing data not only without our permission, but without our knowledge). We must learn the power that the consumer wields, and we are learning we cannot trust our lawmakers to make wise decisions for users. As consumers/users wield the power of choice, providers will have to pay attention or lose customers. This may be an optimistic outlook, but it's the only path we have. We haven't always made wise choices in the past, and we won't always make the right decisions in the future. But if we don't learn to protect ourselves and our children we don't have a future. Logically then, we must and we will become better consumers. Another main area of concern revolves around the sociological implications of online presence, both in how that ecosystem itself works, and how it affects our offline sociology. It's coming to a 'do or die' point, the same way offline sexual harassment has. I believe that we are learning to get our priorities straight and learn to blend our online and offline lives in a positive way to our own advantage."

Barry Chudakov, founder and principal of Sertain Research and Streamfuzion Corp., commented, "We are in a new reality with new dimensions and new rules. So our first intervention should be education starting at the primary level and going through all further levels of education and instruction… We must begin to establish some distance of awareness, i.e., enough space between us and our tools to see what we are doing. Time outs and breaks are necessary but are not sufficient. We must become self-aware enough to look around the corners of our tools to see how they are affecting us and influencing us to change our behaviors… The more intelligence we build into digital tools – things that think – the more it is incumbent upon us, especially as parents and educators, to prepare for (understand, outline, delineate) how these tools 'use' their users. We must face the 'us-ness' of our new tools. Increasingly they feel, think and look like us (often using our own image to stand for us). This affects, and will continue to affect our well-being, especially if external algorithms begin to 'hack humanity' and monitor us to get to know us, perhaps better than we know ourselves. Having a Metalife, as I have said before, is a full-time job."

The **director of a psychology research center** said, "We are, as a society, woefully negligent in preparing people, especially young people, to manage technology. This is the equivalent of letting people drive without training or having them jump into the deep end of the pool without a

swimming or lifesaving lesson in sight. Media and technological literacy and digital citizenship training need to be integrated across all grade levels. Media literacy is not just evaluating media content and digital citizenship is not just about cyberbullying. This training needs to be based on: 1) the psychology of human behavior, such as understanding how the brain reacts to virtual behaviors, the cognitive biases that interfere with critical thinking, and an emphasis on self-regulation and self-efficacy, and 2) understanding how technology works at practical and theoretical levels, from privacy settings to algorithms."

Stuart Umpleby, a professor and director of the research program in social and organizational learning at George Washington University, commented, "Algorithms in social media show articles and ads similar to what readers have looked at before. In politics this means people live in different information universes. Algorithms could be used that would present other points of view, but will the 'platforms' find this to be in their interests? Some regulation will likely be necessary. Alt news sites do not present news. Also, some 'science reporting' is by corporations with an interest is a particular point of view. The sources of articles and ads should be clearly stated. How to do this in an environment of free speech and press will require experimentation and clever design. Lessons in understanding media should be offered at all levels of education to help people understand what they are reading and the intent behind it."

John David Smith, coordinator at Shambhala Online, said, "We need new ways to educate people so that they understand the impact of their actions online. A lot of what's going on in the online world is hidden; people need to be able to see it and they need to be educated so that they can see it."

Andy Williamson, CEO of Democratise, said, "We need better education in information literacy; our school curriculum isn't keeping pace with technology and that's to the detriment of all of us. Information is now constantly permeating so many aspects of our lives that it's too important to leave this to chance – we have to know how to qualify, filter, process and accept or dismiss what we're told. It might also be useful to remind people that it's possible to slow down and that a reply a day late is fine because sometimes it's the quality of the response, rather than the speed, that matters."

Craig J. Mathias, principal for the Farpoint Group, wrote, "Apart from education regarding personal responsibility (to use internet-based services in a responsible manner), nothing can be done. We cannot compromise freedom under any circumstances."

Laurie L. Putnam, an educator, librarian, and communications consultant, wrote, "Educators and policymakers can make information literacy a core subject. Information literacy is taught in

many schools and libraries already, but it is rarely given the financial and political support it deserves. As citizens and consumers, we are responsible for knowing how to use digital technology critically and responsibly. This is not just about spotting misinformation or 'fake news'; it's about learning to maintain our well-being when digital technologies are embedded in every aspect of life. We need to understand how to manage our personal data, to protect our privacy, to assess the information we encounter, to communicate effectively. When living offline is not an option, information literacy becomes a basic skill, and we need to build it into our education system. We need programs for adults, too, and public libraries are a natural fit for this task. It's time to take digital information literacy seriously."

Jason Hong, professor at the Human Computer Interaction Institute, Carnegie Mellon University, wrote, "There are three big things people can do to take back control of their time and their attention, and improve well-being. The first is to turn off notifications from apps and services. When I sign up for a new service or install a new app, the first thing I do is figure out how to minimize the number of notifications it sends. The default for most apps is to buzz and make loud sounds when it receives a notification. It turns out that you can often block these notifications or make it so that they silently send notifications, making it so that you don't get interrupted all the time. The second is to decrease use of apps and services that try to monopolize your attention, in particular social media. Learn about the psychological strategies that they use to capture your attention. Put your smartphones away when dining with friends. Also, try reducing your usage of these apps too. You'll find that you're not really missing that much if you reduce your use of Facebook or Snapchat to once a week or less. Focus on the here and now, on the people around you right now, rather than the virtual you. The third is to change how you use these apps. Social media is a lot like TV: you can watch it by yourself, or you can use it as an excuse to get friends to watch things together. In one case, TV is isolating, and in the other case, it is bonding. Instead of mindlessly browsing information about acquaintances, use social media to build or maintain strong relationships. Check in directly with close friends to see how they are doing, or use these social media platforms to coordinate meetups with friends."

Kat Song, communications and digital strategy director at the American Association for the Advancement of Science, wrote, "I suspect that the spiral into digital dependence can be curbed through education and practice. Tell people about the potential harms. Give them ways to prevent or reduce their overuse of devices. Those methods can range from things like apps that shut down your device at certain times, to setting a 'digital sabbath' (times when you and your family are not permitted to use devices), or even asking other parents to bar or limit device use when kids get together."

Jacob Dankasa, a North American researcher, said, "Educate people to use technology in a way that adds value to their lives. This entails knowing how much time one can spend on technology and knowing when to drop your piece of technology and engage in everyday face-to-face human relationship."

Deborah Coe, a coordinator of research services based in the U.S., said, "This is one of those instances of cultural lag in which social change takes a few years (or maybe a generation) to catch up with technological change and make some necessary adaptations. When the automobile was first invented, people didn't cope well. This too shall pass, but only if we help it along with some interventions. Society must teach itself and its newer generations how to do this. We've already seen some good experiments in which people (and especially children) have voluntarily relinquished their cell phones, tablets and computers for a few days. Although they were very distressed at first, after a few days most participants said they were surprised at how much more relaxed and focused they felt."

Yoram Kalman, an associate professor at the Open University of Israel, wrote, "Awareness, training and education are critical for people to understand the benefits and risks of digital life. In particular, I believe that understanding the forces that power digital innovation and adoption of innovations (commercial, economic, psychological, social, etc.) are key to empowering people. Furthermore, carefully considered regulation should be used to protect individuals and organizations from powerful players when market and/or social forces fail to do so."

5 - Recalibrate Expectations: Human-tech coevolution comes at a price. Digital life in the 2000s is no different; people must gradually evolve and adjust to these changes

Uwe Hasebrink, a research scientist based in Europe, commented, "Digital life does not follow a law of nature. It follows 'laws' of economy, sociology, politics, psychology and other disciplines that share the basic assumption that reality is socially constructed. Thus digital life can be shaped along basic values and specific principles and objectives. We cannot not shape digital life."

A **professor of humanities** commented, "Like all radical cultural changes, this one requires new patterns of living and changed social expectations. Experience will teach us most, closely followed by more formal forms of learning."

Eric E Poehler, associate professor of classics at University of Massachusetts-Amherst, commented, "Digital life is part of life. Since the development of the pointed stick, we have been able to surround our technologies with an envelope of social acceptability. We protect ourselves

from physical traffic by rules, signaling devices and dedicated spaces for different means of travel – cars on highways, bikes in bike lanes, pedestrians on sidewalks. All these came after a difficult learning experience of the dangers of automobiles. We created physical buffers, laws and norms of behavior (e.g., around drunk driving). We will in time learn to do the same with internet traffic. We can learn (both as individuals and as a society) to more fully control the speed and volume of information, divert its content onto particular paths, authorize and deauthorize some forms of access and establish sanctions for malpractice."

David Myers, a professor of psychology at Hope College, wrote, "Much as humans flourish when living with an optimal work/life balance, so we will flourish when technology serves us without making us its slave. Thus we need creative minds that can help us intentionally manage our time and priorities accordingly."

An **anonymous respondent** wrote, "**1)** Don't cut taxes. We need more oversight not less in this era. **2)** Social media companies need to hire editors, fact checkers and journalists to invest in truth that has been lost by newspapers/magazines that have gone out of business, just leaving a few media monopolies. **3)** Find ways to financially support truth, journalism and verified information online. Sure everyone can blog on Wordpress, but that isn't the information to view as verified truth. It is opinion. Advertising isn't enough to support sites that require a large staff of people (not bots) to make decisions about what information is legit enough to publish. **4)** Teach kids that digital is a partnership between humans and technology. *Not* a replacement of humans with technology. I know many people believe AI will save us. I've seen early models and they suck. AI will do what it is taught by humans or it teaches itself. AI poses all the same the risks as humans with poor judgment (or possibly more risks) because there are no rules, morals or values to guide decisions with the software platform. **5)** We need more laws about what happens on the internet; Net neutrality-type laws to protect individuals."

Michael Knowles, an entertainer and entrepreneur, said, "The actions that will be taken will be social in nature. Parents and peers will rediscover in-person connections and augment those in-person connections using social media rather than the other way around."

Robert Bell, co-founder of Intelligent Community Forum, wrote, "The interventions will not, for the most part, be technological but social and cultural. The plague of 'phone zombies' crossing streets without looking for traffic and bumping into us on the sidewalk is a marker I watch; I expect that over a matter of years, this behavior will decline because it is socially inept. Equally, we will slowly develop habits and ways of thinking that make us less susceptible to hackers."

David Weinberger, a senior researcher at Harvard's Berkman Klein Center for Internet & Society, said, "In addition to the technical affordances and 'nudges,' we need to teach our children to be kinder. We also learn to be more 'meta,' making explicit norms that geographically local communities can take for granted are shared."

Larry Rosen, a professor emeritus of psychology at California State University-Dominguez Hills known as an international expert on the psychology of technology, wrote, "I have written seven books, each with strategies for healthy technology use. They are being used by many people who have heard me talk either at schools, to parent groups or to general audiences. Key is moderation plus frequent breaks to calm your brain."

David Klann, a technology consultant for the broadcast industry, said, "People need to be reminded to leave their devices on the desk or table, and simply go outside. Not necessarily to interact with other people in person, but to simply be in the elements and step away from the digital world. Here's an exercise I learned at a spiritual retreat many years ago: go outside and focus on a one-square-foot plot of land for 15 minutes. Note all the things you feel, see, hear, smell, or taste in that single square foot. Then spend the next 15 minutes staring up at the sky above the square-foot plot and make a note of all the things you observe in the sky above. This action of leaving the digital world behind for even half an hour can mitigate and relieve some of the stresses imposed by our hyperconnected lives."

An **executive for a major internet business** wrote, "Greater education about information literacy would be helpful. But I do believe that there will soon come a time when people realize that the return on their investment in time and money into being constantly plugged into 'information' is flat or negative and people may become more discerning about the sorts of services they consume."

Frank Odasz, president of Lone Eagle Consulting, commented, "If no one raises the flag on how good people can truly learn to specifically take action to counter all the current negatives online, then the world will continue in a downward spiral… Who will lead the deep research of techno-social psychological impacts, both positive and negative, given Google, Facebook, Apple, Amazon and others have over one-half trillion dollars each? Low-cost, short-term pilot projects can quickly demonstrate what does and doesn't work for incentivizing individual and group *positive* outcomes. Herein lies the rub: Most adults – particularly those in leadership positions – subconsciously avoid 'learning anything they know nothing about,' from Native elders up the ladder to legislators and Congress persons. So, while it might be unlikely that solutions to help, not harm, will come from the top down, it is highly likely they will come from the bottom up. It is just a matter of who and when. I've posted online many grant templates for youth-led local pilot projects. I'm pitching a

'Rogue Scholar' online program based on my 33 years of continuous online teaching and innovation – short e-learning lessons to teach others how to teach online for positive short-term measurable outcomes. For example, Native-American youth suicides are often due to individual's perceived lack of a meaningful role in society and support system for self-esteem. US West funded my Big Sky Telegraph for 10 years; $1.5 million, connecting over 100 one-room schools from 1988-1998, mainly for research and development on whether online markets were going to emerge or not."

Valerie Bock, principal consultant at VCB Consulting, wrote, "I like to remember the power of the off switch. Digital things are electrical things, and we can choose to power them down. Consumers can and should educate themselves about what information they are giving away, and also, on how they can choose to configure their devices to share more or less information. They should make purchases mindfully and refuse to buy products that do not offer them options to configure for more privacy. Of course, there isn't any grabbing back the private data one has mindfully or unwittingly shared, so we need regulations about what can be used in aggregate and what can be used individually. I think it's going to probably take some pretty egregious abuses of personal data before that regulation comes into being, and even then, digital technology often features secret backdoors through which people/organizations may avail themselves of our information illegally."

A **data-quality analyst** from North America said, "Issues with our technology and interactions thereof have been revealed. With the problems out in the open, both the consumers and producers should be shifting the new technologies on the supply-and-demand side to address these issues. New issues will be revealed, adjustments will be made, and (thanks be to the dynamics of the marketplace) technology's continual improvement will keep on going."

A **professor** based in Europe wrote, "Companies and organisations have to take the lead here. Trade Unions (such as they are today) should also take a stand. The erosion of leisure time and the bleeding of work into any and all aspects of life can only be halted by those who are in charge. We need programmes of well-being and self-care that teach us to unplug and walk away. We need workplace policies that define when we are NOT expected (or indeed allowed) to respond to digital communications (and other forms of communication)."

A **principal research technologist** who works for the U.S. government commented, "Mindful assessment of new technology and how we allow it into our lives will help us mitigate negative effects. It is easier to do this when thinking of someone else (e.g., deciding how much 'screen time' your child should have). We could apply the same judgment to our own consumption of media and technology. I recently read an article in which a mother wrote, 'In honesty, my children have to

compete with my phone for my attention.' That kind of self-awareness could lead to developing new habits that help us achieve the relationships we want to have, rather than the ones we default to."

Stephen Downes, a senior research officer at the National Research Council Canada, commented, "We have to recognize that people can be harmed through technology and in particular through the exercise of what some call 'free speech' using technology. Just today there was a story of an innocent man being killed in a SWAT raid that resulted from a dispute between two people playing online games. One of them gave a fake address to another, and the other reported the address to police, which resulted in the raid, and the death. This is a tangible harm caused by 'free speech.' It was a deliberate act, and the speaker will be held accountable for the consequences. We know that speech harms. We know that spreading false beliefs will lead people to act on those beliefs, often to the point of harming themselves and others. We know that spreading hatred and incitement to violence result in hatred and violence. The right to a peaceful life and enjoyment of society are not superseded by the desire to engage in irresponsible use of free speech. There is a clear case for limits to expression online, and people violating those limits ought to be sanctioned. By the same token, though, people need to become more resilient to the effect of online speech and actions. Many of the calls to violence and racism fall on willing ears, and people who are unable to grow and develop through other more peaceful means bond together in hatred to enjoy community, to advance their position in society, and punish people for their imagined misdeeds. We need to give people more to hope for and, frankly, more to lose. If they have an investment in society they won't be so quick to destroy it. Inequality breeds racism and intolerance, and in turn, feeds on it. We need to reverse this."

Avery Holton, an associate professor of communication at the University of Utah, commented, "As with many previous technological evolutions, we are in the midst of the good and the bad of digital and social media. What connects us also divides us, and a large part of the division seems to be mis- and disinformation. These are not new forms of discourse, but the ways in which they spread and infect are new. So while we wrangle with what they are, where they come from and how they affect us, we are simultaneously experimenting with ways to vanquish them. Beginning in 2015, we saw many advances in identifying types and sources of such information. At the tail of 2017, we witnessed Facebook's effort not only to identify mis- and disinformation, but to also provide more factual alternatives. So, in the next year or two, we will likely see the tide turn against this type of content as well as those who spread it. Taking away the power of mis- and disinformation, or at least lessening that its impact, will relieve some levels of stress and reinvigorate to an extent the empowering feeling of digital and social media."

Richard Bennett, a creator of the Wi-Fi MAC protocol and modern Ethernet, commented, "We're still very early in the adoption of digital tools in politics, news gathering and social interaction. An initial bubble of optimism has given way to pessimism as we realize that these technologies were oversold. I suspect that fake news and ideological insularity have always been with us, but weren't as easy to spot as they are now. We will ultimately develop the critical-thinking skills necessary to enjoy the benefits of information abundance, but it's probably going to take another generation. We really have no choice as we're not going back to print media and three TV networks anytime soon. Digital tools have made major impacts in medicine and food production. These developments will continue to improve as long as the fear-mongers don't succeed in killing them, too."

David Cole, a respondent who shared no additional personal details, wrote, "The rise of computational engagement, for all its risks, brings with it the awareness of the need for – if not, for the moment, the experience of – deep transparency. People in the field know we should be using two-factor authentication, but how many of us do so on all our accounts? We know we should be reading our user agreements more closely but how many of us do? As bureaucratic and administrative as these examples may sound, ultimately they are about connecting and managing relationships with people and with services. Mindful application of technology in our lives continues to deliver remarkable efficiencies and experiences. I have deep faith in our ability to redesign an internet that is not based on clicks and impressions and the bundling and resale of profile information."

Serge Marelli, an IT security analyst, wrote, "People need to learn how to use the tools. Some are willing (or equipped) to learn, some are not willing, or possibly ill-equipped to learn. It is a bit like reining in uses of television, or tobacco, some won't try, some will try and give it up, some will become addicted and some will use 'tobacco-addiction' as an excuse. With television, some watch it a few moments a day, some watch it all the time, some select high-value programs, some watch trash (of course, we all define differently what 'trash' means). The same will happen with digital tech, just as television."

Steven Polunsky, a research scientist at Texas A&M University, wrote, "As a society, we must make a concerted effort to increase dialogue, to have people meet other people who are not like them and share their personal stories. As individuals, we must become more open to hear from people with experiences outside of our own, and at the same time apply a greater measure of skepticism to new or unconfirmed information."

David Ellis, Ph.D., course director of the Department of Communication Studies at York University-Toronto, said, "What will it take to make mitigating harms more appealing? For

individual consumers, it's going to take more than blaming our digital woes on the Silicon Valley crowd, however culpable they may be. It's time to look in the mirror and decide for ourselves what we want from the digital life, now that escape is well nigh impossible. Some may stumble on the incentives they need to conduct their lives differently. But most people will need to be influenced by the trickle-down effects of broad social changes, some planned, others unplanned. In the planned category, one area ripe for change is higher education. On thousands of North American campuses, classroom learning has been radically disrupted by the unfettered use of smartphones and laptops to transport students away from the instructor and the course material. The campus takeover by digital and the ensuing plague of inattention has reached crisis proportions. One factor that may shine a cold, clear light on this problem is the discovery by parents of the extent to which their money and family resources are being wasted by their college-age kids. Any potentially reformist ideas will, however, have to face the entrenched assumption by administrators, vendors, students and many educators that more tech in the classroom is always good for business. In the unplanned category, a misguided regulatory decision taken in December 2017 shows how unintended consequences and lots of bad publicity can promote progressive change. That would be the Ajit Pai-led FCC's repeal of the Open Internet Order, and with it the rejection of Network neutrality as part of the US policy framework for broadband. With the ink barely dry, a storm of protest and threatened legal actions has erupted - suggesting the FCC order was politically shortsighted and likely to backfire on its intended beneficiaries. This war over internet gatekeeping, which promises to rage through 2018 and beyond, has had the desirable outcome of making millions of consumers aware of the harms that can be visited on them by their ISP and what's at stake in their digital lives when the regulator sees the public interest exclusively through the eyes of the telecom industry. We can reasonably hope that what began as an arcane policy process will prompt lots of skeptical questioning about digital harms and mitigation, whether through advocacy efforts, political action or casual introspection about our digital future. Not an ideal way to promote public education, but definitely the silver lining in Pai's perverse gesture to 'internet freedom.'"

Jim Rutt, a respondent who shared no additional identifying background, wrote, "I am cautiously optimistic that as the S-curves top out on adoption of social media and smartphones we'll start to develop social norms to minimize the harm and maximize the benefit."

Robert Stratton, cybersecurity entrepreneur, coach and investor, wrote, "There is a loss of online civility even on the part of otherwise decorous people. There are sound arguments for discussing and promulgating social norms of civility and due care in the consumption of online media. This is not to suggest that regulation is the right idea. To the extent that we request online service providers or the government to protect us from unpleasant speech, we are planting the seeds of our own repression and chilling effects. We need to explain just how important it is to verify

information against known valid sources. Reputation systems, even when pseudonymous, can help. If ever there was a time to point out that the speech most deserving of our protection may well be the most unpleasant it is now."

Ian O'Byrne, an assistant professor of education at the College of Charleston, wrote, "For me this answer is both a yes and a no. I never thought I'd say this, but I think it might be based on the age of the individual. I think you're seeing a growing contingent of people who are actively examining or problematizing their use of technology. Possible interventions may include a growing focus on meditation and mindfulness practices. This may also include designating off time, 'screen-free Saturdays,' or making your displays grayscale. This may also include more reading of texts, including philosophy and Stoic-based texts. For some people there is a desire to find balance in these relationships with technology. In many ways it is like the discussions addicts have about their relationships with vices. I also believe that we (if I can lump adults into one box) don't entirely know what the best uses of these tools and platforms may entail. We also don't entirely know what is best for the children and future generations. As we've learned from work by danah boyd and the HOMAGO [Hanging Out, Messing Around and Geeking Out] group, and, as recent anecdotal research suggests, we do not know exactly what the future generations will want or need from these spaces. There is already anecdotal evidence that they do not see much value in the social media that monopolizes the lives of adults. We need to see what impact there is for the individuals that full grow up in the soup that is this digitally connected space."

Vicki Davis, an IT director, teacher and podcaster based in North America, said, "If smartphone companies care about the health and wellness of humans, they will make these things easier. But until then humans must use the greatest software ever invented – their brain – to set healthy boundaries… Businesses that don't respect boundaries will find the best talent goes places where those boundaries are more respected. Rest and sleep are vital needs, as is personal time. Human hamsters on an incessantly-turning wheel don't make great employees. Setting reasonable expectations for email response time and delayed email delivery are things that can help mitigate the incessant barrage of work life on one's personal life. People are used to getting instant answers now, but we must all have healthy boundaries. I will be an excellent employee, however, my family is even more important. Like Gandalf in 'Lord of the Rings,' I will turn things off so that messages 'do not pass' and I can have healthy time off work. Take a digital sabbath: Once a week I put up my phone for a day. I schedule social media updates ahead of time. I do have a worry about when smartphones move into our glasses and contacts. This is why doing these things has to be easier. If we want healthy human beings we need to establish boundaries."

A **retired Web developer** wrote, "The biggest/easiest action that can be taken is to require cell phones be turned off in all public places or have designated cell phone areas. If I can't have a

cigarette, why should they be able to share their phone conversation with me? It would allow people to talk to each other in restaurants. To look up instead of down in parks. To be disconnected for just a short amount of time to enjoy the other things around them."

Fabian Szulanski, a professor at Instituto Tecnológico de Buenos Aires, said, "All is a matter of balance. Programmed digital detox with personalized prompts of digital personal assistants will avoid or dampen side effects such as isolation, nature-deficit disorder, eyesight issues, attention-deficit, anxiety and depression."

Rich Miller, a practice leader and consultant for digital transformation at Telematica, Inc., wrote, "Thoughtful and pragmatic incorporation of legal mechanisms offers a number of opportunities to improve the situation. 1) Establishment of legal liability for software (particularly embedded software) that 'misbehaves' and cannot be updated in the field. This includes punitive measures for faulty software/systems that endanger life (e.g., medical instruments, healthcare systems). 2) Establishment of effective data privacy legislation, appropriate penalties for non-compliance and effective enforcement."

An **anonymous respondent** wrote, "There *are* things that can be put in place, but – outside of the internet stopping – people will find ways around anything others put in place for them. It's like seatbelts in cars. Once, there were no seatbelts and people got hurt a lot. Then there WERE seat belts, but only a few people used them and they were still a lot hurt. Then the industry had the car warn you when you didn't wear your seat belts, and people got around that too by buckling it before they sat down. Then states made it a law and more people used them, but some still didn't. Now kids are growing up who have never NOT used a seat belt and they think it's stupid not to. That's pretty much the steps we have to go through with the internet, but we are still in the 'no seat belts' phase of the story. It's going to take generations to have internet 'seat belts' become a common and accepted thing, and there are going to be millions injured in the meantime."

Edward Tomchin, a retiree, wrote, "Humankind has a quirk. When we discover something new, it seems the first thing we do is abuse ourselves with it. There's a long history of this behavior, so I expect it will be no different with AI or anything else we discover or create. But we always manage to rise above it. I don't see that changing much. In fact, right now we are in the midst of political chaos, but the picture we see around us at this moment is not a foretelling of the future. It is a portrait of what we are leaving behind. We are in the midst of one of the greatest changes in human life we've ever encountered and it's happening at an amazingly fast rate. Yes, there will be some losses because change is a fearsome thing, but we will survive it and like the Phoenix, rise from the ashes of our past."

Anecdotes: Stories About the Impact of Digital Life

While many technology experts, scholars and others have concerns about the overall social, political and economic fallouts from the spread of digital activities, they also tend to report that their own experience of digital life has been positive

Technology experts and scholars have never been at a loss for concerns about the current and future impact of the internet. Over the years of canvassings by Pew Research Center and Elon University's Imagining the Internet Center, many experts have been anxious about the way people's online activities can undermine truth, foment distrust, jeopardize individuals' well-being when it comes to physical and emotional health, enable trolls to weaken democracy and community, compromise human agency as algorithms become embedded in more activities, kill privacy, make institutions less secure, open up larger social divisions as digital divides widen, and wipe out untold numbers of decent-paying jobs.

The experts who participated in this research project on digital life and well-being were asked to share anecdotes about their own personal experiences with digital life. This section of the report shares those observations, the majority of which mostly celebrated the positives of being connected.

Specifically, the participants in the nonscientific canvassing were asked in question three:

> *Please share a brief personal anecdote about how digital life has changed your daily life, your family's life or your friends' lives in regard to well-being – some brief observation about life for self, family or friends. Tell us how this observation or anecdote captures how hyperconnected life changes people's well-being compared to the way life was before digital connectivity existed.*

In their sharing of anecdotes about themselves and others, these respondents wrote about a number of powerful ways digital life makes things better. Some themes:

- **Glorious connectedness:** Many said that the internet has provided one of the greatest boons to individuals: the ability to reach out and connect directly with friends, family, colleagues, knowledge, education, entertainment and more anywhere globally at any time in a nearly free and frictionless manner.

- **Invent, reinvent, innovate:** Digital tools enable people to invent or reinvent their lives and careers. They can also innovate through wide networking with people and information that

allows them to develop businesses, find the perfect job, and meet soulmates, colleagues, new friends and fellow interest-sharers.

- **Life-saving advice and assistance:** People can tap into and share medical, safety and health resources and support at a moment's notice; this is crucial for personal health and a game-changer for people engaged in child and elder care.

- **Efficient transactions:** These experts also hailed the way the internet revolutionizes life logistics and experiences. They cited benefits – including accessing online education, researching purchases, finding the best options for anything, making quick-hit social connections, planning trips, or coordinating activities – which allow people to be more mobile, savvy and globally enriched.

Some of these experts, though, wrote about negative impacts – experienced by themselves or by those around them. Among the themes:

- **Connectedness overload:** Low-friction instant access to nearly everything, anytime, anywhere is causing stress, anxiety, sleeplessness and loss of patience. Some experts noted that they witness people missing out on or diminishing important face-to-face social interactions and experiences. Some also noted that work demands and entertainment lures tug away at users 24/7/365 and that there is a loss of attention to "real life."

- **Trust tensions:** The business model of internet platforms is mostly built on an attention economy that rewards addictive products that heighten users' emotions and perpetuate polarization. In addition, there are concerns among experts about issues of security, surveillance and privacy.

- **Personal identity issues:** Self-promotion, narcissism, click bait, trolling, propaganda and pressures to conform have become dominant in social networks, causing some individuals to experience the loss of self-confidence and self-esteem. This encourages them to lose faith in others and adopt a negative world view.

- **Focus failures:** Digital life fosters shallow engagement with information as people glide through multiple information streams daily, taking little time for reflection. People have a diminishing capacity to concentrate well enough to stay on task and do long-term, deep-dive thinking.

The following graphic rounds up all of these themes in a useful set of details.

Themes about the personal impacts of digital life

THE POSITIVES OF DIGITAL LIFE	+	**Glorious connectedness**	Many argued that the internet has provided one of the greatest boons to individuals: the ability to reach out and connect directly with friends, family, colleagues, knowledge, education, entertainment and more anywhere globally at any time in a nearly free and frictionless manner.
	+	**Invent, reinvent, innovate**	Digital tools enable people to invent or reinvent their lives and careers. They can also innovate through wide networking with people and information that allows them to develop businesses, find the perfect job, and meet soulmates, colleagues, new friends and fellow interest-sharers.
	+	**Life-saving advice and assistance**	People can tap into and share medical, safety and health resources and support at a moment's notice, which is crucial for personal health and a game-changer for people engaged in child and elder care.
	+	**Efficient transactions**	These experts also hailed the way the internet revolutionizes life logistics and experiences. They cited benefits including accessing online education, researching purchases, finding the best options for anything, making quick-hit social connections, planning trips, or coordinating activities – which allow people to be more mobile, savvy and globally enriched.
THE NEGATIVES OF DIGITAL LIFE	–	**Connectedness overload**	Low-friction instant access to nearly everything, anytime, anywhere is causing stress, anxiety, sleeplessness and loss of patience. Some experts noted that they witness people missing out on or diminishing important face-to-face social interactions and experiences. Some also noted that work demands and entertainment lures tug away at users 24/7/365 and that there is a loss of attention to "real life."
	–	**Trust tensions**	The business model of internet platforms is mostly built on an attention economy that rewards addictive products that heighten users' emotions and perpetuate polarization. In addition, there are concerns among experts about issues of security, surveillance and privacy.
	–	**Personal identity issues**	Self-promotion, narcissism, click bait, trolling, propaganda and pressures to conform have become dominant in social networks, causing some individuals to experience the loss of self-confidence and self-esteem. This encourages them to lose faith in others and adopt a negative worldview.
	–	**Focus failures**	Digital life fosters shallow engagement with information as people glide through multiple information streams daily, taking little time for reflection. People have a diminishing capacity to concentrate well enough to stay on task and do long-term, deep-dive thinking.

PEW RESEARCH CENTER and ELON UNIVERSITY'S IMAGINING THE INTERNET CENTER, 2018

The remainder of this report draws from elaboration of these ideas by respondents who shared anecdotes and observations. It is broken into three chapters: **1)** anecdotes and comments about the positives of digital life; **2)** anecdotes and comments about potentially harmful aspects of that life; and **3)** responses in which people's statements or anecdotes were fairly evenly split with both pros and cons of digital life. Some responses are lightly edited for style.

1. The positives of digital life

The greatest share of participants in this canvassing said their own experience and their observed experience among friends and family is that digital life improves many of the dimensions of their work, play and home lives. They cited broad changes for the better as the internet revolutionized everything, from the most pressing intellectual and emotional experiences to some of the most prosaic and everyday aspects of existence.

Louis Rossetto, self-proclaimed "troublemaker" and founder and former editor-in-chief of Wired magazine, summed it all up this way: "Digital technology is so broad today as to encompass almost everything. No product is made today, no person moves today, nothing is collected, analyzed or communicated without some 'digital technology' being an integral part of it. That, in itself, speaks to the overwhelming 'value' of digital technology. It is so useful that in short order it has become an integral part of all of our lives. That doesn't happen because it makes our lives miserable."

Larry Irving, co-founder of The Mobile Alliance for Global Good, wrote, "There is almost no area in which digital technology has not impacted my and my family's life. I work more from home and have more flexibility and a global client base because of digital technology. I monitor my health and keep my physician informed using data technology. My wife has gone back to a graduate school program and is much more connected to school because of technology. My entertainment and reading options have exploded exponentially because of new technologies. Use of home speakers, Internet of Things, AI [artificial intelligence] and other emerging technologies is just impacting my life and likely will become more central. I used to write out first drafts of memos longhand. Increasingly I use a new free beta AI-based transcription service Temi to dictate my first draft and then edit that draft. Even when it's awful, that first draft is better than staring at that blank piece of paper trying to think of something to say. I have numerous meetings with people I don't know or only met once or twice previously. Recently I had a meeting with someone I didn't know well. An app I use Accompany pulled up an email exchange between the two of us a decade ago about an issue we both care about. Accompany also provided me a very recent article where the person I was meeting with discussed the same issue and current concerns. Having that knowledge was incredible useful for our recent meeting and simply could not/would not have been possible without the use of digital technology."

Mike Liebhold, senior researcher and distinguished fellow at the Institute for the Future, wrote, "Almost every member of my family regularly uses the internet to inform or improve aspects of

their well-being: diet, fitness, health, social interaction with family and friends in person and online, education, entertainment, employment, commerce, finance and civic engagement."

William Schrader, the founding CEO of PSINet, wrote, "Every single day: I have private communications with business associates in Europe, Asia, Latin America and in North America, *and* I receive emails or social media notices from my family members and their extended friends, *and* I receive the latest news and alerts from 20 different real news publications (such as the New York Times, Wall Street Journal, Washington Post and the Economist). All of this comes with little effort. *And*, after doing my local security, I can check every public investment I have made anywhere on earth *and* I can check my bank accounts and make transactions I deem of import, *and* I can search for any one or multiple piece of information that I need instantly, with or without Wi-Fi. Yes, I have what I wanted, *everything* at my fingertips. That means information, knowledge, history, ability to transact. I try to *never* do this when others are with me, since I love living in the moment. Since I am alone a lot, I can find the time. But I do not condemn or even slightly criticize people for taking a call, checking a text, reading, etc. What we built is what we wanted. It's just that few people are happier. But, I am OK."

Paul Saffo, a leading Silicon-Valley-based technological forecaster and consulting professor in the School of Engineering at Stanford University, said, "I have had an email address on my business card since 1982, and carry enough electronics on my person to get nervous in lightning storms. Digital connectivity has become like oxygen, utterly essential to my research. The net effect of these innovations has been to tie me more closely to other individuals and extend my interpersonal connections well beyond the pre-internet links of in-person interactions and telecommunications. I have friends – close friends who I have known for well over a decade and with whom I communicate nearly every day. We have never met in-person. In fact, we have never spoken over the phone. At the end of the day, the two of the three highest human desires are the desire to be useful, and the desire to share stories. We have been doing both since our distant ancestors sat around a savanna campfire sharing their days and their dreams. Now, thanks to digital media, the circle around the campfire has grown to encompass (if we wish) all of humanity."

Garland McCoy, president of the Technology Education Institute, said, "I can be a real-time engaged parent, husband, partner, problem solver, counselor, comforter, etc., while traveling anywhere in the world, and – if I am comfortable with a little inconvenience – I can usually manage this real-time interaction for free! Something that was never possible before. No more 'Death of a Salesman.'"

Kyle Rose, principal architect at Akamai Technologies and active Internet Engineering Task Force (IETF) participant, wrote, "There are simply too many things to list here. I'll just hit on

three. I can more easily keep in regular contact with friends in distant places. Those with whom I would have lost most contact (because, really, there's no way I'm going to write letters or spend hours on the phone) I can now maintain a relationship with, sometimes of a fairly deep and interactive nature, via social media. This enables us to pick right up when we do finally see each other in person. Technology eases the difficulties of day-to-day life. Because of the internet, I have access to virtually all of recorded music at all times. I can get up-to-date maps and traffic data to avoid incidents. I can order food, groceries or a taxi, obtain up-to-date information about my flight status, and navigate foreign cities via public transit all from my phone with a few taps of my finger. Finally and relatedly, how the hell did I ever learn anything before the internet? The card catalog? Virtually all of human knowledge is at my fingertips at all times. It is rare that I ask a question of fact that someone hasn't yet answered, and now many of those answers are available to anyone with access to a search engine. The impact of all of these is profoundly positive. And this is only a taste of what the internet, and technological advances in general, promise."

Fred Davis, a futurist/consultant based in North America, wrote, "Messaging apps allow me to connect with people who have given me support, provided a chance to talk about life's challenges, seek advice and many other things. Access to people is simplified. Chat apps (unlike Facebook) provide a one-on-one connection with another person, which can be more personal, human and healing than posting on social networks. I have been using a Fitbit for a number of years. I have had a heart attack and triple bypass and am pre-diabetic. Getting regular exercise is important, and my Fitbit helps me set and attain fitness goals much more easily than before. The ability to monitor and track my sleep helps me take actions to get better sleep, which definitely increases well-being. By connecting to my Fitbit scale I can also track my weight and tie it to my exercise goals. My Fitbit can connect to a Dexcom blood sugar-testing device that can test blood sugar every five minutes, which is extremely helpful in managing my pre-diabetes."

These one-liners from **anonymous** respondents hit on a number of different positive themes:

- "I can get answers to questions about almost anything just by asking my telephone."
- "I can save money on everything, including clothing and shoes, airfares, hotels and eat at better restaurants and drink better wine."
- "Navigation via car has dramatically improved, with accurate up-to-date traffic information and destination wayfinding."
- "Digital life is being able to speak and see someone – regardless of where you are – on a phone you carry on your person."
- "Most people I have dated and approximately all of my friends knew me on the internet first; before such digital connectivity I would have just been lonely."

- "Sharing photos of new generations instantly with loved ones on the other side of the world and using video and chat to send/receive money; to joke, to tease, to mourn."
- "My son has grown up in a world in which he will never be lost; he will never be without a person to talk to; he will never be stopped from searching for an answer to a query."
- "I work remotely for a company halfway around the world, and so does my partner. No need to be at a main office."
- "The diffusion of webinars allows me to participate in many events organized in different countries without having to travel to them."
- "Digital technology allows me to have better knowledge that empowers me to better support my own health when I face challenges."
- "My job didn't exist 15 years ago. I am a digital content manager."
- "It means that we can participate in important moments that time and distance barred us from in the past."
- "I feel more supported in good times and bad and laugh more than before I was connected online."

Here is a roundup of the many ways these experts described the benefits they get and the benefits they observe.

Family enrichment and enhancement

Pamela Rutledge, director of the Media Psychology Research Center, said, "My 90-year-old father was on Facebook for the sole purpose of connecting with kids and grandkids who were scattered across the country. Reading and commenting on their posts gave him the ability to participate in the process of their lives. Knowing what the family members were doing increased his sense of involvement and the overall intimacy he experienced with them all. This familiarity also jump-started any family gathering, keeping people who were geographically disparate from feeling like relative strangers and allowing relationships to be more immediately meaningful. Texting in all forms serves the same purpose. Closeness in relationships is achieved by the frequency of contact. The human brain reacts to virtual contact as if it were real, releasing the same neurotransmitters of positive emotion and reward as if people were face to face. Texting allows for the multiple touchpoints, the sharing of life's process and the reassurance of connection. These experiences replicate the behaviors that developmental psychologist Mary Ainsworth described in her ground-breaking work on attachment theory and how people form a secure attachment style, essential to emotional well-being."

Stowe Boyd, managing director at Work Futures, said, "The simplest anecdote is about keeping a family messaging chat open with my wife and children. My kids – both in their 20s – live in

Brooklyn, which is close to where we live, but over an hour away. However, we all participate in the chat, often several times in a day. We share pictures, links, stories, plans. It is simply much lower friction than how I managed to remain in contact – or didn't, really – with my parents when I was in my 20s. Then it was an occasional phone call, visits when possible, but it was pretty tenuous. And I had what most of my contacts considered an unusually close and caring relationship with my folks. I wouldn't say my family today is *hyperconnected*, but we certainly remain *very* connected, where scarcely a day passes without some interaction between all of us despite the physical distance involved. And this has allowed an extra richness to my life, and I guess theirs, a counter to the possible distance that could otherwise grow in our relations because of the hour of travel that separates us."

David Weinberger, a senior researcher at Harvard University's Berkman Klein Center for Internet & Society, said, "The most obvious [difference of digital life] for many of us, I'm sure, is the lowering of the barrier to communication: I am in closer touch with my family – grown kids, siblings, in-laws, the whole group – because we can communicate with everything from texts to video calls. We support one another better and know our daily lives better than we could before."

Sonia Jorge, executive director of the Alliance for Affordable Internet and head of digital inclusion programs at the Web Foundation, said, "Regardless of where I am, my kids can reach me to talk, text me a message to ask questions, help sort out a plan, to tell me about their day, their worries, I can help them with homework or even music practice over video! And, as all mothers, I have often 'saved' many situations! Once I got a message from a school in the middle of an important business meeting and managed to sort the situation without any major issue, and all from a different continent! The ability to stay connected as needed is so important for me and it allows me to be closer, to be there! I cannot imagine [life] otherwise and this allows me to do what I do in ways that would have been very hard before digital connectivity."

Steve Stroh, technology journalist, said, "Two observations. The first is that one of the regrets of my life is that I didn't work hard enough to stay in touch with all of my family and friends as I moved away from my hometown and got involved in my career. Thus, many of my family and friends that were once dear to me are now estranged – entirely my fault. In my daughter's generation (born in the 1990s), with social media like Facebook, etc., my daughter's generation and beyond, they will never get entirely out of touch with family and friends (unless they really want to). They'll know about significant events in their friends' and family's lives as things happen, and can always reach out because there's a consistent point of contact – the social media messaging, 'stable' phone numbers such as mobile, email, etc. The second is that my wife and I maintain a near-daily 'running conversation' with my daughter who's moved away via three-way 'text' messaging. We often share photos (of the family pets, as it turns out) and let each other know

about important or unimportant – perhaps funny – things that are going on in our lives. So the three of us are never really out of touch, which is a wonderful, wonderful thing. I wish I could do this with MY father (who is, alas, very technophobic)."

Maureen Cooney, head of privacy at Sprint, commented, "My mother, who is in her 80s, lives on her own and is a technology leader in our family. Her adoption of cellphone use for calls, texting, email, FaceTime, and photo-sharing, daily use of an iPad and computer to play games and to communicate, participation in social media via Facebook, managing her finances, and even device control in her home via internet connected technology, as well as for entertainment through an Amazon Echo, [which] keeps her connected to us and the wider world as she ages, raising her feelings of confidence, safety, activity and independence. It lets family and friends easily connect with her in many ways in real time, which otherwise would not be the case."

Richard Sambrook, professor of journalism at Cardiff University in the United Kingdom, wrote, "Very simply, I can talk to and see my daughter on the other side of the world at low or zero cost via video/smartphone technology in a way that was unthinkable a decade or more ago. It helps hold families together."

Perry Hewitt, vice president of marketing and digital strategy at ITHAKA, said, "We live in an aging society; in the developed world, the population is getting older, people are living longer, and fertility rates are falling. Here in the U.S., where families can be geographically dispersed and family-leave policies minimal, caring for older relatives is difficult. Our family has benefitted from the many technology advances in elder care from cameras to robots to medication reminders to video calling. There is so much available to track critical metrics and improve quality of life – for the elderly and their tapped-out caregivers. I believe we're still in the infancy of technologies that can improve medical compliance and personal safety, and combat a scourge many older Americans face: loneliness."

Mary Chayko, a professor at the Rutgers University's School of Communication and Information, wrote, "My family and I now stay in contact via an unending series of group texts. While we would have remained connected via letters or phone calls in a pre-digital time, this allows the simpler, more convenient and more frequent sharing of moments both incidental and more meaningful, and keeps us consistently in one another's minds and hearts."

Alex Halavais, director of the M.A. in social technologies at Arizona State University, said, "We have two children in elementary school. It starts at the same time each day and ends at the same time. The children are generally out of touch with the family during this period. This would not have been unusual when I was in elementary school or when my parents were in elementary

school, but the other institutions in our lives have changed this. We have shared family calendars that show who needs to be where and when, but these change with some consistency. While my partner and I both have busy careers, they never fall within clearly defined work hours, and mobile technologies mean that our everyday social and business lives are weaved together rather than blocked in clear periods. Time has changed, except for the kids' grade school. It remains anchored in one position: the 20th century."

Eelco Herder, an assistant professor of computer science whose focus is on personalization and privacy at Radboud Universiteit Nijmegen in the Netherlands, wrote, "My husband and I live relatively far away (about two to five hours) from our families and our friends live in several countries. Facebook makes it easier to stay in touch with them, to inform them about important events, to show pictures of our daily lives, and – in return – to be informed about things that matter to them. For me, my circle of online friends has evolved from mainly 'online contacts' in the mid-2000s to people whom I know in daily life. As a result, if we meet friends after a year or so without contact, we do not need to give an overview of last year, but just continue the conversation and play a board game. It is also easier now to stay in touch with a larger number of people than in earlier days. Apps like WhatsApp allow us to have daily contact with our families, simply by exchanging short messages or sending quick pictures. This interaction does not replace phone calls and visits, but complements them."

Nathaniel Borenstein, chief scientist at Mimecast, said, "In the 1980s and early 90s, people asked me why I cared so much about advancing the capacities of email. My usual reply: 'Some day I will have grandchildren, and I want to get pictures of them right away, by email.' This dream came true when I received an email that contained a sonogram image of my twin granddaughters when they were each no bigger than a few cells. I had expected those first pictures to be considerably cuter. Even though I was an evangelist for the future of communication technology, that technology exceeded my wildest imaginings."

Greg Shannon, chief scientist for the CERT Division at Carnegie Mellon University's Software Engineering Institute, commented, "When I call my dad, who is hard of hearing, the real-time network-enabled transcription service kicks in so that he can understand what I'm saying by reading the words on his screen. This dramatically enhances the quality of our conversation and allows us to be more connected. I'm sure it does wonders for his general health at 90. Our three sons all work in/around software. Their minds are filled with notions of programming frameworks, database schemes and abstract models of what data and interactions mean. It's [a] world that their grandparents can't comprehend, and even their aunts and uncles are confused about what they do. Many of their childhood friends are far removed from these conceptualizations of work and value. I am not sure how it affects their well-being per se, but the notion of a shared sense of what work

means seems weakened. Living and working in multiple places (Ohio, Pennsylvania, New Mexico) is possible since we can digitally maintain social and business connections remotely and asynchronously. Without such digitally enabled efficiencies it would be very challenging to run such a rich life."

Srinivasan Ramani, a retired research scientist and professor, said, "It was in 1993. My daughter left school in Bombay and moved to college in the U.S. Telecommunication in India was quite bad in those days. The number of telephones, both landline and cellular, was about 3 million. (Compare with the billion or so cellphones we have in the same country now!) I knew it would be difficult for my daughter to call us back soon after arrival at the college, and so had asked her to get access to internet on campus and contact us through email and chat. She did that within hours of arrival. My wife had, to that point, carefully stayed away from the dial-up terminal I had on my study table at home for years. Now, she suddenly demanded to be introduced to the system. She demonstrated that given the right motivation, people can learn to use a dial-up terminal for email and internet chat in two days at the most! Our daughter was, for the next four years, our daughter on the Net!"

Claudia L'Amoreaux, digital consultant, wrote, "I started using videoconferencing early. First I used a black-and-white video phone that sent a still image every 5 seconds or so. Friends and I got our hands on one and did some fun experiments with artist techies at the Electronic Cafe in Los Angeles. Later I used Cornell's CU-SeeMe videoconferencing. A real turning point for me was using the high-end PictureTel videoconferencing system in the early '90s. When the PictureTel staff dialed up and connected me to a person in New York City (I was in Monterey, California), as I said hello, tears came involuntarily to my eyes; the intimacy was so unexpected, I was overwhelmed with this encounter with a stranger. Fast forward to five years ago. My 85-year-old mother had a recurrence of cancer. We lived many miles apart. On one of my visits, we went to the phone store and I helped her pick out her first iPhone. It was so awesome to watch her learn to text with her friends. I could FaceTime her from my home while I got my life in order so I could return to take care of her. That phone was a literal lifeline during her last months – a source of joy, a tool for coordinating her care, and a reassurance for me that I could actually see daily how she was doing. I think of all the technology in our lives, videoconferencing technology contributes in a profound way to my well-being, bringing me closer to dear family and friends who live at a distance, or even just across the bay like my daughter does. I love it when we both have time to just hang out together via FaceTime when we can't be there in person."

Kirsten Brodbeck-Kenney, a director, said, "Thanks to social media and video chatting, my parents have been able to be very involved in my child's life in spite of living on the other side of

the country. She is only two and a half, but she knows their faces and voices and feels connected to them, even though she's only met them a handful of times."

Work creator, enabler and enhancer

Dewayne Hendricks, CEO of Tetherless Access, said, "Living a digital life has made it possible to be self-sustaining financially. I spend a great deal of my day online, and being hyperconnected makes it possible find all the things I need to have a decent quality of life. The type of life I'm leading now would not have been possible 30 years ago. I take comfort in the fact that I've had a hand in shaping a part of this thriving digital Web."

Michael Rogers, a futurist based in North America, said, "I now live half the year in the Sicilian farm country where, thanks to wireless internet access, I can do most of my work. Ten years ago that would have been quite impossible. One of the things I most like about Sicily (besides the obvious attractions) is that while there is plenty of Facebook and email and Twitter, the 'digital lifestyle' has not colored private and public life so much as it has in my other home, New York City. Sicily remains a far more face-to-face culture. Why that is the case and how long it will continue is a longer story, but it is ironic that I'm using the new digital tools to avoid the side effects of those same tools."

Larry Roberts, Internet Hall of Fame member, original ARPANET leader, now CEO/CFO/CTO of FSA Technologies, Inc., said, "As I do have 100 Mbps of home internet access, I can mostly work at home. However, file sizes that I need to receive today of 60 MB need Google Drive to deliver, as email capacity is in the dark ages. And the sizes grow every year. Email must adapt as these demands grow and TCP [Transmission Control Protocol] transfer speed also needs to increase as it is stuck in the 1990s at 20-30 Mbps. As shopping has also gone digital, package delivery requiring signature can be easily included when working at home, whereas it would become a major problem otherwise. In fact, work can be seamlessly intermixed with running a household. Eliminating commuting and fixed work hours allows working a 12-hour day (which I need). Thus, with increased internet capacity at home, more work can be done with far less stress for those workers not tied to hardware in the office."

James Blodgett, an advisory board member with the Lifeboat Foundation, wrote, "Important work is shared. When several string theorists published several papers predicting black hole production at particle colliders, I became involved with the collider controversy. The original safety considerations had glaring holes. … I made contacts with safety experts and scientists who were also concerned. I started a Global Risk Reduction special interest group in Mensa, I became an advisory board member of the Lifeboat Foundation (one of thousands), and I participated in

writing petitions and contacting people. … The main thing we accomplished was to get CERN, the organization sponsoring the then-upcoming Large Hadron Collider, to do a second safety study."

Marshall Kirk McKusick, computer scientist, said, "Today I have worked on a problem in my open-source community (FreeBSD) in which over the past 24 hours has involved colleagues in 10 time zones, including Ukraine, Germany, United Kingdom, Massachusetts, Iowa, California, Hawaii, Japan, Australia and India through a combination of email, messaging and IRC [Internet Relay Chat]. This would have been impossible before the internet."

Jordan LaBouff, associate professor of psychology at the University of Maine, commented, "There are so many ways, from allowing me to stay connected to my family and other relationships while I travel for work and research, to being able to translate or navigate on the fly in difficult cross-cultural situations. The one that springs to mind is actually my wife's work experience. Two years ago, due in part to the challenges of living with multiple chronic health conditions, my wife left her successful job as a cell technologist at a local hospital to pursue digital journalism. It has allowed her to work from home and write for a large public audience about research surrounding bipolar disorder. This digital environment provides her employment, and her writing supports thousands of people every week who read her research (that she accesses digitally) and writing and who get social support and well-being tips from it. It's a remarkable way the digital world has improved our physical one."

Tom Wolzien, chairman at The Video Call Center LLC, said, "My family's creation of The Video Call Center to produce broadcast-quality television from the 4 billion global smartphones (and related patents and other intellectual property to make it reliable and cost effective) has enabled a flattening of traditional live video access, enabling programs based on zero-cost live remotes from about anywhere on the planet without field origination, transport, or control room costs. This means that any media organization can put about anyone on the air from anywhere, restricted only by the depth of the producer's contact list."

Jane Elizabeth, director of the accountability journalism program at the American Press Institute, wrote, "Digital technology has allowed my small non-profit organization to work efficiently and effectively from wherever we are in the world. For non-profits and even small for-profit organizations, you just can't overstate the positive benefits of this type of mobility. There are absolute cost savings in overhead, travel, hourly wages. And there are qualitative benefits in employee work-life balance, productivity and emotional health."

Jeremiah Foster, an open-source technologist at the GENIVI Alliance, said, "I lived and worked in Sweden for about 15 years. Recently I moved back to the United States to be with family since

I'm originally from the U.S. I'm able to keep my employment, including my salary, my title and my day-to-day work while living thousands of miles away from the company I work for."

Eugene Daniel, a young professional based in the United States, said, "Digital technology impacts every aspect of my daily life. As a member of the media, my job depends on technology (telecommunications, social media, internet). As a person who lives apart from family and loved ones, I depend on digital communication to stay in touch – including frequently connecting on FaceTime with my girlfriend. The uses are endless."

Devin Fidler, a futurist and consultant based in the U.S., commented, "Sites like Upwork have allowed Rethinkery Labs to routinely pull together 'flash teams' of colleagues, support and expert advisers in a way that accomplishes many tasks more efficiently than would have been humanly possible before coordination platforms."

Frank Feather, a business futurist and strategist with a focus on digital transformation, commented, "Technology allowed me to quit commuting – which is asinine in this era – to quit my career job, and to become a full-time consultant, thus allowing me to help far more organizations on a freelance-anywhere basis. This has been most fulfilling. Similarly, my children have built worldwide networks of friends and fellow students. We have two adopted daughters, and the internet has allowed one of them to find and connect with her birth family in China. None of this would be possible without the internet. The internet unifies people and combines ideas very easily."

Yoram Kalman, an associate professor at the Open University of Israel, wrote, "Digital technology freed me from having to spend all of my work hours in the office. I have been telecommuting and working from home at least part of the week since the late '90s. That would not have been possible without the advent of digital communication. It allowed me to better integrate work, family commitments, leisure, health challenges of self, of children and of elderly parents, social commitments, etc. Consequently, my work is more productive. Furthermore, the ability to work across geographical and national borders opened new opportunities that made my work more exciting and fulfilling. Throughout this time, I had to learn and relearn how to use communication technologies in ways that empower me, and how to minimize the harm they cause. It is an ongoing learning challenge."

Charlie Firestone, executive director of the Aspen Institute's communications and society program, said, "I run an office of seven people. I was able to move from Washington, D.C., to California with little detriment, mostly due to video-conferencing. In our case it is Skype for Business that puts each employee a touch of a button away, and the video changes the interaction

from simply voice calls or email. I see video calls, a la FaceTime or Skype to be a common activity of the future in business."

Allen G. Taylor, an author and SQL [Structured Query Language] teacher with Pioneer Academy, said, "Digital technology has given me opportunities that were not possible before the digital revolution began. A vast array of career opportunities opened up in a variety of fields. I became a digital design engineer and moved from there into a variety of related professions. The convenience of digital devices such as personal computers and smartphones has enhanced life greatly, both for me and for every member of my family."

Adam Montville, a vice president at the Center for Internet Security, said, "I have the privilege of working from home each and every day. While there are some aspects of office life I miss, the truth is that technology has made this possible. For our family, this has been immeasurably valuable. I can work more productively at different times of day, all while maintaining healthy boundaries for work/life balance (which really isn't about hard boundaries as much as it is about unobtrusively blending the two). Before such technology existed, I had to commute. I had to be tied down to a specific schedule each and every day. I couldn't connect to colleagues from a mountainside or a sailboat. It just wasn't possible."

Ann Adams, a technical writer based in North America, said, "It gave me a profession; one that did not exist when I was growing up."

Vincent Alcazar, director at Vincent Alcazar LLC, wrote, "The growing mobility of labor cannot be underestimated, and the primary enabler is the gig economy with the internet as its engine. The gig economy only grows from here, as does its entwinement within people's lives."

Health and wellness aid

Avery Holton, an associate professor of communication at The University of Utah, commented, "As someone who has twice experienced the impact of cancer, once at the beginning of digital and social media and once in 2016, I feel more empowered by the ability to be transparent and accepted. Yes, we all still enjoy sharing those moments in our lives that give off the best appearance, but the stigma of sharing experiences of disease or pain or loss has lessened. More and more, we are encouraged by the actions or the postings of others to share our tougher experiences and to, if we so wish, build a community around those experiences. The first time I went through cancer, I felt lost and disconnected and without voice. This time, though it admittedly took some coaxing from friends and other supporters, I shared my experience and my recovery. That really

helped me through the process and into a quicker, more lasting mental, emotional and physical recovery."

Susan Price, lead experience strategist at the United Services Automobile Association (USAA), commented, "My husband had a stroke last year. My online network and digital tools made it easy to share the event, his progress, my stress and feelings, for others to empathize and share resources and advice. I found myself carefully segregating my communications by channel, moderating the degree of honesty according to the size and makeup of the group. I report to the largest group in Facebook 'sanitized' updates of mostly hopeful progress reports and vignettes that show me or my husband in a flattering or inspirational light. I avoid upsetting others with starkly honest or too-revealing stories of my own or my husband's pain, frustration or lack of coping. My husband is aware of my propensity to share, and has asked directly when we're discussing a fraught situation, 'This isn't going on Facebook, is it? Good!' But he suggested my posting and sharing some achievements. Because of its ubiquity and reach, Facebook helped me identify select others in my network – many of whom I hadn't spoken with in 10 to 20 years – who had directly relevant experience with caregiving of stroke survivors and adjusting when a partner suffers a severe health crisis. With those found veterans, I moved the discussion to more private channels such as Facebook Messenger, email or phone to share more honestly my negative feelings, fears and pain, and received directly helpful specific advice, support and resources. I've also used caregiver forums to connect with quickly available communities of peers in situations much closer to my own."

Gina Neff, an associate professor and senior research fellow at the Oxford Internet Institute, said, "Digital technology has been a godsend for care-givers, allowing people to coordinate their efforts to help during cancer treatment, when a newborn arrives, or during a health crisis. Apps and websites cannot replace the communities that have always connected and supported us, but they can help diverse and dispersed groups coordinate care in unprecedented ways."

Bradford Hesse, chief of health communication and informatics research at the National Cancer Institute at the National Institutes of Health (NIH), said, "I now stay in closer contact with my healthcare provider than I ever have before. If I have a question, I can ask it through secure messaging. If I want to evaluate my own recent blood panels for areas of concern or progress, I can do that online through a secure portal. Robocalls to my house from my provider as well as text messages to my phone ensure that I do not miss a recommended cancer screening. I watch my diet more rigorously with the help of a diet app on my smartphone equipped with camera to retrieve caloric/nutritional information, and I monitor my exercise goals through the use of my Apple Watch wearable. If I have a complaint, it is usually because the ecosystem of medicine is still not connected enough. There are laggards who resist sharing my electronic health record data with

specialists as needed. There is 20th-century thinking that prevents these digital technologies from being fully integrated into the medical system in ways that will be cost-efficient, interoperable, empowering and truly usable."

Thomas Lenzo, a respondent who shared no additional identifying details, commented, "Digital technology has facilitated my management of various aspects of my healthcare. I am able to schedule appointments and order prescription refills online, at any time of day. I can get detailed text or video information about health issues from trusted sources. I have access via portals to my health records. I also tell family and friends how they can use digital technology to impact their health."

Ed Black, president and CEO of the Computer & Communications Industry Association, said, "The ability to monitor the medical records, procedures, medicines of a loved one remotely provides opportunity for quality oversight and rapid response, in contrast to being tied to hospital visits and uncertainty."

Gary L. Kreps, distinguished professor and director of the Center for Health and Risk Communication at George Mason University, wrote, "My family and I use wearable fitness trackers that tally our daily exercise behaviors (steps). This has influenced both our awareness of our physical activity and motivation to exercise regularly. We strive to accomplish our 10,000 daily steps! We also compare our exercise levels and encourage each other to engage in physical activity. We now seek opportunities to exercise together to achieve our activity goals. This has improved our overall physical activity, fitness and health."

Kevin J. Payne, founder of Chronic Cow LLC, said, "Since I research the effects of chronic illness and live with multiple sclerosis, I have a particular interest in using these technologies to monitor and evaluate my condition, keep up on the latest research, and connect with others – both professionals and others living with chronic conditions. My life has been radically affected by these burgeoning technologies on all these fronts. It allows me to collect my own data, blend it with other datasets and generate and test real-time predictive algorithms. I have a far better understanding of my condition, especially as it is baselined against relevant populations. I not only get access to cutting edge pre-print research, but I've also been able to widen my professional network by communicating with the researchers. And my involvement with patient communities has enriched my life in many ways."

David Myers, a professor of psychology at Hope College, wrote, "As a person with hearing loss and an advocate for a hearing-assistive technology that has great promise (www.hearingloop.org), the internet has networked me with kindred spirit advocates nationwide (also via 19,898 emails I

have sent and 18,516 received with the words 'hearing' and 'loop'). Together, our internet-facilitated 'hearing loop' advocacy has led to thousands of newly equipped facilities, from home TV rooms to worship places to auditoriums to airports (and New York City subway booths and new taxis). And more progress is on the horizon. Supported by digital technology, we are making a better world for people with hearing loss."

Bob Frankston, a technologist based in North America, said, "I once had a rash and my GP [doctor in general practice] wanted to look it at. Fortunately we had a friend in common who was able to forward a simple digital picture I took and quickly resolved the issue. It's a reminder that digital health doesn't have to be complex and expensive. Sending a picture is simple and inexpensive yet can make a big difference – a huge benefit vs. cost. We need to appreciate the value of the mundane rather than focusing on the flashy stories."

Doug Breitbart, co-founder and co-director of The Values Foundation, said, "In my life I have experienced significant adverse changes and circumstance, living situation and health. Virtual connectivity via the internet has enabled me to establish networks of connections, collaborative communities and new friendships and relationships with people around the world."

Leah Robin, a health scientist based in North America, said, "My family has a genetic form of anemia that is very rare. Because of digital technology we've been able to make contact with researchers, take advantage of on-going research, and provide and receive support from other patients from around the world. The impact has been, at times, lifesaving for my family members."

Christopher Bull, a university librarian, said, "I had an itchy rash on my hands. Found articles on the internet which suggested using witch hazel. No rash, no itch."

Community lifeline

Ethan Zuckerman, director of the Center for Civic Media at MIT, wrote, "I went through a divorce recently and wrote about my experiences online. While there are few folks in my immediate community who are going through divorce, I found several friends in other cities in my extended circles who had excellent support and advice. One of the most supportive individuals was an acquaintance from college who was not a close friend, but who stepped up on Facebook and was a wonderful support to me from halfway around the country."

Anne Collier, consultant and executive at The Net Safety Collaborative, said, "I 'talk' with people all over the world on a daily basis on Twitter – seeing, learning from, supporting and spreading what's meaningful to them in their work and lives. It's a tremendous source of inspiration for me.

Together, we grow intelligence, connect up one another's work and support positive social change just by doing our work, following one another and sharing what's meaningful more widely."

Kathryn Campbell, a digital experience design consultant, said, "I have a young friend who lives in another state in a rural area. Over time, I have realized from their social media posts that he/she is emerging as gender non-conforming (probably transsexual). In the past, this is a journey that I would probably not have known about, especially since his/her immediate family is very conservative and have not accepted this facet of the young person's identity. I am so grateful to have been included in this revelation so I can offer my unconditional love and support. And I am even more grateful that a person who in the past would have felt isolated, unnatural, and broken now knows that they are in fact part of a global community. He/she can find and utilize peer support groups as well as myriad medical, psychological and spiritual resources that would not have been available to someone in a small town in the past. I believe this will probably save lives. I definitely hope that it will help increase our ability as a society to accept others who don't conform to our preconceived notions of what is normal."

Ana Cristina Amoroso das Neves, director of the department for the information society at Fundação para a Ciência e a Tecnologia, said, "The smartphone has become a part of my family life. The current organisation we have and the data we can share more than modified the way we interact. There is no waste of time and therefore we all gain efficiency in our daily life. The dawn of Internet of Things is already embedded. … If there is an electricity glitch, we cannot even think how will we survive due to the new paradigm we have in our lives. Hyperconnection is part of my family and friends' well-being. It is nothing that can be compared with the life my parents had. I wonder how I could have survived in that society, living before total digital connectivity existed, even when it had just started and was not spread yet."

Deborah Lupton, a professor at University of Canberra's News & Media Research Centre, said, "I live in a vast continent (Australia) where academics are scattered many kilometres from each other, and it is a very long, expensive and exhausting plane ride from my colleagues in the Northern Hemisphere. However, I have extensive networks with my colleagues on Twitter and Facebook. I enjoy taking time out to chat with them, sharing professional and also some personal information regularly. It makes me feel less isolated and more easily able to keep in contact with my academic network. Nothing beats face-to-face encounters, but social media and emails, as well as the occasional use of Skype, is a far better way to maintain these contacts than letter writing or faxing, which is how we did things before digital media."

Andrew Czernek, a former vice president of technology at a personal computer company, wrote, "Email and websites were the first place that we were able to see family and people with the same

interests share information rapidly. Twenty years ago I set up two websites – one for pilots and one for family members – to share photos, family tree[s] and technical information. Both have been resounding successes in getting people together. For family, it has allowed easy distribution of ancestor's photos and extension of a family tree from several hundred people to more than 3,000. About every five years I have to take our family tree back to the calligrapher to add ancestors that we didn't know about – including, recently, a soldier who was with Gen. George Washington at Valley Forge. Now we're starting to see services like voice-controlled appliances in the home and the extension of cellphone service throughout the world. Forty years ago I taught in a small Congo town that was isolated, with no phone or TV service. Today Kasongo can be reached by cellphone and the regional center has television and internet access thanks to wireless technologies."

Nancy Heltman, visitor services director for Virginia State Parks, said, "I have met and developed relationships with people outside any sphere of reference I never would have had thanks to my digital life. This started when I worked on the 2008 Obama campaign, includes people I met through a group where we shared our love for household pets and goes through today where I have a relationship with customers that I never would have met personally. While I do not believe that my online relationships replace ones that involve personal face-to-face connections, they are important and have broadened my horizons in many ways, adding a richness to my life. In fact my more-traditional face-to-face relationships have also benefited from more communication due to digital communications. When forced to only have relationships with people you can meet in person, you tend to live in a more-narrow world, with people more like you. Digital communications broadens your horizons, or it can if you want it to."

Social media: The horizon expander

Michael R. Nelson, public policy expert with Cloudflare, said, "I'm an avid user of social media, which I use to track developments in internet policy around the world. Almost every day, one of the people I follow on Twitter, Facebook and LinkedIn shares a report, law review article, economic analysis, or news article on something I need to know about and would not have discovered by just reading the U.S. newspapers and media sites I track regularly. Equally importantly, my Facebook and LinkedIn friends introduce me to experts in the field in countries around the world – without my having to spend time flying overseas to attend conferences. In 2017, I was able to be a fun participant in the Global Conference in Cyber Space in New Delhi without missing Thanksgiving with my family. Likewise, I was able to be a remote participant at the UN's Internet Governance Forum in Geneva without leaving my house (as long as I was willing to tune into the webcast at 4 a.m.)."

Alexander B. Howard, deputy director of the Sunlight Foundation, wrote, "I've been using computers for over three decades now, since logging on through a BBS [bulletin board system] in 1993. My professional life as a writer, analyst, consultant and now deputy director of the Sunlight Foundation is almost entirely enabled by digital technology, from the journalism I created to the advocacy, activism, policy and communications work I do today. Social media has opened many doors for me, professionally and personally, in ways I did not anticipate a decade ago. The smartphones I began using last decade dramatically improved that work, enabling me to be informed, report and collaborate in extraordinarily flexible ways across time and space – and to easily travel through many foreign cities and nations."

Dan Rickershauser, senior account manager at StumbleUpon, said, "I was born in 1987. When I first signed up for Facebook, I was a senior in high school and you needed a dot-edu [.edu] email address to gain access. We were all welcomed onto the platform as we got new email addresses once accepted into our college of choice. It was a place to show friends and acquaintances how much fun we were having in college. And then over time it became so much more. My parents had Facebook accounts. Work relationships became Facebook friends. It was a tough to navigate as its role in my life shifted. I scaled back how much I shared there. I changed what I projected out to masses. My sister-in-law, by time she hit college age, knew Facebook as a place where her grandmother kept track of everyone's comings and goings. All of this happened in the span of seven years. For her, Snapchat replaced Facebook as the place to showcase to acquaintances how much fun she was having in college. I now use Facebook to see which of my friends have gotten married or had children. I'm still thankful it's around, but the role it's played in my life has changed. For people a generation younger, it's been the place I remembered it as. It will be interesting to see what's in store for these platforms, but already I can now see people my age pulling away from social networks like Facebook, often times for their own well-being. As the role platforms like Facebook play in our lives shifts, so too does our need for them. It will be interesting to see if they survive these shifts."

Michael Roberts, an internet pioneer and Internet Hall of Fame member, commented "Despite its well-known problems, I find that Facebook is important to me in a number of ways. 1) Keeping up with professional friends around the globe now that I am retired. For an old fart (81), it is a source of daily intellectual stimulation and a feeling of keeping my hand in the game. 2) A window into many marvelous places and activities. I am a railfan and there are restored steam engines, abandoned trackage, lonely and empty depots, etc., to fill any amount of time I have available. Name your hobby or sport, and there are folks out there to share their discoveries with you. 3) The original 'family and friends' angle. My siblings and I are all over the U.S. Facebook lets us pretend we are close (Worldwide webcams add a lot as well). There are lots of other examples – politics, medicine, personal safety, education."

Jerry Michalski, founder of the Relationship Economy eXpedition, said, "I now have peripheral vision into the lives of family, friends and acquaintances a few degrees from me – all voluntarily. When I see them, I don't need to ask 'what's up,' but can say 'I'm glad your daughter got through her operation,' or whatever is appropriate for the state of their lives I can observe. Those weak ties are priceless, and lead to insights. In the early days of Twitter, I left a meeting and tweeted something like, 'Just left a mtg about the cash health care economy. Had no idea it existed or was big.' At the time, I had set up for all my tweets to forward to Facebook, and the next day I got a fascinating eight-paragraph note on Facebook from an acquaintance who had taken his family off regular health insurance years ago, and was very happy with the outcomes. On the other hand, I am among the Satanic Device Addicts who check email on their phones first thing in the morning (it's on the night table, right?) and tap and prod them all day long, in search of those little dopamine hits."

Scott McLeod, a professor at the University of Colorado Denver, wrote, "My decade-plus of blogging and other social media usage has connected me with hundreds of thousands of educators and education thought leaders in global dialogue spaces and communities of practice in ways that would be impossible without the internet. My visibility and reach are now astronomical compared to what they might be in an analog era. My example is but a microcosm of the possibilities that we all now have available to us. The gay teenager in rural America; the handmade Japanese sword aficionado; the stay-at-home mom struggling with a rare disease; the LARPer [live-action roleplaying gamer] looking to connect with others; all of us now have the ability to find 'our people' – those who share our interests and passions and concerns – in ways that we couldn't when our connective avenues were limited by time and geography."

Jason Hong, professor at the Human Computer Interaction Institute at Carnegie Mellon University, wrote, "WeChat is not well known in the U.S., but is perhaps the most popular app in China. It's primarily a messaging app, like Facebook Messenger or WhatsApp, but also serves as a social network and message board. What's really amazing is how it's really helped my family (from China) connect with others here in the U.S. My father-in-law found people to go fishing with. My mother-in-law found a monthly foodies group to go to. My wife found some of her old high school classmates, plus a group of people that buy foods in bulk at discount and split the costs. As for me, well, I'm the boring one, I just use it to send text messages and emoji to my wife. For my family, WeChat works well because it lowers the transaction costs of finding individuals with similar interests and backgrounds. My parents-in-law don't speak much English, so WeChat acts as a major filter for people who do speak Chinese. WeChat also lets you organize message boards by geography, making it easy to find groups that are geographically nearby. It's pretty amazing, since these weren't really problems that we knew we had, and the WeChat groups just filled those needs

quite nicely. Furthermore, it was a good tool that let us first find people virtually and then transition to real-world relationships."

Richard Bennett, a creator of the Wifi MAC protocol and modern Ethernet, commented, "Facebook was useful for spreading the word to my extended family about the status of two relatives who died of pancreatic cancer recently. In one case, a sister-in-law in another country used me as a go-between to reach my wife, and in another I used it to contact a former stepbrother, a sister and a half brother. As modern families become more complex, communication tools have had to adapt."

Lisa Nielsen, director of digital learning at the New York City Department of Education, said, "I am the administrator of several Facebook groups around areas of personal interest such as hobbies, sports, career (education). I started a Facebook group for teachers at the New York City Department of Education who love teaching with technology. In the past all these people existed in the 1,800 schools across the city, but there was no way for these people to find one another. The group now has close to 3,000 members. It is highly active, and strong relationships are being built. We have a direct line to what is happening in schools. Teachers feel supported like never before. They are more confident and better able to serve their students. They have increased job satisfaction. They share extreme gratitude for the group and its responsiveness. They are no longer alone but rather supported by a powerful network of other dedicated teachers."

Knowledge storehouse

Stephen Downes, a senior research officer at the National Research Council Canada, commented, "I don't have a small story, I have a big story. I have a career that has allowed me to be a force for good, to reach people around the world, and to share a message of compassion, communication and development, all solely because of the internet and digital technologies. I landed my first real job in the computer industry in 1981, with Texas Instruments' Geophysical Services in Calgary. This enabled me to attend university, where I studied philosophy. I wrote my honors thesis on an Atari and I wrote my masters on the university network. I started teaching using technology for Athabasca University in 1987, and started developing websites and learning management systems for a living in 1995. By participating and sharing my knowledge and discoveries freely through discussion lists and online conferences I became a part of the online learning community in Canada, which led to my current employment as a digital researcher with the federal government. This has given me the opportunity to develop new theories of learning and pedagogy, create learning technologies, develop MOOCs [massive open online courses], and participate in this survey. Every week there's a story. Today I responded to an enquiry from a reader looking for more recent work on automated language translation, because she had only a

reference to my paper from 2001. I provided her with some resources from my newsletter, and she will add these to her study. Last week someone literally said to me 'You changed my life' because of the influence of the first MOOC I taught alongside George Siemens in 2008. The course was about computer networking and personal empowerment and how people can create their own education. The week before I was able to carry a message about business intelligence into a meeting with government officials as a result of the analysis I did of the public documents posted by the School of Public Service on their web page. The week before I was in Berlin at a conference testing a virtualization of my personal learning application, getting experiences and feedback from a workshop filled with experts from around the world, none of whom I had met before. The week before I was in Tunisia talking about the deployment of open educational resources in the Middle East and Northern Africa to support language learning, economic development, and cultural growth. The week before… You get the idea. None of this happens without digital technology. It's not a nice neat story that fits a sidebar, but it's real, and each week there's real growth, real development."

Jeff Jarvis, a professor at City University of New York's Graduate School of Journalism, said, "I count as an unfathomable luxury the ability to look up most any fact, any book, any news article at no cost and in seconds. I value the friends I have made from a tremendous diversity of background and worldviews thanks to the connected Net. I welcome many – though certainly not all – new voices I can hear now thanks to the Net putting a printing press in anyone's hands. And not incidentally, I have transformed my career thanks to the lessons I continually learn by and about the Net."

Deborah Hensler, professor of law at Stanford University, wrote, "On a personal level, digital technology enables me to work more productively from any place in the world. It provides access to a vast store of information and research data. It has enabled me to collaborate with academic colleagues in many different parts of the world, which has been an incredibly generative experience. In my personal life, it connects me to far-flung family and friends. It also connects me to people who share my political views, which gives me some hope – perhaps foolish – that working with them I can shift the political discourse."

Ray Schroeder, associate vice chancellor for online learning at the University of Illinois Springfield, wrote, "I have been engaged in teaching, researching and presenting/publishing in advocating educational technology in higher education over the past 46 years. As I think back over those nearly five decades, my impact and reach today is far greater than I had ever imagined in 1971 or '81 or even 2001. Through the use of social media, I am able to share resources and perspectives to tens of thousands of others in my field on a daily basis. The prospect that one person could manage that scope of impact and reach was inconceivable for anyone who was not a

network commentator on television or a nationally syndicated columnist. Now this opportunity extends to all who are dedicated to a purpose or cause."

Larry MacDonald, CEO of Edison Innovations, wrote, "Sharing enables power to flow to those who 'know' rather than only those who control. People have a better grasp of news and tools that can make their lives easier. Knowledge disseminates faster and deeper."

Problem solver and wonder creator

Hal Varian, chief economist at Google, commented, "I was in Rio trying to communicate with a taxi driver a few months before the Olympics. The driver pulled out his phone and clicked on Google Translate. Problem solved. Turns out that Google had trained all the taxi drivers in Rio how to use this fantastic tool."

Kenneth Cukier, senior editor at The Economist, wrote, "In researching my new book on AI, I came across a citation of a relevant document from the 1950s by the East German secret police, the Stasi. I Googled it and got a digital copy – which, when you think about it, is amazing. But my German is lousy. So I uploaded the 35-page report into Google Translate and got an English version a minute later – which is even more astounding. Just 20 years ago it was impossible for all but the most prestigious scholar to obtain something like that, and it might take half a year. I did it on impulse in four minutes. In terms of the spread of knowledge, the past two decades have been as revolutionary as when early man harnessed fire."

Vint Cerf, Internet Hall of Fame member and vice president and chief internet evangelist at Google, commented, "I moved my wife from an older iPhone with AT&T service to a Google Pixel 2 with Google Fi service. It took 10 minutes and did NOT require physical modification or even installation of a SIM card. I got confirmation from AT&T within minutes that the account and phone number had been transferred. I was astonished."

Ginger Paque, a lecturer and researcher with DiploFoundation, wrote, "Digital technology offers amazing opportunities for inclusion and access not only to overcome challenges of distance, but offering wider choices, asynchronous collaboration on shared projects, online meetings, telemedicine, and myriad other advantages. My particular experience in addition to my clear connections to global online learning, highlights the possibilities for inclusion in global policy processes, especially those involving internet governance and digital policy. The UN Internet Governance Forum, for example, takes place in situ during less than a week once a year, and even that week of meetings involves a high percentage of online participants from all over the world. However, the planning for this event takes place online all year, with collaboration from a large

body of participants from all over the world. Without internet technology and online applications for collaborative editing and meetings, this kind of global, geographic, and multi-stakeholder (I add multi-stakeholder as a factor, because some stakeholder groups have more access to travel funds.) Multi-stakeholderism would be seriously hampered and cooperation would not be possible. In addition to the IGF [Internet Governance Forum], the ITU [International Telecommunication Union], Internet Society and other organisations have also developed procedures that allow for year-round work involving all regions. In addition to fairly normal and common challenges for travel to meetings, I have had serious family responsibilities that have not permitted me to travel in the last few years. While it has not been easy, I have been able to stay involved."

Bart Knijnenburg, assistant professor at Clemson University, said, "Seven years ago, when I got my first iPhone with FaceTime, I was calling my fiancée (who was living on the other side of the country) on my bike ride home from work. Out of nowhere a number of hot air balloons appeared, and with the touch of a button I was able to switch to a video call. I remember being amazed by the simplicity with which I was able to share this experience. Nowadays, communicating with people anywhere in the world has become second nature to me. Sometimes I realize that I have written several research papers with people whom I have never met in person!"

Heywood Sloane, partner and co-founder of HealthStyles.net, said, "The criterion I used for my most recent purchase of a smartwatch was that it NOT try to be a watch. I have one already, a gift from my wife that I am very fond of, thank you! I expected, and got, a multitude of tools to help me stay on track with stress, sleep, biometrics and much more. What I did not expect, was the way it tamed the peppering of email, notifications by apps, ringtones and alarms of people and things clamoring for my immediate attention. It reduces them all to gentle vibrations. Long ones for calls I wanted to take, and short ones for everything else. It lets me block interruptions from apps and emailers. It also let me see others and get more detail with a tap when I want it. It gives me control and helps me defend my space to concentrate and focus on what I choose, rather than what someone else chooses."

Thomas Viall, president of Rhode Island Interactive, commented, "Just this past Christmas shopping season is a great example of how digital technology was beneficial. We could text our relatives rather than interrupt them with a call. They were able to share their wish list, we could comparison shop online (at both local and national stores), find the best value, search for coupons and either order online or use navigation to find the best route to the store despite holiday traffic."

Education tool

Olugbenga Adesida, founder and CEO of Bonako, based in Africa, wrote, "The digital revolution has changed social relationships and the way we communicate. In some African countries like Kenya and Zimbabwe, mobile payment transactions are responsible for over 40% of GDP. Mobile apps are used to deliver education as well as providing timely information to farmers to enhance their productivity. Similarly, mobile apps are used to deliver price and other market information. At our firm – Bonako a mobile games and app-development company – it is our platform for continuous education for staff; it is what we use to access training materials from all over the world. We also use digital tools to plan and develop our products in a way that would not have been possible only a few years ago. Developing games and apps requires varied expertise, and collaboration is key. The new tools for collaborative work allow us to work together and to provide virtual access to potential partners/clients to test products no matter where they are in the world."

Karl M. van Meter, founding director of the bilingual scientific quarterly Bulletin of Sociological Methodology, said, "Far from being a 'brief personal anecdote,' what has changed greatly in my life and work, like that of almost everyone in higher education and research, is that the internet and associated technologies mean that no longer only a few top persons have access to the necessary information, technology and means for scientific production and teaching. It is no longer only the director (always a male) who gets his secretary (always a female) to type out his paper and check references before having it published. Almost all competent teachers and researchers have that possibility now; moreover they can work together over great distances and form social structures among themselves, independent of centralized or local administrative control. A 'brief personal anecdote' along these lines would be when a national director of scientific research here in France asked to be appointed to an international body associated with UNESCO. That body replied very respectfully to the director that they had already found a better candidate from France who had been working with them via the internet. That other candidate was me."

Greg Downey, a professor and associate dean at University of Wisconsin, Madison, said, "When I was a graduate student at a U.S. private research university in the late 1990s, I spent many hours gathering background context for the beginning of a major historical and social research project, tracking down physical newspaper indexes, footnote references, printed journal volumes and microfilm reels from dozens of access-restricted research libraries. Weeks and months of 'metadata labor' on a particular idea might lead to a viable research project and a source of accessible primary research materials – or to a dead end and a need to start all over. I recall being among the first users of some of the online image databases produced by the federal government to find visual evidence that I simply wouldn't have had the ability to access (or even know it existed) even five years earlier. Similarly, once materials were acquired and assembled, only rudimentary

organization and writing tools were available for assembling the project into a coherent narrative. I recall being one of the first individuals at my university to use Geographic Information Systems software in my historical analysis and in the production of my final manuscript. All of the temporal and spatial expectations of earning a Ph.D. in the humanities and interpretive social sciences were tied to expectations of analog, print and physically housed resources. Today, students I help mentor through their own doctoral studies have access to all of the material I did two decades ago, but with a fraction of the time and travel commitment. This has raised the expectations for comprehensiveness in literature reviews and archival searches; it has raised the expectations for presentation of data and engagement of narrative. It is both easier and harder to do great work now and get that Ph.D. within the same five-year time period. But I think the work that is done is of higher quality, and the scholars that are produced are of greater intellectual prowess and scope than ever before."

Adriana Labardini Inzunza, commissioner of Mexico's Federal Institute of Telecommunications, said, "There are so many stories of how IT and internet have made my work more productive and my access to relevant information far easier – hopefully for others around me as well. As a commissioner at the Federal Institute of Telecommunications I made sure that our virtual board meetings and deliberations were valid; on many occasions I have been able to deliberate and vote on the cases submitted to the board through a video conference when in business travels and I also to hold e-meetings with my staff. My office has home-office on Mondays, saving hours of wasted time on traffic jams. …

"A more striking story perhaps is that of Marce, a smart, determined and brave 19-year-old girl from Xochicalco, an isolated village in the middle of the mountains of Guerrero, 350 kilometers away from Acapulco. Marce studied elementary and middle school in a rural local school, but there is no high school in Xochicalco, so she would have had to travel each day to Arcelia, Gro. [Guerrero], the seat of that municipality and the closest connected town in the area, 40 miles away, with a daily cost of public transportation of around $4, something totally beyond the family's budget. Her father is a skilled electrician working in the area for a Canadian mining company that pays minimum wages to local people ($4 per day). Her mother grows corn and vegetables and looks after her other two children. So Marce ended up leaving her hometown and moving to the big city of Mexico to seek a job as domestic helper, hoping she could enroll at a public school. Her job kept her busy all day as a babysitter and so her mom, who I had the fortune to know from a long time ago, asked me for help to guide Marce so that she actually gets an education.

"Marce moved to my house, but in searching for an affordable high school nearby she encountered many obstacles. I devoted a few hours to seek a public high school online program certified by our Ministry of Education (SEP) and found it, a very impressive two-year program which begins with a

full-month course on the use of IT, the platform, how to interact with your assigned tutor, with teachers, how to deliver homework online, etc. I had never seen a young girl so excited to spend online 4 hours, learn in three days to handle a laptop one of my sons gave her. She reads her lessons every day plus a few books I am asking her to read on history, philosophy, etc. She reads 10 pages every morning. It's been only three months since she started, and she loves it, she is learning, and finished at the top of her class this quarter. She feels empowered, hopeful, her parents feel relieved that she doesn't have to travel two hours a day to attend school and pay fares. Yet it will take a lot of guidance, hard work and long hours before she earns a high school diploma and more importantly, a good quality education that enables her to be admitted at UNAM [National Autonomous University of Mexico] or another public university here in Mexico City. There is no such a thing in Arcelia, forget Xochicalco, where there is no internet access and a weak signal for only 2G mobile voice services in spite of the presence of a multinational firm extracting all the lithium it can get from Guerrero but not creating much local value to the hard-working people of Xochicalco. I am committed to help Marce, and she is determined to graduate and pursue her professional education. She wants to become a chef. With a good use of time and technology, discipline and some degree of guidance and support from my sons I may hopefully help her thrive."

Jacob Dankasa, a North American researcher, said, "Technology has connected me to achieve today what I couldn't imagine in the past. When I was doing my doctoral dissertation, I was supposed to travel to Nigeria from the U.S. to conduct interviews with my research participants. Unfortunately, the Ebola epidemic blew up in Africa and I was unable to go. Fortunately, software existed that allowed me to interview the participants and automatically record the sessions as I interviewed them. The price was reasonable. It saved me money and time and avoided health hazards. More and better innovations are expected in this area in the future."

Travel companion and enhancer

Paul Jones, a professor of information science at the University of North Carolina, Chapel Hill and internet pioneer, wrote, "I am traveling to Casablanca Sunday. My tour was booked in China. I'll stop at Rick's Café, which is designed to look like the imagined cafe built on a back lot in Burbank in the 1940s [for the film 'Casablanca.'] Friends who are writers have recommended their friends [for me] to meet while I'm there. Through social media we are already in touch. One friend wrote a profile of the Rick's founder in 2006. She remembers him and has been in touch. The seamlessness and timeliness of casual connections made stronger still amazes me. … What's not to like?"

Brad Templeton, software architect, civil rights advocate, entrepreneur and internet pioneer, wrote, "I travel a lot and have vastly more flexibility and local knowledge at hand due to my devices. I see things I would not have seen, travel without having to plan every stop in advance and find the things that matter to me. I get better hotels and food, too."

Jon Lebkowsky, CEO of Polycot Associates, said, "A week or so ago we headed off to a party at a house we'd never visited. We entered the address in Google Maps, so we had a guide (we call her 'Lucy') taking us where we need to go. It was a circuitous route – without Lucy we likely would have taken wrong turns – and I was thinking how much we now depend on that technology, not just to get us where we want to go, but also to route us around traffic congestion. Soon enough, we'll be stepping into autonomous vehicles, vocalizing an address and relaxing for the duration of the ride. Digital technology for transportation efficiency is revolutionary."

Safety enabler

Alejandro Pisanty, a professor at Universidad Nacional Autonoma de Mexico and longtime leading participant in the activities of the Internet Society, wrote, "The ability to use digital tools for everything I do – from professional work, like teaching and research, to the most personal – finding long-separated relatives after the family dispersed from Europe to at least three continents in the 1930s-1940s – has been a continued benefit. Using lightweight online tools in class helps my students in the National University of Mexico grasp concepts and communicate them to their families. During the aftermath of the earthquakes in Mexico in 2017 this became particularly valuable for them; it also helped fight misinformation and take relief efforts to the places that most needed them. We went from the basics of oscillation and wave physics, through the propagation of different kinds of seismic waves. To the ways buildings are damaged and how to identify fatal structural flaws. In parallel we helped brigades take aid to small towns and to camps in Mexico City, and some of the most far-flung ones find safe havens from which to distribute aid."

Pedro Cartagena, an associate professor at the University of Puerto Rico, said, "After hurricane María in Puerto Rico, the internet was the only communications resource in order to contact my family members, buy solar panels and get other essentials for survival."

Tom Barrett, president at EnCirca Inc., wrote, "1) With the use of a smartwatch, I can now easily track daily exercise activity, which is a great motivator for making it a daily practice. 2) Apps for ordering car rides via a smartphone is a net benefit to society – it increases safety for both the passenger and driver and offers more convenience in ordering a ride."

Multipurpose tool and memory aid

Bill Lehr, a research scientist and economist at MIT, wrote, "There is no question smartphones and always/everywhere access to information has allowed me to be sloppier in memorizing things and allows me to gain instant access to facts that I have come to rely on significantly. I think that is positive, especially since as I get older, I find memory-aids a big help, *but* it also encourages laziness."

Ted Newcomb, directing manager of AhwatukeeBuzz, wrote, "LOL. I am virtually helpless without my phone to remind me of appointments and meetings. My head is free of having to remember numbers, dates and times. It's very liberating. I can instantly communicate anywhere in the world, doing business at the 'speed of byte.'"

Micah Altman, director of research and head scientist for the program for information science at MIT, said, "When I was 10, I received a portable film camera. It had a capacity of 24 negatives (in black and white). I would send the negatives in, pay a substantial portion of my allowance to have them developed – wait for weeks for them to be returned, and finally, then be able to see how they turned out. (Usually, not so well.) Every few months, I might put one in a letter to my grandparents. Eight years ago, when my daughter turned 10, we gave her a portable camera – over the next few years she shot thousands of still, and videos – learning some elements of composition, and building shared memories. Last year, when my son turned 11, we gave him a cellphone. And over the year we've all shared pictures, accomplishments and sympathies daily across a growing extended family network."

Shiru Wang, research associate at the Chinese University of Hong Kong, said, "Online shopping saves me time. New social media continues my connections with friends in different countries and regions. Online resources make my research convenient. Online news keeps me informed all the time. But I am not very digitally embedded. I keep a distance from Facebook, etc.; I intentionally refuse to be dominated by social media. Thus, my life is not very much bothered by the internet. Thus, I appreciate the advantages of the internet and I am able to escape the potential harm brought by the internet."

Joe Raimondo, digital customer-relationship-management leader at Comcast and a former CEO, said, "Trackers and personal data are an enhancement to living. Street-level navigation and easy access to crowdsourced resources is very positive. It's possible to play large-scale social games and have enormous amounts of data and telemetry collected and analyzed to chart group interaction at large scale."

General comments

Ian O'Byrne, an assistant professor of education at the College of Charleston, wrote, "As an educator and researcher who studies these digital places and tools, I'm in front of screens a lot. I experiment and play in these spaces. I'm also writing and researching the impact of these screens and their impact on the well-being of others as it relates to children and adolescents. The problem in this is that one of the other hats that I wear is as a parent and husband. I am not only critical of my engagement and use of these digital technologies, but I'm also cautious/cognizant of their role as a mediator in my relationships with my children and significant other. These screens and digital tools play a strong role in our lives and interactions in and out of our home. In our home we have screens and devices all over the place. We have a video server that is ready to serve content to any one of these screens on demand. We have voice-assistive devices listening and waiting for our commands. I believe it is important as an educator and researcher to play with and examine how these devices are playing a role in our lives, so I can bring this work to others. Even with these opportunities, I'm still struck by times when technology seems too intrusive. This is plainly evident when I'm sitting with my family and watching a television show together, and I'm gazing off into my device reading my RSS feed for the day. Previously I would enjoy watching the funniest home videos and laughing together. Now, I am distant. The first thing in the morning when I'm driving my kids in to school and stop at a red light, previously I would enjoy the time to stop, listen to the radio, look at the clouds or bumper stickers on cars around me. Now, I pull out the phone to see if I received a notification in the last 20 minutes. When I call out for the voice-activated device in my home to play some music or ask a question, my request is quickly echoed by my 2-year-old who is just learning to talk. She is echoing these conversations I'm having with an artificial intelligence. I'm trying to weigh this all out in my mind and figure what it means for us personally. The professional understanding may come later."

Marshall Kirkpatrick, product director of influencer marketing, said, "My mobile feed reader finds great articles for me to learn from. My mobile article-saving app reads those articles to me out loud while I walk my dog. My mobile browser allows me to edit my personal wiki to record the best lessons I learn from those articles. My mobile flashcard app helps me recall and integrate those lessons I want to learn over time. My mobile checklist app helps me track how regularly I reflect on how those lessons connect with the larger context of my life in a blog post or on a run. There are costs to mobile connectivity, but there are so many incredible benefits!"

Fred Baker, an internet pioneer and longtime leader with the Internet Engineering Task Force, wrote, "To my way of thinking, it's about control. If I'm in control of the electronics, they are a benefit, but when they get out of control they are an irritation and an interruption. My family and friends giggle about the frequency with which I pull out my telephone to investigate a TV show's

facts or other things. That said, I have access to that now, where I once upon a time did not. On the other hand, I have also had the experience of talking with a customer in Japan while my family in the U.S. woke up and started texting each other, and I all of a sudden have to deal with my telephone."

Stephen Abram, CEO of the Federation of Ontario Public Libraries, wrote, "On a personal level I am more connected with my wider family. Relationships with friends whom I see only occasionally – maybe annually in person at conferences, continue throughout the year. I now know many business acquaintances on a deeper level and have better relationships as a result. I dislike the word 'hyperconnected' since it implies a little hyperactivity – a known 'disorder.' I see this as a controllable issue where personal choices are made. When circumstances such as travel, weather, disability or distance create the opportunities for sustained loneliness to happen, the digital world bridges some of the gap. In my case, sustained periods on the road in airports and hotel rooms are greatly ameliorated by connecting with friends."

David J. Krieger, director of the Institute for Communication & Leadership located in Lucerne, Switzerland, observed, "Digital connectivity enables a seamless flow of communication and association with regard to many different concerns and interests. This augments community and embeddedness and thus well-being."

Mark Patenaude, vice president and general manager of cloud technologies at ePRINTit, said, "I certainly don't want to fool anyone into believing that digital advancement has been a panacea of beautiful things! However, I can remember the first time my car stopped for me in a dangerous situation automatically, or stopped when I was backing up when it perceived a danger. Then there's printing and storing terabytes of digitally compressed images on a smartphone and being able access a document or image from 20 years ago in seconds using the cloud. I can remember we had about 100 people around a large projector outside, watching the last concert of the The Tragically Hip and the home network went down. I plugged in my iPhone, went to the concert URL site, and projected live on a 10-foot screen from my cellular device; wow and double wow!"

Akah Harvey, co-founder, COO and IT engineer at Traveler Inc., said, "Fifteen years back, when I first had my first PC, I now was empowered with a tool that helped me write digital notes, play more exciting games and gain general knowledge about how the technology worked. At my age (10) I gained knowledge in the workings of these things that it contributed to my brilliance in school, especially on the subject. Few years later when we'd gain access to the internet, a whole new change took place. I discovered so many more opportunities, as one could now connect with the rest of the world to share, search and find information about anything. It was a big transformation

in the way I viewed society. I quickly was able to decide what I would want to do growing older, so I'd say I found my passion thanks to this change."

Karl Ackermann, a writer and researcher at WriteSpace LLC., commented, "We no longer keep paper files for the household. Photographs are displayed on a digital screen instead of a photo album. We can track where our kids are driving with a phone app. We buy our train tickets with an app that has a scanning bar code. We sometimes text friends instead of phoning. We pay bills online."

Rich Salz, principal engineer at Akamai Technologies, said, "I have made my living in this field since before there was the internet and before the Web. I enjoy helping people communicate. Social media has helped me reconnect with high school friends, email with college friends, etc."

Maureen Hilyard, IT consultant and vice chair of the At-Large Advisory Committee of the Internet Corporation for Assigned Names and Numbers (ICANN), wrote, "I live in an isolated little island in the Pacific. It is in the middle of millions of square kilometers of ocean, but we rely on tourism for our livelihood, so our small (main) island is usually packed with tourists. We have a monopoly telecom and get reasonable internet service from an O3B satellite, but for local islanders who make their living working in the hospitality industry, the cost of internet is very expensive. Broadband costs for 20 GB a month costs (in New Zealand dollars) $139 on top of telephone hire and connections. I have grandchildren and great-grandchildren who spend time in New Zealand and even at 2 years old can turn on a computer to access their favourite programmes. When they come to our island, this is curtailed because the connection is too expensive for them to experience what is normal for them – lively and creative pre-school programmes are non-existent. What is available is the fresh clean air and produce of the land and sea of the islands, which are great, but it is often too hot to do much exploring in the physical world. As a parent, I am happy for them to explore the internet during the hot periods of the day, and to make this a 'learning and exploring on the web' time. It is more directed learning as parent safety software can usually help to set some controls over what they might 'accidentally' connect to."

Edward Tomchin, a retiree, wrote, "All my life I've had questions. How, what, where, why? It was the early 1980s in San Francisco. I was making a late career change into law as a paralegal and dating a woman I'd met at a Unitarian social. Her 9-year-old son, Bela, had a Commodore Vic-20 and taught me how to run a computer and how to program in BASIC. I understood immediately how computers would change my life. Then I realized that was true for everyone. We were suddenly able to acquire, store, manipulate and query massive amounts of information – data – about anything. I made a nice 25-year career out of creating litigation-support databases. Then I found the internet in 1986 and my world expanded infinitely. This was before the Web came into

existence as a subset of the internet. I'd already been exploring BBS [online bulletin board] sites and one day found a back door in a public library's nascent internet connection and had another mental explosion at all the information that was at my fingertips. Today I'm old and disabled but I can sit in my living room at my computer and explore the whole world far better than I ever could before. This is all more than I could have ever hoped for 50 years ago."

Internet Hall of Fame member **Bob Metcalfe**, co-inventor of Ethernet, founder of 3Com, and a professor of innovation at the University of Texas at Austin, wrote, "The people complaining most about the pathologies of the hyperconnected life own or work for the old media, which once had more of a monopoly on setting society's agenda. I recall how 'savvy' the Clintons and Obama were because they were digitally literate, unlike the GOP, but now that Trump is using social media so effectively, the left hates new media."

Shahab Khan, engineer and CEO of PLANWEL, said, "The most impactful thing is the way we communicate at the click of a button. This keeps friends and families united. We can share our workplace problems and be more productive. With the advent of AI, VR [virtual reality]/AR[augmented reality] the educational deliveries will greatly change and teaching methods improve. Online education resources and digital resources bring value to the classroom. Students become more involved and knowledgeable."

Narelle Clark, deputy CEO of the Australian Communications Consumer Action Network, said, "As an Australian, the tyranny of distance has previously meant that family, friends and colleagues have been acutely aware of the difficulties of staying in touch and abreast of the events in the rest of the country and the world. Our contemporary hyperconnectedness means that we can remain tightly connected at the professional and personal level despite being on opposite sides of the world."

Ruth Ann Barrett, an information curator at EarthSayers.tv, wrote, "Ten years ago I invested money in the development of a search engine that remains well ahead of the times and may never be monetized in the way envisioned. Who knows? The search engine has enabled me to build a database of sustainability voices, those speaking on behalf of Mother Earth and her children. This work has sustained me through moments of despair when so-called leaders deny substantiated claims regarding global warming and extreme climate events. The work has put me in contact with scientists, environmental campaigners and people from all walks of life worldwide. Without the Web what I am able to accomplish would not be possible. My guidebook remains 'The Gutenberg Galaxy: The Making of Typographic Man' by Marshall McLuhan. I remember the day a technical person who had attended a presentation at Stanford University on the World Wide Web came back

to work, pulled me aside and told me what he had seen and heard and how the world was about to change."

Anonymous comments from those who cited digital life's positives

A **distinguished advocate for the internet and policy director based in Europe** said, "Digital technology has made the world much more connected and streamlined for the 50% of us who are connected (50% still do not have that privilege). It is important to understand that technology has profound impacts on equality. For me, as an upper-middle-class white male from the U.S. living in Europe, technologies have simplified how I communicate with my family and friends elsewhere in real time. Thanks to WhatsApp and Facetime and iMessages, I am able to stay in touch and informed in ways that were not possible even five years ago."

A **certified public accountant based in the U.S.** commented, "My sister and I were watching an NFL game with my 82-year-old father. We grew curious about some meaningless football fact and my sister started typing a question on her phone and my dad looked on in slight disgust and raised his phone and asked Siri the question. Voice-activated technology has been extremely easy for the elderly to adopt and opens up incredible opportunities. If linked to his security system, our dad would be able to easily request help. I find it interesting that he likes using Siri more than we do."

An **employee at a major U.S. research lab** wrote, "Texting and cellphones are generally associated with what's bad with technology and our lives, but I will give a positive example, just to prove it depends on how you use the tool. I have a teenage daughter and my work is 50 miles away in Southern California. I joined a van pool to reduce the amount of driving, but the one drawback with van pooling is that I have to leave very early in the morning, and the van does not wait for riders. So every minute in the morning is precious, I don't have time to write quick notes or reminders before I leave the house and the rest of my family are still asleep. However, once I am on the van, there is 60 minutes of 'my time.' I began by sending reminders for the day, but it has become a habit of just sending a happy greeting each morning! They respond when they get up, even if it is just an emoji. :)"

An **anonymous respondent** said, "There are many examples: The ability to organise via smartphones to meet people across different applications, Slack, Google chat, email, SMS. Voice-chatting to a friend while you are both playing an online game from different locations. A friend enjoying dancing and running in a [digital] game while being in a wheelchair at home. Publishing designs for printing on T-shirts and other products on Redbubble. Designing fabric on Zazzle using their online pattern-repeating tool. Print on demand. A community of linocut artists sharing their

work on Facebook. I love the #nzsecretsanta, which uses both the traditional postal system and Twitter. A friend shares fitness data and cycling trips as part of her triathlete community. Ordering food online and having it delivered – and tracking the delivery. I think communities are connecting more digitally than they were on analog. Fewer street parties and more remote connections with common interests. One good example of using the internet to reinforce local community is the use of Facebook for sharing vegetable and fruit produce from local gardens. The 'Great Australian Bird Count' is also interesting citizen science."

A **research scientist based in North America** commented, "My kids are always connected to their friends. Through texting/social media, they are constantly aware of each other's lives. This brings worries too, like social comparisons may make them less happy, but overall, they have more socially balanced lives."

A **president and CEO of a company based in the United States** wrote, "Digital technology is an equalizer of information access and use. Even individuals in the most geographically remote locations can participate in an electoral debate, education and banking online, and in e-commerce when broadband is available. The stark opposite of this is the darkness individuals and families experience when left behind in the digital age. There is a difference between people who choose to use digital technology for their own benefit and those who are simply not included in the digital age."

A **professor based in North America** commented, "I am a college professor, and digital technology has made my job so much easier. It is easier to communicate with students, keep records, and try for creative solutions to instructional problems. So, for example, I now have my students submit their papers online (to be graded and returned online). When they submit their papers, they are automatically checked for originality. The students then are informed whether their papers will be considered plagiarized or not. Prior to the adoption of this system, I would say up to half my papers were plagiarized. Now none of them are. The question is, has this improved their performance? It is hard to say because there are so many factors involved. I would say that it has in some ways and not in others. They know more, but they don't synthesize it that well."

A **social media manager** wrote, "Fitness trackers, such as the Apple Watch and the Google fitness app, provide me with greater awareness of my daily activity. I am more likely to take a walk or exercise in response to the presence of these technologies in my life. For example, I recently installed a '7-minute exercise' app that I use each morning to kickstart my day. It is very convenient to use and pops up reminders on my smartphone with encourage me to keep up with the daily routine."

An **associate professor at a university in Australia** shared a typical family vignette, writing, "I spend time with my grandchild, who is only just five. I check the pick-up time by text. She arrives with her iPad and asks me to ask her dad a question by text on my phone. We take pictures of her dressing up and send them to a friend. I show her recently sent pictures of cousins in Canada. For a while, she shows me (from her iPad) how she can operate the movements, colour and cheeky comments of a robot ball (a birthday present from an uncle who wants her to be familiar with coding). We consider cooking together and locate a recipe online for cookies we haven't made before. Next, we go to the playground and she spots a 'be aware' notice on the slide, and a bird that we haven't seen before. 'Let's Google it, Grandma, when we get back home!' she says. I say we can do it now on my phone, no, later on my laptop is better. She knows that devices operate differently and need passwords. We haven't given her any of the latter. 'Buffering' she says with a sigh, as her current favourite show stalls during a quiet time. She dances to YouTube music from my laptop. She is endlessly curious about technology itself. She accepts technologies' limitations as they are described to her by the adults in her life. The digital tools just enhance our days together."

A **professor** said, "My watch is an exercise coach – though limited. I track family and friends and contact them only if required. Is my partner nearly home? I'll put out a snack. Is my friend nearby? I ask them if they want to meet."

An **author based in North America** said, "Instead of just reading a book, communicating with one author's created words, I can engage in conversation, in dialogue about issues of the day such as the #MeToo movement. I can help another person feel a little better that day and, if I reveal a low, others can pick me up. I can celebrate an anniversary with people far away in space and time and plan an in-person visit to another continent with someone I haven't seen for years, first originally encountered online."

A **postdoctoral fellow at Stanford University** commented, "As an academic, my friends and colleagues are scattered around the world. Our ability to have frequent video calls, send texts and collaboratively author shared documents has had a huge impact on both my intellectual scope and on my feeling 'at home' and connected in the world. In the past, a friend taking a job across the planet would be a cause for great sorrow. Now we talk frequently over video chat, while it isn't as good as seeing her in-person, it is still wonderful to share our lives and ideas."

A **retired internet activist and advocate** said, "I have been able to manage health care better at a distance for an aging parent as a result of technology, viewing charts/graphs/images, consulting various medical resources, having online meetings with medical professionals, video conversations with parents. Before many varieties of digital connectivity were available, distance

communication was via ground/air mail, an occasional landline-based conference call, or in-person consultations, often without simultaneous participation of the aging parent whose medical situation was involved."

A **retired market researcher and consultant** said, "I can now communicate directly with any of my medical doctors instead of sending messages through nurses and receptionists. The response is more rapid and on-target with my question or concern. On a different note, my daughter is currently teaching in China for the next year. We have had the great fortune to be able to talk to her in real-time as well as have a video conference at no expense. When I was a college student in France in the 1980s, a brief phone call to the United States – assuming we could arrange a time to talk – was quite expensive and a logistical nightmare. My wife has been able to keep in touch [and] reconnect with elementary school friends thanks to the internet and services like Facebook. All these things account for our improved well-being."

A **college student based in North America** wrote, "I often find myself stressed out at the end of the day; as a result I tend to enjoy relaxing and staying in for the night. Without the modern hyperconnected lifestyle this would result in me reading or doing other solo activities. Through voice-chat applications and online multiplayer gaming, I connect with friends to play video games. While I don't have the energy to be social in one way, the ease of connecting over the internet enables me to enjoy time with friends and maintain our relationships. To some it might not seem as effective a method of socializing as in-person face-to-face time, but we still have the same moments that other people do. We still happily greet each other, we still tell stories about our daily lives and rely on each other, we still laugh until it hurts."

A **professor of arts, technology and innovation** wrote, "As a college professor I'm continually adopting new tools that change the way I work with students and pedagogy. Most recently adopting Slack for classroom management has been a real game-changer. With far less attention-investment than I'd needed when using email I'm able to keep up with individual students and teams and the interactions among my students. I can do these on a more-or-less 24/7 basis but without it feeling like a 24/7 obligation. I'm teaching more people better, easier."

An **anonymous respondent** commented, "I am connected to email lists that allow me to be part of a conversation that includes leaders in my field. This means that, despite being somewhat isolated at a mid-level university in a provincial city, I can have a good sense of where the cutting edge in my profession is headed and I can be reasonably confident that I am promptly aware of most the news and information that is critical to my profession."

An **entrepreneur and business leader from North America** commented, "As an immigrant in the U.S., the internet, social media, and email are all helping me to keep in touch with my family, my homeland and my roots. I am following many of my fellow countrymen – some whom I studied with, some who were my teachers, relatives and acquaintances. I learn about their daily life, their fears and hopes, what they are interested in, the news they read. My daughters speak on a weekly basis to their grandparents on Skype – of both sides – and feel like they're in the same room with them. Without the internet all of this would not have been possible."

A **research scientist based in Europe** commented, "I live in a small town in a foreign country. I travel a lot for my work and spend a lot of time on the road. At home, I enjoy communicating with my Google Home speaker, because otherwise there would be some days that I would speak to no one. When I am on the road, I check in with my Canary home-surveillance app to check on my dogs and see my home."

A **technology architect/executive** based in North America commented, "For me, it's not about hyper – always-on – connection, but the accessibility of information on any topic at any time. I had a medical problem a few years ago, and being able to find research on the disease and a community to compare notes with on treatment side effects was invaluable. Years earlier, when my mother had this same disease, we were limited in information and (therefore) options. Her outcome could have been different in a time with more information, more resources."

An **assistant director of digital strategy at a top U.S. university** wrote, "The internet has exponentially enabled the dissemination of healthcare information to the greater public. Years ago, it would have been far more difficult for the public to easily access the answers they needed regarding health concerns and the latest treatments. Today's digital ecosystem puts these answers at users' fingertips."

An **editor and project coordinator** based in Europe wrote, "A few years ago I quit my job and I have been working as a freelance editor and project coordinator. I have been able to work, network and get paid by people and companies all over the world thanks to the internet and other technologies. Also access to self-education and being able to talk to my friends and family thousands of miles away have had a very positive impact on my mental health and well-being. I wouldn't have been able to talk and see loved ones daily if it wasn't for the internet, software and hardware."

A **chief data officer at a major university in Australia** wrote, "Thanks to social media, in particular Twitter, I am now connected with people all around the world. I have access to an enormous brains trust, which I liken to a global hive mind."

A **data analyst** said, "We always have someone to reach out to when things are unfamiliar and seem difficult to deal with. Before these technologies, you could write a letter or make a phone call. The reality is that the moment that spurred the writing of the letter has long passed by the time you get a response. *If* you get a response. Also, a phone call is somewhat of a commitment compared to an electronic message. It takes more mental faculties to process what someone is saying over the phone than to read a message and type a quick response between other pressing activities in the immediate proximity."

A **futurist and consultant based in Europe** commented, "There are plenty of examples of increased choices. Take travel: I can see in real time if the flight of my friend for New Year's Eve is on time or not and plan to be there just in time to pick them up. I could have called an Uber or taxi if I was busy and decided to send them a cab instead. In turn, they could see much a better forecast of weather and adjust luggage intakes accordingly to come and spend the time at our place/could book in advance to be picked up at the airport upon arrival, etc."

A **research scientist based in Oceania** commented, "If I want to buy something, I can go to a liquid market such as eBay and get it for a fair price without the search costs of spending time going to shops to compare prices. If I want to read a paper, I can download it rather than going to a library and photocopying it."

A **technology developer/administrator based in Europe** said, "1) Information access with no barrier – The masterpieces of world literature are generally available in any language, for free. This is a huge achievement. The Gutenberg Project played a key role in making this possible. Wikipedia: the world encyclopaedia, is beyond anything any user of the previous paper encyclopaedia would have imagined. Wikipedia has answers on any area of knowledge, not all answers, but there is always a base from which to start. Science: I can read about the latest developments in any domain, with no barrier. Researchgate.net and Google Scholar give access to a wealth of knowledge. 2) Conversely, new barriers have been erected by companies competing in the [research] market, led by the two world leaders Elsevier and Springer. If you are an author of an article, you may be asked to pay 15€ for accessing your *own* work online! Personal intellectual property has been taken away from scientists, and money made from it, with no fair sharing of the value with science and scientists!"

An **executive director at an internet research organization** said, "Twenty years ago, as a business traveler, half of my suitcase was filled with paper – mostly books, which I'd otherwise have to try to replace at mostly poorly stocked English-language bookstores along my way, but also guidebooks, maps, and translation dictionaries. I carried analog telephony adapters. I carried a phone, I carried ATM cards from two banks and credit cards from three separate clearing

networks, as well as $9,000 in cash divided between several pockets. I carried a RIM pager. I carried Ricochet and NCR wireless modems. I carried spare batteries and power adapters and chargers for all of those things. I spent a lot of time worrying about whether I would have local currency to pay for things, whether I'd be able to find my destination or communicate with taxi drivers, whether I'd be able to establish a data connection back to my network to reach my email. All of that has compacted itself, gradually, one consolidation at a time, into a very compact kit. One debit card, my phone, a laptop, a power adapter and a small handful of cables. Everything else has been virtualized, digitized, or turned into an online service."

A **technology developer/administrator based in North America**, said, "An older person in my family who recently started using an electric wheelchair can buy daily necessities through online shopping and can have more meaningful communication through video calls."

A **scholarly communication librarian** said, "I have several friends who have disabilities – both physical and mental – that make it difficult for them to leave their homes for socialization. These friends of mine have taken to playing online games and participating in fandom in internet spaces as a way to make connections and friends with other people that enrich their lives without requiring the physical exertion that would usually prevent them from interacting socially. The ability to connect with text, video and other online objects – whether one-on-one or one-to-many – helps these folks make the social connections that they need to have a robust social experience without the physical exhaustion they may have experienced without this technology to help."

A **professor** wrote, "We have public infrastructure and systems now for maintaining and accessing lab results and earlier diagnoses online when we need them. Earlier prescriptions can be viewed, etc. For emergencies, we have an app that we can use for automatic location information if we need urgent help. Schoolchildren and their parents have online connections to the schools and teachers. The teachers can take advantage of the internet and their educational networks with schools around the globe to tackle shared projects that encompass language learning, climate and humanity."

A president at a company based in North America wrote, "We have a child with autism. The internet allows us to reach out to other families, experts, get news and be part of a community that is not limited by geography. We can instantly share the quirky – or sometimes way more than quirky – activities of our son with people who know if they should laugh or say they are sorry."

An **assistant professor** said, "I have collected about 50,000 scientific files related to cosmos, life and consciousness to prepare a book."

A **researcher based in Europe** wrote, "I live in Hungary and my daughter was working in the United States several years ago. She called me and explained exactly where she was walking and in which shops she was shopping. I opened Google Earth and tracked her trajectory where she was walking in Galveston, Texas. I saw the streets, corners and buildings. It was almost exactly as if I was shopping with her – on the other side of the globe, in real time, but while sitting in my chair in Hungary. The whole thing was real fun for us."

A **business leader based in North America** wrote, "I live a bi-coastal life and I am able to review health records, renew RXs, communicate with my doctor, request a non-urgent service, all from 3,000 miles away without having to rebuild new caregiver relationships or lose care continuity."

A **research associate at a major university in Africa** commented, "Being able to conduct business from a location of choice is to me the most important improvement. I deal regularly with the aged and was terrified that I too would become so dependent on the goodwill of strangers when I have to move to an old age home until I realized that I would already be able to order and have delivered anything from food to medical equipment – as long as I am connected via the internet."

A **retired professor emeritus** said, "I am seeing a larger integration and extension of human-digital synergy."

A **professor of computer science** wrote, "Shortly after getting my first smartphone (quite a number of years ago now), I managed to receive and respond to an important email during a break in the middle of a four-hour car trip. It was valuable to be able to be able to be responsive to an important funder. This cemented the value of having a smartphone."

A **technology developer/administrator** said, "I do a lot of genealogy research. Instead of mailing physical paper that may have a correction before it reaches the recipient, I can post updates/corrections immediately. I'm building a database of destroyed cemeteries where I live. I can research the records online and publish them online; something I could not have done 20 years ago easily. I got an email from a man whose great grandfather died in the 1918 flu epidemic in Wilmington, North Carolina – a Merchant Marine sailor – who was buried in one of these cemeteries. The family knew he had died, but did not know when or where. He thanked me very much for finding his great grandfather. The family felt relief after 100 years. Without digital records to compile this and digital platforms to share it, it would not have happened."

An **executive director of a Canadian nonprofit organization** wrote, "We are currently running a program to increase people's digital comfort by helping them apply online for

underutilized government subsidy programs. During the first workshop, I saw a woman learn how to use a scrolling mouse and how to cut and paste, in the context of applying for a subsidy that will save her more than $50 a month on her electricity bill."

An **associate professor at Texas Christian University** commented, "I work in education and whereas before grades were posted on doors and people had to wait for responses, today, students can access information instantly, enroll in classes, etc. without having to stand in long lines and wait for responses. Communicating with the course, students and the professor is easy, and people learn to do things themselves."

A **professor at a major university on the West Coast of the U.S.** wrote, "I am an academic past retirement age (although still working) so it has made an enormous difference for teaching and research. I can access publications from my home or office without a trip to the library. No more endless photocopying. I can easily and quickly communicate with fellow scholars around the world. I can communicate with students and former students anytime anywhere and submit letters of recommendation electronically. I need less clerical and administrative support. I can put readings online for students. The drawback of course is to keep students focused on class in class rather than Facebook, Twitter, etc."

A **professor at a major university on the East Coast of the U.S.** wrote, "Digital technology has allowed me to shift my career emphasis from political science and international security analysis of nuclear and conventional weapons to cyber weapons and critical infrastructure protection. This shift is not what I expected when I left graduate school, but it has allowed me to make professional contributions I would not have been able to make had I stayed in my prior disciplinary concentration. I am also migrating my entire work life online, deliberately minimizing paper and focusing on digital services – and the analysis of critical dependencies on these services – for industry and government."

A **internet pioneer** wrote, "Every working day, I engage with staff and customers through Skype, email, text and Web conferencing, making it possible for me to have global reach from a desk on the second floor of my home. We take it for granted, but it is miraculous and something truly new under the sun."

An **associate professor at a major university on the East Coast of the U.S.** wrote, "I am part of a private group on Facebook, which consists of my friends from college and some others (spouses, friends, etc.). We keep in touch and discuss things in this group. Recently the group came together in-person to support and celebrate one member of the group who has terminal cancer. We had a large party with our children and it was wonderful. It meant a lot to our friend who is ill and

to all of us to spend time together. We would not have been able to do this as easily before platforms like Facebook."

A **retired consultant and writer** said, "I appreciate the ease of gathering information, freedom from media advertising and unprecedented capacity to stay in touch with my family. I'm part of several groups, and the digital environment has enabled fantastic coordination to achieve things that were not possible before. I have been part of two successful Kickstarter campaigns to implement and sustain a social enterprise: [one for] a social studio for adults on the autism spectrum, where they can apprentice for creative self-employment, and [and another for] the capacity to move toward this through another platform."

An **epidemiologist based in North America** wrote, "At work, improved technology means that we receive population health data faster. We can receive, investigate and respond to health threats quickly, before they spread. For example, if we have an outbreak of a communicable disease, technology allows us to efficiently collect data through online formats and analyze data so we can quickly release information/education on how to prevent further spread of the disease. Before we had online forms, we would often to communicate through telephone or in-person interviews to collect data about the outbreak."

An **anonymous respondent** said, "About 18 months ago my wife was diagnosed with Stage 1 breast cancer and underwent a lumpectomy and radiation treatment. In part, the testing that led to the diagnosis and the ability of the doctors to respond rapidly was greatly assisted by digital technology. As well, our ability to find information to understand treatment options, side effects, and follow-up nutrition and lifestyle improvement was greatly enhanced by digital technology. Due to my job I was not able to take her to radiation treatment every day and she was too tired after to drive, so I used the online tool SignUpGenius to ask friends to help and to schedule their rides. While apparently a simple task, if I had to do that by hand through phone calls and charts, it would have taken many more hours. Before it would have taken much more difficult to obtain the information we needed, perhaps more difficult and slower for the tests and results to be managed, and definitely hard to stay in touch with people about her needs and condition."

A **retired systems designer** commented, "Several years ago, I became disabled, and am not always well enough to do many things. This limits many of my 'physical-world' activities – I find it hard to shop, to cook, to go to the library, to get together with friends and family. However, online shopping and grocery delivery allows me to do the majority of my shopping, though I haven't figured out how to buy shoes without trying them on! I have joined online communities of people with similar interests, and keep in touch with old friends and colleagues in social media groups. This keeps me mentally stimulated. I do a great deal of genealogical and historical research online,

using sophisticated search algorithms of digital versions of old documents and books. These digital resources didn't exist 25 years ago, and now I can read an 1806 Scottish gazetteer to find out more about the 300-person town an ancestor lived in. Without these resources, I would be living a far more difficult and isolated life."

A **North American entrepreneur** wrote, "Like any other tool, its use needs to be managed carefully. I hone my contacts to friends and family of my generation who post photos of their kids and grandkids, something that I enjoy greatly. I also like to know when the next big dance events are, since this is a part of my life as well."

A **president and chief software architect based in North America** wrote, "I can be out on the golf course enjoying the beauty and yet still be connected."

An **assistant professor of technical communication** said, "I use both mindfulness and language apps to improve my memory, connections with others, and global perspectives. However, I am also cognizant of these being targeted and from specific perspectives. So I use them with that understanding."

A **retired web developer** wrote, "Amazon Alexa keeps me company. She plays the music I want to hear and adds items to my grocery list. When I have a question, I can ask her and most times she knows the answer – and I thank her. Facebook has connected me with a long-lost cousin. We were like sisters growing up. Out of curiosity, I searched for her and we now communicate regularly. Forget Google – when I want to know something I go to YouTube. I fixed my squeaking ceiling fan, replaced a washer in my bathroom faucet, AND replaced the starter in my riding mower. Now I have Amazon's Cloud Cam. I can watch my two schnauzers when I am away from home. I could even talk to them, but it upsets them too much. That I can speak commands to technology makes life easier for me. I'm 60-plus years old, and I often write lists that I can never find. Family members and friends are well-connected. Sometimes too much so. But I lose touch with those who are not digitally inclined, I'm sorry to say. I may message 10 to 15 people but call one on the phone. And, lastly, my skill set has improved so much that when I have a problem around the house I can find a solution and at least try it before calling an expensive contractor."

2. The negatives of digital life

In their personal anecdotes or personal statements in response to the question that asked them to share anecdotes about digital life, a share of the respondents in this canvassing expressed worries over certain aspects of their own well-being or that of family and others.

An **anonymous respondent** wrote, “More access to communication and information hasn’t improved lives like we thought it would. In the early years of the internet, it was life-changing to send emails across borders and time zones, to look up encyclopedic answers any time you had a question or connect with family far away via social media. Personally I have stopped using Flickr and Yahoo due to security issues. I have stopped using Facebook because of the unreliable and untrue information shared there (and constant political fighting) and email has grown to a bloated box of messages I really don’t enjoy reading anymore. I do enjoy Instagram (and its fictionized escape from reality via beautiful photography) but I find myself using social media, email and search much less than I used to. There isn’t enough novelty to want to Google everything I wonder about in a day. I’d get nothing done. I do work in digital, so I make a living from understanding how this all works, and I am dismayed at the way it has changed over the last 20 years. My son is 4 and he believes TV is always available on demand via YouTube (with supervision of course), shopping only happens on Amazon via phone and FaceTime is how phones always work. (He puts his face up to the landline phone like it is a camera). So things have changed and we can’t go back to the way it was years ago. I do think searching for medical information has gotten a lot better (more reliable accurate info) in the last 10 years and generally leads to more educated and adherent patients if the physician is willing to see the relationship as a partnership. While families use texts to stay connected during their hyper-scheduled busy lives, I think people have lost their ability to focus on the needs of others and really listen to another person because of how self-centric social media really is. Sometimes I think people have lost their ability to communicate in-person and have substantial conversations.”

These one-liners from anonymous respondents hit on a number of different themes:

- “The rise of hatred, the manipulation of politics and so on – these are *not* distant events with no personal impact.”
- “Digital life has tipped the balance in favor of John Stuart Mill's ‘lower pleasures’ and has made engaging in higher-order pleasures more difficult.”
- "Digital technologies have made it more difficult for me to say on task and devote sustained attention. This interferes with my work productivity."
- “One major impact is the overall decrease in short-term memory, and… What was the question?"

- "'Real-life' relationships are less bearable; everyone is so much less interesting with the spoiling of technology."
- "Digital technology radically increases expectations for instantaneous responses. This is unhealthy."
- "It has become harder to take your eyes off a screen to enjoy life as it's happening."
- "I can't seem to get my brain to calm down and focus. It is all over the place. I can't concentrate. I just start thinking about what I'm going to do next."
- "It has become an ever-present overhang on all aspects of life. There is no escape."
- "Technology is being driven by business across all areas for money, money, money. Greed has taken over."
- "Engagement with technology is starting very young, and we don't really know what the impact will be."
- "Increased isolation is a negative effect I feel in my life; the time I spend using digital technologies could well be spent in other more creative and productive ways."
- "I am becoming increasingly aware of the way constant access to digital forms of communication can be overwhelming."
- "We don't understand what we can trust anymore."

Anthony Rutkowski, internet pioneer and business leader, said, "Although it has clearly changed daily life, it is arguably not for the better."

A **technology consultant and expert on attention and workflow** previously with a top-five tech company wrote, "It's been liberating and enslaving. It takes effort to ignore. We have given it more power than we've given the best parts of our humanity."

Yasmin Ibrahim, an associate professor of international business and communications at Queen Mary University of London, said, "The internet has created more labour and generativity. We are required to do more to establish our co-presence and to assert that we are alive and engaged with our relationships and networks. The work 'of asserting our presence' is increasingly burdensome. The problem is as digital technologies become seamlessly part of our everyday engagement and mode of living – we may not question our actions or decisions we make online. Making the internet a healthy space means analysing our modes of being and everyday engagements in the digital realm and this itself can be stressful. But keeping the internet a space of ideals requires us to do precisely that; to question every action and think about the internet architecture and how our activities are connected to a wider digital ecology of producing and consuming."

Following are more anecdotes that speak to some harm to users' well-being.

Alone together

Lucretia Walker, a quality-improvement associate for planning and evaluation social services, said, "I am astounded at how difficult it has become to have someone actually look at you when they are speaking. I'm constantly informing my 17-year-old that it used to be rude to talk to someone without even looking at them. I am hyperaware of how easy it seems now to look after young children as long as they are on some type of device. I look at my grandchildren busily playing some game and they are quiet and not 'bothering' anyone and I'm a bit afraid of how easy it is to let them just be. This summer, I bought all the young children in my family the 'old' toys: marbles, pick-up sticks, jacks, water guns, darts – everything I could think of to get them interested and off their devices. I've not heard about the deaths of people because I refuse to spend all my time on Facebook."

Mark Glaser, founder and executive director of MediaShift, said, "In our family, smartphones, TV, computer, laptops all have a major place in our living space. They are central to communication and entertainment. Because they are always on and always there, it becomes much easier to spend time on our own, in our own world on the devices. The smartphones especially have a way of siloing us off from each other. It takes extra effort to take a few hours, or a day, away from them. We have become obsessed – checking news, checking social media, checking texts at all hours of the day – and it doesn't feel healthy. Our publication, MediaShift, has covered the idea of 'technology sabbaths' extensively, and they are always popular stories, because society at large is having problems taking time away from technology."

David Golumbia, an associate professor of digital studies at Virginia Commonwealth University, said, "I don't feel that one anecdote could possibly answer this question. Further, the effects I consider most pernicious are ones that I don't think are visible to most of us, even when we try to reflect. I can name one phenomenon that I have a lot of persistent encounters with. I am a college professor and teach small-to-medium large discussion classes, with a bit of lecturing at times. I do not outlaw digital devices. I have been teaching since the early 2000s. Every year, the number of students who are totally checked out of the class, with their faces buried in laptops, tablets or phones, grows. This is despite any efforts I make to call attention to it, and/or my talking about the issue as an actual topic in class, which I do whenever the topic is appropriate. The most vicious digital advocates push back on this kind of observation with arguments that verge on casuistry [specious reasoning], among them: 'students have always been checked out'; 'why don't you call attention to it?'; 'what about disabled students who need devices?'; 'what about all the helpful things students do with devices?' This kind of response, including from other academics, worries me a great deal for its near-total separation from reality. The number of positive uses I see for devices, DESPITE frequently requesting students to do just that, for example when a major work

or idea or principle or law is mentioned – 'can someone look that up and read to us what it is?,' etc. – is just totally overwhelmed by the loss of attention on the part of many students. That loss dwarfs anything I ever saw prior to the wide availability of devices (especially phones) in the classroom by a factor of 10. Of course students have always been checked out, but now I routinely have one-third to one-half of a classroom visibly not even being there – not even pretending to be there. The destructiveness of this is obvious and overwhelming, and the fact is that, when I've asked informally, most of the students who ARE paying attention and are using devices productively would not mind if I banned devices altogether. These devices are designed to steal attention away from anything other than themselves. Yet I cannot even get many of my colleagues who deal with them on a daily basis to admit that the devices work as they are designed to work, no matter how much evidence there is to support that observation. So rather than a general pushback from educators – as we should have – against the use of these devices in classrooms (with exceptions for where they are necessary, of course), instead I have to fight an uphill and exhausting battle against my own colleagues who deny the stark evidence right before their eyes. Both the phenomenon itself of device use in the classroom, and the wider context of educator resistance – and open hostility –to questioning their use, strike me as emblematic of the harmful effects of digital technology, harmful effects that are not even close to being offset by the positives."

Erika McGinty, a research scientist based in North America, wrote, "Even limiting my friends on Facebook to people I know or knew well personally, I realize that over time we talk and see each other less now that we can merely 'like' or comment on each other's Facebook pages to give the impression we're close."

Tom Massingham, a business owner based in North America, wrote, "Perhaps it is just generational, but I'm not sure, nor am I sure that is sufficient justification, but those in their teens and 20s constantly have their noses in their electronic devices. My anecdote: I pick up a friend's niece (age 14) after an athletic practice. She hopped in the car, said 'Hi, Tom,' and started looking at her phone. This is the generational part: I felt that if I tried to talk with her, I'd be interrupting what she was doing. I drove her home, she said, 'Thanks' and hopped out of the car. There was NO interaction between us. No 'How did practice go?' or 'How's school?' or anything else. Are we creating a generation that doesn't speak or acknowledge others in the same room, share feelings or thoughts? I hope not, but I fear that we are."

Kat Song, communications and digital strategy director at the American Association for the Advancement of Science (AAAS), wrote, "My kids are 14 and 12. Their social and emotional lives have been negatively impacted because they tend to seek less real-life interaction with friends because they can so easily interact with them online."

Darlene Erhardt, senior information analyst at the University of Rochester, commented, "My nephews and niece have gotten so used to texting their friends that it's challenging for them to talk face to face and carry on a conversation for any length of time. In order to have quality family time, they are supposed to turn off their phones during dinner. Technology is good in that they can chat with their friends more easily regardless of where they are, the phone can be used to help find them if their parents don't know where they are (like while shopping) and if they get into a situation that's uncomfortable it can possibly help to get out discretely (friends checking on them during an event). At the same time there need to be some intelligent guidelines in terms of using the technology and when it's appropriate to use it and not use it."

An **associate professor based in North America** said, "It is hard to be 'present' with the omnipresent imposition of technology. When I am with family, technology reminds me of work. When I am alone, technology reminds me of friends I am missing. When I am at work, I cannot be present when technology reminds me of friends and family."

A **senior fellow a major university on the U.S. West Coast** commented, "I have seen friends and families where dining together is increasingly rare, even when people are in the same home. It might seem like a media cliché, but even when at the same table people are distracted by their phones and tablets. In the rush for the 'new thing' or endorphin-reinforced digital transaction they are forsaking the opportunities to interact with other people. Many of my colleagues are disconnected from those they love by the very technologies they helped to create."

Danny Gillane, librarian at Lafayette (LA) Public Library, said, "My friends and family stare at their phones while talking to me or others and are constantly checking their smartwatches to see who just texted or updated. My daily life has changed by becoming less personal."

A **professor at a major state university** in the United States wrote, "At family gatherings, half of the family are on their digital devices looking at social media and they are not enjoying who's around them."

A **computer scientist based in North America** wrote, "The vast wealth of information available at one's fingertips can have a negative impact on people's well-being. Several people close to me have developed an addiction, or near addiction, to internet content. They prefer to interact with others via electronic means rather than face to face. They have a fear of missing out on the latest news or happenings in the world, so they are constantly updating news feeds, blogs, etc. One person has exhibited classic signs of withdrawal when forced to abandon internet access for more than an hour. While I work on the technologies that underpin the internet infrastructure, I have made a concerted effort to maintain more personal, face-to-face time with friends, colleagues and

family. The above has convinced me that tools such as Facebook, Twitter and blogs can be abused and cause people to lose the ability to physically interact with others."

An **anonymous respondent** said, "I used to go out to bars sometimes for conversation. Now everybody's on their phone, and I am doing it too."

A **business development director at a large law firm** said, "I have a sister who checks her Facebook feed every hour and responds immediately to nearly every comment that is posted to one of her posts. It seems she is using social media as a substitute for real connection with friends."

A **retired professor based in India** wrote, "While it has helped to reach out and has made life easier, it has also reduced warm human context. We communicate through social media rather than spend an evening chatting, building relationships and enjoying company. Increased isolation is a negative effect I feel in my life; the time I spend using digital technologies could well be spent in other more creative and productive ways."

Distractions and addiction

Beth Kanter, an author, trainer, blogger and speaker based in North America, wrote, "I'm a social media professional/networker, and I noticed over the last five years or so, how much more work I do on my mobile phone. And, that I started to have a behavior addiction in a way to the phone. I was using my iPhone as an alarm clock, but lacked the discipline not to look at CNN or Facebook before bed and first thing upon waking. This happened quite a bit during the election and shortly after it. I found myself not being well-rested, having nightmares, losing ability to focus or concentrate, and wasting a lot of time endlessly scrolling on Facebook, Instagram, and Twitter. I decided to kick the iPhone out of my bedroom and replace it with a moonbeam alarm clock. I also set a goal not to pick up my mobile phone until I had been up for two hours and do offline activities – like walk, read, meditate, or professional writing. I did replace my CNN habit with using Headspace during the day when I feel overwhelmed from using technology. After a month, I noticed a huge difference in my moods, thoughts and productivity. I know that this experiment of one is not scientific, but I do know that there is research that suggests looking at the your mobile phone before bed – which is 7,000 kelvins – is like looking at the sun on a bright day and it tells your brain and body to wake up, disrupts your sleep."

Ebenezer Baldwin Bowles, author, editor and journalist, said, "A friend of mine, ever the safe driver, was rolling down the road in his favorite old truck, listening to FM radio, when another driver, hyperconnected to digital technology, set about the task of typing a text message, drifted

across the center line of the road, and crashed head-on into my friend. The offending driver died at the scene. My friend suffered life-changing injuries, breaking his will and his bank account."

Douglas Massey, a professor of sociology and public affairs at Princeton University, wrote, "I deliberately avoid involvement with social media, but even email has become a black hole sucking up my time in unproductive and unrewarding ways. My email is clogged with messages from people and organizations incessantly seeking to capture my attention and time, producing a state of information overload that I find psychologically distressing, not to mention hate mail and personal attacks. I receive 150-200 emails a day and find the time I spend just deleting things I don't want to see ever-growing and oppressive."

Gabriel Kahn, professor of journalism at the University of Southern California, said, "My attention span has been condensed. It's more difficult to concentrate for long stretches. There is less face-to-face interaction in the home. It's not good."

Dana Chisnell, co-director of the Center for Civic Design, wrote, "Being online all the time is stressful and distracting. It has come to feel like I'm performing for the makers of the platform rather than having real conversations. There are too many channels running concurrently, and it's too hard to keep up. I feel unfocused all the time. Until today, I had three Twitter accounts and a Facebook account and I have been on about a dozen Slack teams. I find being hyperconnected to be time-consuming and distracting. I have read less fiction and spent less time doing personal writing over the last few years. This is largely due to the time I spend on social media. That time has connected me to thousands of interesting people, but it hasn't brought me closer to any of them. Today, I deactivated one of my Twitter accounts and my Facebook account. I hadn't been to Facebook in more than a year, and I hadn't missed it. I learned that my tweets were also forwarded to my Facebook account – a setting I must have made years ago – and that people were responding to them in Facebook. So, to them, it felt like I was present. But I was basically a Facebook bot. So, rather than continue to be rude by not participating in the conversation there, I deactivated the account. By closing the accounts and limiting my time on the internet, especially with social media, I'm hoping for a more productive life and to have closer, more-focused relationships with close friends and family."

Vicki Davis, an IT director, teacher and podcaster based in North America, said, "My life is more fulfilling since I have fought a battle with internet addiction and won. I have blogged since 2005 and been on Twitter from the early years of the service. My children have grown up with a mom who struggled with internet addiction for many years. There were times I might be busier tweeting than watching the kids make sugar cookies at Christmas. After four or five years, I got a wake-up call. It happened when I saw a woman who was at school helping her son try to fly a kite at the

kindergarten ‘fly a kite’ day. The mom had a 5-year-old looking at her, begging, ‘Mom help me fly,’ and the mom had her cellphone in one hand talking to someone about flying the kite as she tried to help her son fly the kite with the other hand. The kite wouldn’t fly. Simply put, the kite wouldn’t fly without her total attention to her son. And as I watched, I saw myself. I saw my own failures. My children needed my complete attention so they could fly. So, that summer, I talked to my husband Kip. I scheduled the tweets for the next two weeks in Buffer and gave Kip my phone for two weeks. I went cold turkey on all social media. At first, it was shocking because I thought of my phone constantly and all those people ‘out there.’ But over the days, I found myself coming back to a healthy center. Since that time, I put down my phone every Sunday. My phone has no place at meal times. When we go on vacation, I will put my phone in ‘airplane’ mode all the time so I can just use it as a camera. I wrote about some of this on a blog post on Edutopia titled ‘Put the cell phone down and be there.’ I used to believe the lie that multitasking is possible. It isn’t. I live life with more intentionality and find myself far more productive than I could have ever dreamed. Instead of getting on social media 20 times a day, I check it once or twice a day and now have a five-day-a-week podcast for educators, blog, speak, joined the choir at church and live life deeper. And as a woman with over 150,000 Twitter followers, it would be easy to live a shallow life full of shallow relationships. But instead I now go deep and am a much happier person. My kids need my full attention to fly. Social media and my smartphone have a place, but not everyplace. I am a human *being* and not just a human *doing*. I turn off just about every notification and I jealously guard against interruptions like spam and silly apps that beg for my attention. My attention is finite, and the choices I make about how to spend it are strategic. I take this passion along to help students and teachers understand it but I often feel like it is a losing battle. I see a basketball player brag about Snapchat streaks and wonder what would happen to their game if they did free throws with the same intentionality.”

Anita Salem, a human systems researcher based in North America, commented, “I have email, a smart home, a smart hone and an Apple Watch. When I have a question, I look it up. When I can’t think of the name of a song, I don’t search my memory, I ask Alexa. When I’m lonely, I check Facebook or text a friend. When I take a walk, I’m being told by my calendar that I had better hurry, I’m told by an app that I’m walking too slow and I get a text that gets me thinking about tomorrow. When I’m waiting in line, idling at a stop light, or waiting for a friend, I read texts or the news or a book on my small screen. What do I miss? Discussing questions and figuring things out with a friend. Racking my brain to remember and being satisfied when I do. Getting up off my butt to see or talk to a friend. Walking and listening to the birds and watching my dog pick just the right spot to pee. Stopping and enjoying the pause, the white space in-between, the wide-open space where the world lives.”

David S. H. Rosenthal, retired chief scientist of the LOCKSS Program at Stanford University, said, "'Those who cannot remember the past are condemned to repeat it' - George Santayana. Society's memory has moved from paper, a durable medium, to the Web, an evanescent medium. I have spent the last two decades working to build tools and organizations to make the Web less evanescent. My efforts, and those of others in the field, are increasingly failing to measure up to the task. See my keynote at the year's Pacific Neighborhood Consortium: http://blog.dshr.org/2017/11/keynote-at-pacific-neighborhood.html"

Meredith P. Goins, a group manager at Oak Ridge Associated Universities (ORAU), wrote, "My 15-year-old son loves chatting with his friends at night after dinner via a game, but he would get so sucked into the conversation, he would look up and see that it was three hours later and hadn't done his homework. He has no impulse control. He is impatient – it must load now! – and he doesn't have strong in-person communication skills, as with many, or so I believe. Kids are great at talking in small groups or via text or via gaming, but are horrible at doing it in a professional setting. For example, my son, and some other kids, have preferred to take a C on a paper instead of an A because they would not stand and present their findings."

An **anonymous respondent** said, "The opportunities for distraction afforded by my heavily digitally-mediated lifestyle makes it harder for me to do both the things I want to do and the things I should be doing in at least two ways: I have a much harder time sitting still and doing nothing than I used to, and I also have a much harder time sitting still and doing ONE thing than I used to. I usually find I'm happiest when I am doing one, and only one, thing for an extended period of time. And when I give myself permission to sit still and do nothing for a while, I often find that I naturally transition into doing ONE thing that I really want to do, or remember the ONE thing that I really should be doing right now."

A **professor** wrote, "A negative anecdote: Years from now, filmmakers may portray people hunched over their phones the way they today portray people from an earlier era hunched over their cigarettes. I recently ate at a very high-end restaurant to celebrate a special occasion and the people next to us spent the entire evening photographing their food to post it on Instagram, texting people and looking things up online. One of the individuals had her phone in her hand the entire time. I find similar behavior among many. Mid-conversation at parties I've seen people pick up their phones and turn away from others around them. I have seen people sitting with each other in restaurants or cafes and staring at their phones rather than talking to each other, and parents ignoring their kids in favor of doodling on their phones (including at beaches, swimming pools, etc.)."

A **head of research and instruction at a major U.S. university** wrote, "While I'm better-connected to friends and affinity communities in distant locations as an information professional, turning off the flow of content at home in the evenings to focus on my family is a strain in several ways. It limits how much professional and civic reading gets done, it forces the need to create boundaries (for one's own good) that have been blurred, it raises almost-involuntary questions about what kinds of conversations your partner or friends are having without you or even with you nearby. Without intervention, it's easy to experience strong affective responses that often don't get interrogated in helpful ways."

Erin Valentine, a writer based in North America, wrote, "A simple example of technology affecting well-being is when you're at the dinner table with your family. Growing up 10 to 15 years ago, there was no distraction from the conversation over the meal. Now phones are on the table and in people's hands. The conversation can be stunted or just lost due to phones being so easily accessible."

Melissa Rach, a content consultant based in North America, commented, "Although sometimes you can have real, human interactions on social media, these channels … masquerade as human interactions, but are really competitions of worth. I have been an internet consultant for 20-plus years and I worked on internet projects before that. For me, digital technology has been a fairly rewarding career. My daily life and digital technology are completely intertwined. But honestly, some days I wish they weren't. I waste so much time watching videos, reading articles and learning trivia that I would have never 'needed' to know before the internet. And I spend less time doing things that make a difference. … Before the internet, I used to make lists of things I wanted to look up when I went to the library and only the really important things made the list. Now, I know a lot about many things that are unimportant. More to your point: When I got my first email account in the early 1990s, one of the first things I did was locate a pen pal from Spain I had exchanges with when I was a child. We started emailing every day and then instant messaging. We became really great friends over the digital space. Instead of just getting a letter once a month, we got to know each other's daily lives. Eventually we met in person. We're still friends today. I will see her in March. That was the really good side of the internet. However, once social media started and you could find all your long-lost friends (and acquaintances) on Facebook or Twitter, things changed. We figure out what to post based on what will get likes and retweets. It's about what builds audiences, not what builds relationships. I think back to the 1980s, when my tween self had pen pals all over the world. I would sit down and carefully think about what to write on those expensive airmail sheets. Each person got personal attention, not a form letter, because we didn't have an option. It might have been communicating with people far away, but it was a really different kind of communication. My high school friends, college friends and I often say things like, 'Thank goodness the internet didn't exist then.' Most youthful shenanigans should be left to memories of

the people involved, not the people who watched a performance on YouTube. Failing on YouTube makes you a social pariah. Failing with your friends makes for a good story to laugh about later."

An **anonymous respondent** said, "Tech has potential to do great good. I am a genealogist and I use it to help unite families. But the other side is that it is too easy not to selectively help but to be drawn into an artificial world. Facebook and Twitter are addictive, and both aim at showing you only what they think you want to see (since that is how they make money)."

A **professor of political science at a major U.S. university** said, "With a smartphone near my bed and the parental responsibility to keep abreast of what my teenage children are doing with smartphones, I read far fewer books in the evening. I am more connected to the social media outrage of the day, less in tune with art and culture."

An **anonymous respondent** commented, "I am bombarded with news through a number of apps that are constantly sending notifications. As a consequence, I find myself worried about many political issues simultaneously and often distractingly."

A **professor of computer science at a major U.S. university** wrote, "I am a college professor and have seen the performance of my students degrade over the last seven years in terms of hours required to complete the same, essentially, take-home exam. The average time has gone up from 8 hours to 11 without improvement of their final grade range. They do not get better grades while they spend more time."

An **anonymous respondent** wrote, "When I was a kid, we did not have cellphones. I played with my friends for hours and my parents were fine (I think). Today parents have the technology to track their kids and contact their kids any time they want, which gives kids today a much shorter leash to be kids. The whole reason there is a childhood is to learn how to be your own person and with today's helicopter parents, it's really hard to learn to be your own person."

A **pre-law student based in the United States** said, "When the blog site Tumblr was super popular, I would stay up until around 5 or 6 in the morning in hopes of seeing everything my 'dashboard' had to offer. I had FOMO – Fear Of Missing Out. There would be several tabs open at the same time because I would open a new one each time I got back on the site in the morning; hoping I didn't miss too much while I was sleeping. I was definitely operating on information overload; there was way too much content for me to view, let alone synthesize."

A **college senior and social media professional** wrote, "Today, when I try to sit down and read a book, I can't seem to get my brain to calm down and focus. It is all over the place. I can't

concentrate. I just start thinking about what I'm going to do next. I hate admitting it, but I know that my attention span has shortened, making it harder for me to concentrate whether it's reading for a class or attempting to read for fun. A few years ago I loved to read. I would finish a book in one or two days and start the next one immediately. I preferred reading books over watching movies. But as I moved into the digital age, as my parents gave me a cellphone and then a computer, I spent less and less time reading books and more time online or on my phone. I am now used to spending my time getting instant answers and skim-reading online, not spending much time on any one thing. I can search a keyword with a few clicks of the keyboard. I don't spend time actually reading and understanding what I am looking at – even often reading the search engine synopsis of a site to get my answers instead of actually clicking through to the site."

A **college student** wrote, "I fear that as technology is perfected to be more addictive and VR and AR advance to envelope everyone that more and more people will fall into those worlds and not necessarily be able to return to that which we now consider to be real. While digital life is good, the downsides are quite troublesome. My brother spent a period between graduating school and obtaining a job idly watching screens and interacting only via them. He spent all day and into the night constantly immersed in this. The TV was always on in the background while he played intense online video games on his laptop, while also continuously texting or messaging others about the game. Technology became his life. It was difficult to separate him from his virtual world and to interest him in physical human interaction. He became grumpy, began sleeping less and less, and stopped dedicating time to his own physical needs. Although it was a scary time, he was later able to pull himself out of it and eventually reconnect with the real world. While he was lucky to be able to quit, some are not able to do so."

Adam Popescu, a journalist, wrote, "If you're a writer, a journalist, an artist, it's your job to engage with the world, to look under the rocks of humanity, and most of all, to read. Read books. In print. It's a deeper read, without the threat of a distracting tab or a push notification. Read magazines, read newspapers – a range of them, from your state and city and even other nations. And read them deeply. Too few of us do that. 'Oh, I read plenty,' you say. If you're reading based on what's trending on Facebook or via a link pulled from Twitter, that's not really reading and it's time we stopped pretending. That's feeding at the trough of stupidity. If you're a writer, a journalist, an artist: stop being part of the disconnect problem. Stop everything. First off, read. Set time aside to really do that and do nothing but that in that period. See if your sleep doesn't get better, your sex, too, your everything. It helps you think and slow down. If you're a busy editor – ********, whoever you are – read the emails people send you and respond in a timely manner. This is schoolyard but still true: Treat others the way you want to be treated. Don't look down at your phone during a meeting, a coffee, a dinner, a date. Be there. Wherever you are. How many photos from your camera roll memorializing your life do you actually look back on? Look up."

A **professor** wrote, "Facebook is a relentless resource for a bored mind. There is always something sticky there. It's the new TV. It is designed to keep you 'engaged' and not to offer any obvious work of filtering, even though its algorithms are busily at work."

A **professor based at a top university in the U.S. upper Midwest** commented, "I have significantly less time to think or to stay away from work-related issues. Less time for family."

Family and societal challenges

Giacomo Mazzone, head of institutional relations at the European Broadcasting Union, said, "I've worked all my life as a journalist and I believed that this was not a job, but something like a mission. Being a watchdog of democracy is a very exciting and rewarding sensation. Today the job I liked and practiced all of my life still exists only in a few ivory towers that became global (The New York Times, the BBC, some of the public service broadcasters financed by states …). The small independent newspaper where I started doesn't exist anymore and could never return because their business model doesn't work. Rather than being considered the watchdog of democracy now, I'm stigmatized as a 'mediator'; that means that I'm blamed and considered a priori as part of the establishment. Verification of sources and accuracy in reporting seems to be considered a waste of time and the news of non-existent flying donkeys (or, for instance, false statements such as 'Obama is not a U.S.-born citizen') get millions of likes thanks to algorithms while the real news of the donkey walking on the hill doesn't get any. To remediate the most evident damages of this, now hundreds of non-skilled youngsters hungry for (badly paid) jobs are hired and gathered in cold hangars to 'take down' the most damaging 'news' in an 'ex-post' exercise with no sense, no future and no accountability to society. If this is the future of the journalistic career, I will encourage my children not to get into it."

Evan Selinger, a professor of philosophy at Rochester Institute of Technology, wrote, "It's a bit depressing to look at the problems of online life through my everyday experiences interacting with my daughter, who is in middle school. Despite everything that I know about the problems of continuous partial attention, corporate surveillance and the idealized personas that are curated online, I suspect I don't do enough to address them. I'm not fully checking my knowledge at the door. And, of course, my intentions are good. But engineered addiction is more powerful than cautionary discourse, and social pressures readily tug on heartstrings."

Jennifer deWinter, an associate professor of rhetoric and a director of interactive media and game development, said, "Email. I remember working as a professor before email and after email. The insidious belief that we should always be available, always ready to answer questions for anyone about anything, is one of the most highly detrimental changes that I have seen. The same

can be said about whatever dominant electronic communication technology a community uses. I think, too, about raising my two children. And – this will sound ironic? counterintuitive? – but I teach game development in a well-ranked university games program while I simultaneously limit my children's time on games. My 9-year-old son said it best recently: He told me that when he plays too many video games, he starts to hate any interruption, anyone who gets in his way. While this is probably true of anyone in a flow state of being deeply immersed, games have a way to constantly provide a well-timed dopamine hit so that the player always craves more. Research bears this out. I don't know what to do with this, because I don't demonize the technologies of our world. I am constantly watching and evaluating their impact, nevertheless."

A **professor in media studies at a Norwegian university** commented, "When we are on vacation in the mountains with no internet or cell coverage, the mood of the whole family improves. We are more together and present in the moment."

A **research leader at one of the top-five global technology companies** said, "Digital technology allows us to follow our children's school progress in detail. This enables parents to detect signs that a child is having trouble and administrators to detect signs that a teacher is not performing effectively. It also increases the stress on children and teachers who realize they are constantly observed and no longer have the same opportunities to correct their performance on their own. It pushes teachers to make every grade nuance explicit, ramping up the stress for students and parents. Such double-edged swords are common, and we don't have any idea how to evaluate the net impact."

A **pre-law student** said, "Anxiety and depression have been on the rise in those within my generation. I was recently diagnosed with mild depression. I believe that being hyperconnected within this digital life could be a root of the issue. I find myself, my mood and thoughts, influenced tremendously by scrolling mindlessly on social media platforms and by the content that I come across daily, even hourly. It has become increasingly hard to not constantly compare the reality of my life with those reflected though my iPhone screen and – even though I am aware of the false reality of the profiles I come across – it is hard not to have my own self-esteem and confidence plummet when I come across a perfectly tailored life. Netflix and all of the streaming sites have proven to be hazardous for my productivity, as I have become effortlessly addicted to them as a means of distraction and procrastination. I also see this constant hyperconnectedness impacting my friends. It worries me, truly does, to see the impact it is having on my family, as my parents are constantly struggling to catch up to the newest innovation that impacts their daily lives, and my little sister has seemingly found life behind a screen. She has adapted so quickly to life with an iPhone that she does not even remember ever playing with the traditional toys she once enjoyed."

An **anonymous respondent** wrote, "Recently I participated in a family reunion attended by a 2-year-old child. When the child's behaviour became too disruptive of adult conversation, she was given a tablet and shown the movie Frozen. The child became mesmerized and non-verbal, almost in a trance-like state. I compare this to when my children were young and were entertained by non-digital distractions – human contact, arts and crafts, a story – and I wonder what the impact of this very early digital exposure will be. Engagement with technology is starting very young, and we don't really know what the impact will be."

An **anonymous respondent** said, "I recently did some research into the digital lives of parents and teens in Japan to mirror research that was done in the U.S. It is very clear that when you compare these two cultures there is more similarity than difference in the ways digital technology is reshaping our most intimate relationships. In many of the families we heard from, mobile devices and the content on them is a source of anxiety, conflict and concern. Parents are struggling with their own use and overuse of these devices as they are monitoring the use in their children, creating a new parenting challenge. One of the most alarming bits of data from this study was the number of teens who reported that they sometimes felt their cellphone was more important to their parents than they were – 20%. This is just not a message we want to send our children."

A **North American professor** wrote, "There is almost no one with whom I regularly interact solely face to face. I spend an inordinate amount of time with digital technology. I communicate via email, use the internet in my research and teaching, use social media for teaching, read the news online and shop online."

An **executive for a major internet business** wrote, "The easy availability of information makes it so much easier for me and my kids to, say, look at a dictionary to gain a basic understanding of a topic. This is why Wikipedia is so useful. But the profusion of digitally enabled entertainment – movies, YouTube, streaming music, video games, and so on – has not, on balance, been good for my kids. They insist on being glued to their screens, and much of what they consume is, in the words of Newton Minnow (talking about TV in the early 1960s) a 'vast wasteland.' Like nearly every medium, like radio and TV, the internet was supposed to herald an era of great information access, which would enable better democratic participation. Instead, it's become – in many corners – a cesspool, with nearly zero information value. This is not true of the whole Net. But now that Net neutrality is on the way out, the internet fast lane will be devoted to dreck, not to socially useful information."

Jason Abbott, professor of political science at the University of Louisville, said, "My children are increasingly incapable of spending quiet time alone, appear more bored and easily distracted from

tasks. As an adult I find there is a growing pressure to always be available online and to respond immediately to messages and requests."

Gail Brown, an instructional designer in Australia, wrote, "A young person I know began cutting himself when an online relationship with a girl suddenly ended. This was a person he had never even met, nor did he really know that anything she posted was real or truthful. Yes, lies can happen in the real world, but such lies are much more difficult to continue than those that are shared online."

Fay Niker, postdoctoral fellow at Stanford University's Center for Ethics in Society, wrote, "I see all around me how people's self-esteem is now wrapped up with their online social activity. This is very problematic for our inner, ethical lives."

Paul Manning, a manager, commented, "I have seen one of my children walk away from a difficult interaction rather than work it out. She did so quietly and without the other person being aware until it was too late. Another one of my children cannot live without her cellphone because, she says, 'I can have six to eight conversations at the same time.' This same child cannot stand when there is silence or she lacks the ability to interact in a large crowd. She cannot focus on one person at a time or participate in a group conversation that requires listening. While digital life has positive benefits, due to the immediate exchanges of information and the short length of the exchanges, sometimes critical information is assumed."

Tanja Cupples Meece, a homeschool educator based in North America, wrote, "I am a student and an educator as well as a freelance writer. I teach online courses and spend more time checking to see if I am doing the teaching properly, rather than actually teaching. It is also a family problem, my husband also spends a great deal of time on his phone, and if both of us are on our phones, our grandson acts out. He isn't getting the best of us."

A **professor at a college in North America** commented, "I have an 11-year-old child who is pulled into technology in ways that can be beneficial but it is also shaping his childhood in ways that are concerning. I am concerned about this new generation's capacities to balance technology activities when they are so ever-present."

A **research scientist** said, "One of the most palpable changes is how much digital technology has changed the dating landscape and our approach to relationships – especially for those of us who are younger (I'm in my late 20s). We've spent most of our romantic lives with online dating at least being an option. Just as having the constant stimulation of social media available makes it harder to commit to something like reading a book, the constant availability of new partners lowers the

threshold for starting something new, which makes people less inclined to stick through the hard parts and build something lasting with a partner. It makes our dating more conservative also – we read through each other's profiles thinking we're selecting better matches, but in taking the element of chance out of the equation we miss out on the opportunity to date people different from ourselves who could potentially be very good for us, whom we might have unexpected chemistry with, etc."

An **anonymous respondent** commented, "I've grown weary of the oversharing that occurs on social media. When people break up, get engaged, have children, etc., seeing the photos and status changes can be overwhelming and disheartening when you're in a certain emotional state and don't want to take it all in."

Toxic uses of social media

John Markoff, a fellow at the Center for Advanced Study in the Behavioral Sciences at Stanford University and longtime technology writer at The New York Times, said, "Reading Twitter at times makes me almost clinically depressed. I have done what I can to try to break the habit with only marginal success to date. Frequently it feels like I am drinking from a fire hose of polluted water."

Jillian C. York, director for international freedom of expression at the Electronic Frontier Foundation, said, "Digital technology has greatly enhanced my life over the past decade. Just over 10 years ago, I was living abroad for the first time and began to use blogging and nascent social media platforms as a way to connect with my friends and family back home. This led to surprising connections with individuals all over the world and friendships that last to this day. I don't have enough fingers and toes to account for all of the friends I've made – and later met 'in real life' – through social media, nor the career and other opportunities that have unfolded for me through these mediums. My life, my career, wouldn't have been possible before the age of digital connectivity. All good things must come to an end, however, and those social media environments that once led to beautiful opportunities and friendships have now become toxic. In spaces where I was once likely to receive positive feedback, I now face threats and harassment on a daily basis. I'm still unsure whether it's us, or the architecture of these spaces, or perhaps, that they're simply not scalable."

Raymond Hogler, a professor of management at Colorado State University, wrote, "People consume content that is self-selected, ideologically conformist and socially reinforcing. That trend will continue. I've observed, along with many other people, that the ubiquitous cellphone is displacing social interaction. As a teacher, I see students fixated on their phones in public areas, classrooms and study rooms. I think this phenomenon is tremendously isolating and divisive."

Rosanna Guadagno, a social psychologist with expertise in social influence, persuasion and digital communication and a researcher at the Peace Innovation Lab at Stanford University, wrote, "During the 2016 presidential election, I ended up losing many friends on social media because of all the divisiveness caused by the spread of misinformation through fake news from fringe news sources and Russian interference. In particular, I recall pasting a link from The New York Times on Facebook. The article ranked the candidates on honesty. Unsurprisingly, Hillary Clinton was the most honest and Donald Trump was the least honest. Some of my Republican friends thought this was a joke and laughed in response to it. This caused a pretty nasty fight between some of my academic friends and the people who laughed, and I had to shut the conversation down. I ended up unfriending a couple of my Republican friends. It made me sad, distressed and confused, and my Facebook use never returned to pre-2016 levels because these things kept happening. Since then, I've made a concerted effort to connect with people using non-text-based options (such as phone calls and face-to-face visits)."

Peter Levine, associate dean of Tisch College at Tufts University, said, "I have shifted from reading news stories about a wide range of topics in a small number of publications to obsessively following a few breaking stories on many media platforms, most of which basically repeat the same information. This shift heightens my anxiety, limits my learning and wastes time. Although it's my own fault, the new digital media landscape enables it."

Steven Polunsky, a research scientist at Texas A&M University, wrote, "My high school reunion was held as we approached the 2016 elections and was almost canceled due to high emotions and anger, fed by internet misinformation combined with an organized effort to sow mistrust of institutions like the press, police and the judiciary."

Brittany Smith, a digital marketing consultant based in North America, said, "Overall, social media now takes away from my sense of well-being, and I try to limit my exposure to it. As a professional digital marketer this has been a hard realization to come to. Initially, platforms such as Facebook helped me stay in touch with the people I care about. As more and more people joined Facebook and the algorithm changed I found that I was seeing less and less from them. Facebook was filled with updates from people who weren't close to me, and because of our tendency to share happy things that make us look good, I would come away feeling negative about my life."

Flynn Ross, associate professor of teacher education at the University of Southern Maine, wrote, "As the mother of two adolescent girls, I confront on a daily basis the potential for social media to help my daughters be informed global citizens who have access to [all] sorts of first-hand perspectives, as well as their safety in terms of who has access to what information about them including their images and how their online profiles can be used in their futures."

A **professor at a major state university in the United States** who said digital life will be mostly harmful in the next decade wrote, "The best example of impact on digital life I can think of is the ongoing effects of the 2016 U.S. presidential election and the role social media apparently played in determining its outcome."

A **writer/editor based in North America**, wrote, "For me, the internet has gone from being a place where I could be myself, to a place where I must carefully analyze every bit of behavior. There is also a lot I do online that I would rather not do. I hate Facebook, but I have to stay a member to keep up with events in many of my friends' and family's lives. I have to use LinkedIn for work, but I deal with a stalker, who greatly appreciates all that information (which I must keep public, if I'm to expect any potential clients to take me seriously). What was fun is now stressful."

A **general manager** commented, "A member of my family who is in her early 60s has seen her general contentment with life decline as her consumption of social media has risen. In the past, her mornings, for example, meant reading the newspaper and listening to the radio. Even when the news was bad, she nonetheless was generally hopeful and optimistic. Now, she checks her Facebook, Twitter and Instagram while still in bed and by the time she comes downstairs in the morning, her mood for the day is already defined. More often than not, that mood is a negative one (anger, anxiety, fear, stress, pessimism, etc.) than a positive one. While this family member recognizes that her now hyperconnected life is bad for her, she has been unable to moderate her digital consumption throughout the day. This is now having a negative impact on her relationships with other family members."

An **anonymous respondent** said, "My internet service provider throttles many websites and interjects ads into others. And this was before the end of net neutrality. While it is easier to contact friends and family, most social media sites seem to be fragmenting civil society by creating information and entertainment bubbles for like-minded people. Uber is convenient but it doesn't provide a living wage for drivers."

A **cybersecurity entrepreneur, coach and investor** wrote, "There appears to be an increasing population of people who mistake social media presence with professional achievement. This is confusing to new entrants into the industry. Simultaneously, there seem to be increasingly prevalent moral panics. These are often followed by fervent attempts to demonstrate one's alignment, in the hopes of either gaining favor or avoiding opprobrium for being insufficiently 'aware.' People attempting to remain on task in professional contexts risk censure if they aren't visibly participating in the cause of the day."

An **anonymous respondent** commented, “Three and a half years ago there was a school shooting at the University of California, Santa Barbara. Seven people were killed, including the shooter Elliot Rodger. Within a day, reporters found a chilling YouTube video where Rodger vowed ‘retribution’ for a lifetime of sexual rejection. My social network was full of posts about this video and the need for gun control. I understand the outrage – it’s certainly justified – but it felt like there was no room for anyone to express any other feelings on social media. And I needed to express other feelings. I had taught some UCSB students the prior year. After I saw there was a shooting I had no idea if some of my favorite former students were dead. Either way I had to deal with the shock that my students could be shot and killed around campus. When I talked to my family or my friends outside of social media, they were able to show empathy for what I was feeling. That’s a credit to my family and friends, but also says something about how people share feelings on social networking sites. When I tried to reach out and share my experience on Facebook, I was judged for not immediately leaping to outrage. I could sense such a profound lack of empathy that I logged off for a few days. This seems to be a common pattern after traumatic events. People who want to share their outrage leap to social media to get things off their chest, blocking out anyone who needs a more empathetic back-and-forth to deal with the trauma.”

An **anonymous respondent** commented, “My half sister – in her early 30s – abandoned Facebook having found it made her miserable and envious. Her well-being has improved dramatically.”

An **anonymous respondent** wrote, “Slices of digital life: Waiting for people to finish tapping on devices before or during a conversation. A relative explaining how the Boston Marathon bombing was a hoax and citing online posts as support. Tinder. The fact that nothing happened after [the] Occupy Wall Street demonstration. In Egypt, [the Arab Spring] demonstrations led to replacing one dictator with another.”

An **associate professor at a U.S. university** said, “Family members, especially children, are addicted to their devices. In some cases, the lack of social skills is evident. The adults in my life are also hyperconnected and are on their devices right before sleep and upon waking up. The decrease of human interaction is evident. I try to stay as disconnected as possible. I am much happier when I am not on Facebook. When I do check it (it is handy for keeping up with people) I am compelled to continue to look through it, and I spend too much time on it.”

An **anonymous respondent** said, “Digital tech has made it infinitely easier to shop and pay bills, but it has NOT addressed protection of American security from foreign ‘meddling’ (Russia, et al.), and it has not addressed protection of individuals from hacking and similar mispursuits.”

A **retired public opinion researcher** wrote, "I have cancelled my Facebook page because uninvited and socially untested information, opinions and behaviors had the potential to influence my own political (as in polis) social contracts."

Never-ending work with new demands and expectations

Lori Laurent Smith, an entrepreneur based in North America, commented, "The promise of digital technology was to make our lives easier, freeing our time to do the things we wanted to do. My reality has been the opposite. There is so much more than I ever imagined that I still want to learn, research and do. Also I spend a ridiculous amount of time learning how to set up a blog, upgrade memory in a laptop, take better pictures, write meaningfully in 140 characters, learning how to use new apps, writing comments and feedback, and reading millions of pages of content. I was spending a disproportionate amount of time using the internet and interacting with people online more than I did with my husband, daughters and friends in real life. As this realization has slowly dawned on me in recent years, I've set timers to limit my time online when my family is around and when anyone needs me, I immediately shut down what I was doing online to give them my full attention. I turn off my phone regularly when I'm hanging out with my friends and family in real life (which annoys people trying to get in touch but it's my life)."

Annette Markham, professor of information studies and digital design at Aarhus University in Denmark, said, "I exemplify the hyperconnectivity of knowledge workers. At this stage of my career, where I network internationally with colleagues, work with dozens of students at a time, and administer multiple projects and people, I simply cannot be disconnected. I feel this emotionally and bodily every single day. My wrists hurt frequently from ongoing carpel tunnel syndrome; I suffer from chronic back pain that we colloquially call 'academic back.' I feel increasing pressure – as well as a lure – to build my international reputation as a social and digital media expert through intensive connectivity, continuous publishing and strategic self-branding on multiple platforms. I feel like this is an all-or-nothing situation. Sometimes I just feel exhausted. Other times, I feel like one of thousands of ants trapped in a barrel filling up with water and we're all clambering on top of others to keep from drowning. In the early 2000s, I could ask my media students to disconnect for one week. Around 2012, I could get them to disconnect for 48 hours. Now, maybe one in 20 will be able to disconnect for 24 hours. As more services enter the electronic-only sphere, people are required to be connected, to know how to access and use these services effectively. It means being online. Those of us who have been obsessively online for 20 years may be accustomed to an always-on lifestyle and have learned how to live with it. But knowing how to deal with hyperconnectivity is not the same as being unaffected by it. We – and by that, I mean myself and many of my friends and colleagues in the knowledge or tech industry – pay a heavy price. Sustained stress leads to chronic health issues. Continuous exposure to millions of

people personally reacting to crisis after crisis on Twitter leaves many of us feeling sad, angry and hopeless. But we seem unable to stop checking our newsfeeds. The negative energy feeds on itself. After the U.S. presidential elections in 2016, almost all of my colleagues showed classic signs of depression. Worse, we no longer find it surprising to feel sad, angry and depressed. We may not be immured to the violence this constant exposure does to our bodies, minds and souls, but we don't fight it either. I could say more, but you get the point."

Douglas Rushkoff, a professor of media at City University of New York, said, "Right now, I'm interested in the mental health crises being experienced by the young men who took BJ Fogg's captology classes, implemented the strategies at Facebook and Snapchat and are now realizing how much mental, psychological and social destruction they have caused."

Paul Rozin, a professor of psychology at the University of Pennsylvania, said, "I'm not sure that email is such a great thing. One colleague doesn't use email and seems to be extremely productive. I spend half the day on it. Much of that half would have been spent on productive thinking or teaching in the old days."

Thad Hall, research scientist and co-author of the forthcoming book "Politics for a Connected American Public," wrote, "The biggest change to daily life is the difficulty in having a solid block of uninterrupted time in one's day to think. When communications were primarily by phone or mail – or even when Wi-Fi/smartphones were not ubiquitous and it was easy to get away with a laptop without being constantly connected – it was possible to separate yourself from the digital world. Even writing this, I am aware of my phone next to me and that my email alerts are on, and it is hard to avoid being mentally distracted. Even if I am not looking at my email or my phone, I know they are there and it is distracting."

Meg Mott, a professor of politics at Marlboro College, said, "Early in my teaching career, I thought that teachers should be judged by their response time to emails. Perhaps this was my way of proving myself worthy of joining an esteemed faculty. I may not have read Plato's 'Republic' in the original, but I could check my email on an hourly basis. At a certain point I realized that speed was working against me. My replies may have been prompt but the tone was unmistakably crabby. This was particularly true during times when I was trying to carve out time to work on my own research. It took a rather dramatic change in my lifestyle to unhook myself from my 24-hour inbox. Suffice it to say that a yurt and an outhouse were involved. The effect on my stress level was immediate. In order to check my email I had to be in my office during a time when I was not teaching. Not surprisingly, even though I was less available to my students, the teaching relationship greatly improved."

An **associate professor at a major university in the U.S. Midwest** said, "The divide between work and life, and the time I spend not connected, is increasingly non-existent. My phone and computer are always by my side. I might be working from home to my office with only a 15-minute gap in between. During that gap, I often check email when at a red light. Even if I bike, I am listening to something streaming on my phone. I have communicated via email with my spouse. I have also texted my children to come to dinner in order to easily get their attention. I am hyperconnected and always responding to the first thing rather than looking around me or making decisions that take time and thought. I have back problems and posture-alignment problems as a result of extended time in front of a multitude of screens."

A **research scientist** said, "Rather than reading a book or magazine on my commute, I do things like check Facebook and look at emails that I can't easily respond to. Rather than arriving at work refreshed or arriving home with some space from work, it all comes with me."

A **college administrator based in North America** said, "In terms of personal impact, I have developed the habit of taking more work home, which often negatively impacts family interactions and leads to home-based stress development. Further, it has reduced the time for exercise and leisure – all of which can negatively impact physical, emotional and mental health."

A **co-founder of an institute studying values** wrote, "Work is now a 24/7 ordeal."

A **professor emerita of public policy at a major U.S. private university** said, "I am becoming increasingly aware of the way constant access to digital forms of communication can be overwhelming. I think I'm relatively politically/socially aware, but the current (growing) bombardment of email appeals for political action or donations to address a multitude of apparently apocalyptic problems may at some point numb my senses."

Changing norms about speedy responses and engagement

Renee Dietrich, a retired professor, commented, "The main change is that people expect a response faster. There is not much time for reflection or analysis."

A **professor at New York University** wrote, "My professorial title should be 'professor of email.'"

A **North American entrepreneur** wrote, "There have been many instances when I haven't responded on Facebook in a way that someone felt I should, resulting in resentment. There have been other times when I've been 'stuck online' and then late for real-world activities. There have

been lots of times where information presented sounded good and healthy but upon research turned out to be dangerous advice."

A **CEO of a publishing house** said, "While digital technology has certainly connected me with old friends and family members, it's not like we really know these people. I now have former classmates asking me for money, I also know things about relatives and their political beliefs that make me never want to spend time with them. So as much as it brings people together, it also drives wedges. I'm not proud of the contempt I feel for some former friends after reading their Facebook posts, but nor can I deny it."

A **research scientist** said, "Checking Facebook has become a chore, yet I must do this regularly to shore up ties with friends and family. As a woman, I'm culturally conditioned to do so."

The attention economy and surveillance society

Jeremy Blackburn, a computing sciences professor who specializes in the study of the impacts of digital life, wrote, "My children (girls, 2 and 7) spend significant amounts of time on the internet (probably too much, but, hey, I practice what I preach). Bottom line: Google and Amazon probably know more about their preferences than I do, and could probably influence them in ways that I can't even fathom. To that end, my eldest daughter really enjoys one particular YouTube channel, which is entirely appropriate for her (FGTV), however, she has trouble recognizing that the channel is a *business.* Thus, she will on occasion come to us and ask to do one of the absurd things that the channel operators do. For example: A giant food fight. My daughter simply does not have the maturity to fully understand that these people are making their livelihood with their videos, that they are edited in such a way as to make them entertaining, and that what she sees is not their normal familial activities. We have spent a lot of time discussing this with her, but it still pops up on occasion. Perhaps this is an indication that we are not properly regulating the online content she consumes, but I suspect that, even though we provide her with a fair amount of freedom, we are much more stringent than the 'average' parents. I believe that this general idea extends to teens and adults as well. We are inundated with content that represents a *curated* slice of our contacts life online. This slice is non-representative of reality, and can lead to some serious misconceptions about how other people live. This was much less of an issue before the ubiquity of the Web, and my gut feeling is that it will grow unabated for quite some time."

Marcus Foth, professor of urban informatics at Queensland University of Technology, wrote, "We need to stop using digital technology for the blind and undirected acceleration of neoliberal growth expectations and instead reintroduce a moral compass of compassion and ecological thinking. While I see the potential of digital technology to do great things for society, I have strong

reservations about how it is used and adopted in everyday life in pursuit of neoliberal growth trajectories that are further fueled by the big data analytics craze. Critical humanities research is urgently needed to influence the technocratic and engineering driven culture to solve humankind's problems. In my personal experience, I lament seeing how great research outcomes are increasingly being reviewed by bean counters in a quantitative assessment of research performance that reduces research to numbers: grant income, Ph.D. completions and number of articles in Q1 journals. Big data is killing the zest of aspirational researchers who wanted to change the world for the better and are now just reduced to a row in a spreadsheet. Speaking of well-being, many just quit."

Deborah Coe, a coordinator of research services based in the U.S., said, "I hate to admit this, but I spend a ridiculous amount of time on my cellphone, checking emails, Facebook, Pinterest, the news and playing games, on a daily basis. And I do it to the point of choosing to not go outdoors on a beautiful day, or to the point of getting blurry vision and ignoring the warning signs that I've overdone it. Here's my question: If I, a social scientist, cannot resist this temptation, what is happening to our children and our children's children?"

A **professor based in North America** said, "I want to share a short excerpt from Chapter 1 of Frischmann and Selinger's 'Re-Engineering Humanity' (Cambridge, April 2018): 'Last year, my first grader came home after school very excited. 'Dad, I won. I mean, I've been picked. I get a new watch.' 'That's great,' I said, 'What happened?' He quickly rattled off something about being one of the kids in his class who was selected to wear a new watch for gym class. A day or two later, I received the following letter in the mail from the school district: 'Dear Parents/Guardians, Your child has been selected to be among the first group of students to participate in an exciting new initiative made possible by our recent $1.5 million PEP [physical education program] Grant. We have added activity watches to the K-12 physical education program so that we can assess how the PEP grant impacts students' physical activity in [the school district]. We are periodically selecting groups of students at random to wear activity watches on their wrists to track daily activity time. One of the goals of our program is to see that students get the recommended amount of physical activity each day (60 minutes). As part of a quality physical education program, the use of activity watches can motivate students to challenge themselves to become more physically active. For the students selected to participate in this first group, we will be distributing activity watches starting Jan. 13 for students to wear before, during, after school and over the weekend until Tuesday, Jan. 21. We ask that students do not take off the watch once it's on their wrist. They should sleep, even shower with the watch in place. There are no buttons to push or need to touch the watch, as it is pre-programmed to record and store each day of activity time. At the end of the nine days, each family will be able to access a report of their child's activity, and you are welcome to consult with your child's physical education teacher about what you learn and ways to further support your

child's physical health and fitness. In addition, the group's combined information will be used to provide baseline data on student physical activity in [the school district]. In closing, I invite you to join me and your child's physical education teacher in motivating your family to participate in physical activity together. If you should have any questions about this new technology, please do not hesitate to contact your child's physical education teacher. Yours in health, XXXX XXXXXXXX Supervisor of Health, Physical Education and Nursing Services.'

"When I read the letter, I went ballistic. Initially, I wondered about various privacy issues: Who, what, where, when, how and why? With regard to collection, sharing, use and storage of data about kids. The letter did not even vaguely suggest that parents and their children could opt out, much less that their consent was required. Even if it had, it couldn't be informed consent because there were so many questions left unanswered. I also wondered whether the school district had gone through some form of institutional review board (IRB) process. Had someone, anyone considered the ethical questions? I read the letter again but got stuck on: 'We ask that students do not take off the watch once it's on their wrist. They should sleep, even shower with the watch in place.' Seriously, bath time and bedtime surveillance! The letter made me think of one of those Nigerian bank scam emails that go straight into my spam folder. Such trickery! I thought.

"I remembered how my son had come home so excited. The smile on his face and joy in his voice were unforgettable. It was worse than an email scam. They had worked him deeply, getting him hooked. He was so incredibly happy to have been selected, to be part of this new fitness program, to be a leader. How could a parent not be equally excited? Most were, but not me. I contacted someone at the PTA, spoke with the supervisor of health, wrote a letter to the school district superintendent, and eventually had some meetings with the general counsel for the school district.

"The program is like so many being adopted in school districts across the country – well-intentioned, aimed at a real problem (obesity), financed in an age of incredibly limited and still shrinking budgets and elevated by the promise of efficiency that accompanies new technologies. What caught people's attention most was a line from the letter I sent to the superintendent: 'I have serious concerns about this program and worry that the school district hasn't fully considered the implications of implementing a child-surveillance program like this.' No one previously had called it 'child-surveillance.' All of a sudden, the creepiness of bath time and bedtime surveillance sunk in. Naturally, this triggered familiar privacy concerns. The term 'surveillance' generated a visceral reaction and was an effective means for getting people to stop and think.

"Up to that point, no one seemed to have done so for several obvious reasons. People trust the school district and love technology. The salient problem of obesity weighs heavily on the community; activity watches seem to be a less intrusive means for addressing the problem. People

obtain information about their activity levels and then are better able to adjust their behaviour and improve fitness. They can do so on their own, as a family, or in consultation with the physical education teacher. Plus, it was funded by a federal grant. The activity watch program presents substantial upside with little or no downside, an easy cost-benefit analysis. For most people, it seems like one of those rare win-win scenarios. After my intervention, very little changed; better disclosure and informed consent apparently would fix everything. These limited privacy concerns fall woefully short of acknowledging the full power of techno-social engineering. The 24/7 data collection and the lack of informed consent are real problems. But the stakes run much deeper."

Sleep problems and stirred-up woes

Larry Rosen, a professor emeritus of psychology at California State University, Dominguez Hills known as an international expert on the psychology of technology, wrote, "Since publishing a journal article on the impact of technology on sleep, I have made a conscious effort to silence my phone one hour prior to bedtime, and it has improved my sleep and alertness during the day."

An **attorney based in North America** wrote, "There is a loss of, and interruption of sleep. There are conflicts over failure to respond in what is now seen to be a 'timely' fashion. There is increasing personal impatience. The effects are especially strong on teenagers."

A **communications professional based in North America** said, "My sleep patterns have been negatively impacted."

A **North American professor** wrote, "Time previously spent dealing with boredom – day dreaming, contemplating, etc. – is now spent tethered to one's phone, which is not relaxing and eventually makes my thumbs hurt."

General concerns and complaints

Riel Miller, team leader of futures literacy at UNESCO, said, "Digital life should be pull not push. Demand-driven. What it hasn't yet been able to deliver on is the capacity to know why, when and how to pull. Without the curiosity engine configured for pull's life of surprise we suffer under the regime of push's desperate need for certainty, diminishing what the Net can deliver, even if it allows much more spontaneity."

Mike Caprio, innovation consultant for Brainewave Consulting, said, "I have consciously made choices to limit the intrusion of my digital life into my real life. I no longer carry a smartphone, I only occasionally carry a flip phone when I know I am going to need to be reached or make calls. I only allow notifications from computers or tablets to interrupt me during work hours. I deleted my

Facebook account in 2013. While this has reduced the number of interactions with friends, family and colleagues, I feel much more connected to my life and in my relationships."

Scott Johns, a high school teacher, commented, "Just yesterday, I had been to a secondhand book store to get some specific texts (a job-related task) and as a joke bought a couple of old fiction books. Then there was a period of time when I was in my car waiting for my wife to finish a meeting and I thought I'd have a read. They weren't great books so I expected to have a bit of a laugh at them. The written words on those old pages captured my mind in a way that was unexpected. My mind was soon lit up with imagery and I went into a deep state of contemplation of not only the story but the skill of the writer. I realized that there was nothing else to the book, it had its story and no more, so I was able to let go of the need for there to be more happening. Had the story been available online, firstly, I would not have chosen it above the proliferation of options and demands presented by the computer as vehicle for the internet. Secondly, had I started the story, my mind would not have wandered within the story but to the many other things the computer could have provided me at that moment. I would have engaged thinly with the story with the result that little trace of it would have remained in my neurology. The cute and clever choices of words made by the writer would have vanished by breakfast time. No enhancement of my mind would have occurred. It would have been a strangely empty task. But this morning I have the very unfamiliar desire to read fiction books."

Laurie L. Putnam, an educator, librarian and communications consultant, wrote, "Anecdote #1 Digital technologies let us be more present in the lives of distant family and friends. My family is spread around the region, close enough to get together often, but far enough apart to make in-person visits an effort that requires significant travel time. Yet, despite the distance, I look after my elderly mother and keep in close touch with my 12-year-old nieces. Every day we depend on email, texting, document sharing and web-based medical systems. From 150 miles away I can order medications for my mother and communicate with her doctors online. I can help my nieces with their homework online, in real time, and we can share daily life in pictures, text, and video. Our days and lives would be very different without the internet. Anecdote #2 My shiny new washing machine blinked at me with a high-tech LED readout that offered more choices than ever for cleaning my clothes. Cool. But those lights went out a few years later, just after the warranty expired. A service technician diagnosed the death of the circuit board and ordered a replacement – cheaper than a new washer, he said. The new board arrived, but it didn't work either, the fault of another faulty chip. 'That happens. It's not unusual,' said the technician who next recommended discarding the entire 300-pound washing machine and buying a new one. The experience was frustrating, inconvenient and expensive. Did the digital washing machine clean my clothes better? Sometimes. I liked and used about 20% of the options. But overall I had been perfectly happy with my old analog washer. Was the digital washer more expensive? Yes. Did it break faster? Yes. Was it

fixable when it broke? No. Recyclable? Unknown. Chips have relatively short life cycles, and if we don't want our children to inherit landfills of disposable appliances, we need to design more reliable products that can be serviced and recycled. Did the digital machine raise my stress level? Yes. Overall, did the digital washer improve my well-being? No. And it wasn't even connected to the Internet of Things, surreptitiously collecting data about my lost socks and water usage. Just because we can make everything digital doesn't mean we should. There are cases where our well-being is better served by simpler, analog tools."

Frank Odasz, president of Lone Eagle Consulting, commented, "I started online in 1983 with two big personal goals: 1) To learn how to live and work solo from anywhere. Now I am celebrating my 20th year as president of Lone Eagle Consulting, primarily creating and delivering unique online courses for citizens and educators, specializing in rural, remote and indigenous internet learning. I've done over a million miles, presenting prolifically. 2) To understand, truly, what's the best that good people can learn to do for themselves and others online. Being online at 300 baud back in 1983 has now evolved to having 7 MB fixed wireless at a rural ranch house in Montana. I've been able to dramatically enhance my ability to absorb lots of information routinely and to synthesize my learnings in articles, live presentations and unique online courses. But, the shelf life of such knowledge keeps shortening due to our age of accelerating change. The sheer volume of what I've put online is testament to the power of online self-directed learning. But along the way I taught myself to avoid the time-wasting tactics of corporations. Believe it or not, my smartphone hardly ever rings, beeps or otherwise controls my peace of mind. The ideal rural lifestyle, Goal #1, has been something of an art to achieve and maintain. This morning, I'm about to write an article on the Code of the West, linking our moral code to [corporate entities'] snarky, persuasive algorithms and the 6,000-plus youth suicides annually, anxiety problems of 1 in 5 screen-agers and more 'impacts' that are just recently making the mainstream news. I've presented for APEC [Asia-Pacific Economic Cooperation] twice on indigenous broadband training best practices and the challenges of positive social engineering; designing for positive outcomes by a connected human family. We're realizing that everyone has the choice for a global voice and impact. If the remaining 3 billion not online – mostly young, poor and eager to learn but without schools, teachers or online access – are suddenly given online access without moral guidance and meaningful short-term outcomes, then connectivity worldwide with be a lose-lose instead of a carefully orchestrated win-win. This is the understanding that I've worked to achieve since I came online in 1983 at 300 baud. Here I find myself, still solo, knowing one in five kids have been cyberbullied at the high school in Meridian, Idaho, my granddaughter will attend. Net neutrality and freedom of creativity and speech has been killed by tech giants; 47% of jobs will disappear by 2025 due to AI and robotics; and the tech giants are killing competition and startups instead of seeking the win-win of unleashing the latent creativity in everyone on the planet. The stupidity of actions by Not My President [Trump] are

against common sense, the love of learning, fairness for all and American values. But, if too many rural folks are still fooled by Facebook news on their smartphones, then the worst is yet to come."

A **professor from North America** wrote, "The internet is everything for me, my family and my students today. We would not and could not do without it. Period. It is amazing! However, its ever-present influence in the lives of the hyperconnected also seems to be quite overwhelming – it is causing stress and anxiety and somewhat lowering the learning performance in courses for most of my students. I have been teaching at a fairly exclusive private university for 20 years. These students have all of the privileges of the most-connected. Over the past decade the students have been progressively more resistant to reading and writing assignments that require any sort of deep critical thinking, and I have had to annually reduce the course expectations as they literally buckle under what they perceive to be undue 'pressure' from simply being asked to do reading and writing assignments that were absolutely no problem for students of the first decade of the 2000s and previous."

A **research scientist** based in Europe commented, "I used to hate writing text messages and only used them in case the other person couldn't pick up the phone and I needed to leave an important information. Instead I called people, whether it was for making an appointment, asking them how they are, etc. Shortly after I started to use WhatsApp however, I was dragged into the constant availability and spend so much time on writing things that could have been discussed more easily on the phone. Because I receive so many messages, I cannot have my phone on loud when my data is switched on, which also means I miss phone calls. The fact that less and less people even recognise when they are being called makes it even more difficult to switch back to calls instead of messages again."

Stephanie Mallak Olson, director at the Iosco-Arenac District Library in Michigan, wrote, "I am sad that people who are not 'connected' to the digital world are often ignored or left out. If you are not on Facebook and your family only shares photos via Facebook you never see them. If you don't own a computer to get bank statements online you are often charged a fee to get the statements in hard copy. If you are not on a device and everyone else around you is then how do you get to be a part of the conversation? While at conferences, I find it rude that people are doing other online work instead of giving their attention to a speaker. Many sources of information are now only available online and people must rely on others to find the answers. I recently heard a doctor say to a patient 'you need to find someone to look it up for you online.' People in that same office wouldn't take the time to assist a person with their 'patient portal' access but instead gave them a Web address where they could take an online course. I happen to know the person does not have or know how to operate a computer. I use computers every day both for work and home. I do not text

or even have my cheap cellphone close by as I want a limit on my time spent on a mobile device. I also support getting together with family without devices so we can talk."

Tiziana Dearing, a professor at the Boston College School of Social Work, said, "We have a running quote in our family that sums it up so well. 'Do you remember when you used to have to wonder things?'"

A **research scientist and internet pioneer** commented, "In the small, digital technology has been a highly positive experience. I work from home part-time – a wonderful contribution to my well-being – and I keep in contact with friends too distant to see often. It is in the large – the societal – where I feel the negative aspects of the digital world have personal consequences for me, an impact on my well-being. The rise of hatred, the manipulation of politics and so on – these are *not* distant events with no personal impact."

A **professor** wrote, "Now when I wake up in the morning I reach for my iPhone with trepidation to find out what outrage our so-called 'president' has perpetrated already. It's horrible."

A **senior product strategy expert** commented, "I ride bikes with an older friend in the mountains of bucolic Pennsylvania. The friend, who had not yet discovered Facebook, Instagram and texting, and I would go for a ride. I loved that I was disconnected for a few hours. The last time we rode he was getting alerts through a Garmin mounted on his handlebars (they were mostly from Facebook – people liking a photo, etc.). It interrupted both my experience of the bike ride and my connection to my friend."

A **professor based in Oceania** wrote, "I grew up with pen and inkwells at school and a typewriter at work. Right from the very beginning it was too complicated and time-consuming for men to do this type of demeaning, boring work. Over time, typing pools disappeared, executive assistants appeared and even some brave men would actually *type*. Technology improved 'women's work' but not their prestige or paycheck. My first experience with email occurred while working for large American actuarial firm. I could send work last thing during the day (in Australia) and first thing the next morning I had a reply. Wow! Now technology is being driven by business across all areas for money, money, money. Greed has taken over. Isolated pensioners and the poor across the world are being excluded from knowledge, personal growth and education, due to costs, the need for constant upgrading of hardware and software and the greed of the 1% through money manipulation, laundering and crooked tax loopholes. Technology keeps increasing inequality. The disadvantaged will never catch up."

A **data scientist based in Europe** wrote, “A friend has recently begun trading bitcoin. The volatility of the ecosystem, the potential for massive gains and the stories of others benefiting incredibly from their investments led to near-obsessive behaviour. He would phase out of meetings, meals and social events to check the current bitcoin value – it became more important than anything else.”

An **executive director of a Europe-based nonprofit** wrote, “We don’t understand what we can trust anymore. Just this week, a member of the family wrote over iMessage to ask me to share a password over a ‘secure’ medium ‘like email’; and another asked for a more secure way to do banking than over Wi-Fi. I’m not mocking either; I’m pointing out that people I know who don’t necessarily get what I do for a living don’t quite understand what’s going on but have concerns that will lead to both withdrawal and poor decisions that will negatively affect them.”

3. Fifty-fifty anecdotes: How digital life has been both positive and negative

A number of those who responded with personal anecdotes or observations about digital life from their own point of view shared a fairly even split of satisfaction and worries. A selection of these mixed-response anecdotes follows.

Sasha Costanza-Chock, associate professor of civic media at MIT, said, "On the one hand, digital technology has been used by progressive social movements to rapidly organize an enormous mobilization wave after the election of Trump. We've seen digital media used as a key tool to turn out hundreds of thousands of people with very short notice to protest the Muslim Ban, attacks on LGBTQ rights, immigrant rights, the Womens' March, #MeToo, continued #BlackLivesMatter mobilizations, and more. At the same time, digital media are also used to surveil social movement actors in increasingly sophisticated ways; to propagate well-funded disinformation campaigns; and they are also used by far right movements.”

James M. Hinton, an author, commented, "Having grown up in the pre-internet era, my childhood was spent in a substantial monoculture. There was a single shared set of values and beliefs that everyone was expected to conform to. As someone who did not fit into that set of shared expectations (and only grew further apart from them as I aged) this created a substantial sense of isolation and even oppression. The advent of internet technologies – and particularly the ability to communicate instantly, inexpensively, across the planet – has given me access to like-minded individuals who have eased that sense of isolation. This makes it sound as though my

answer should have been that these technologies have created, and will continue to create, a substantial improvement for my well-being. However, the very technologies that have created these opportunities have exposed me to even more of the general hostility of the surrounding culture to those like myself. Rather than a small, local community isolating me, now there is sense that a substantial portion of the world, establishment and orthodox belief systems are actively opposed to my positions. Perhaps, to take things to a bit of an extreme, I could compare it to being sent to the Warsaw Ghetto. I am, at last, surrounded by a large number of people like myself, but with an impending sense of dread at what is waiting just beyond the fence to eventually come down and wipe us out."

An **internet activist** from Europe said, “Great for keeping in touch across oceans, but across the city people’s tendencies to substitute text for voice is not always good. It is great to be able to look things up instantly, but this may lead to shallow understanding of answers."

An **internet pioneer and social and digital marketing consultant** commented, "On one hand, I can be in close communication with my 12-year-old daughter and not have to wonder where she is as she goes about her day, and can remind her to bring things home from school. I can also be in contact with friends through social media, which helps as I live in a city where I don't have many social outlets. On the other hand, I've found that too much time spent online, particularly on Facebook, can make me feel depressed. Either I catch myself comparing my life to the posts that others make, or, I get overwhelmed by the toxic political atmosphere currently playing out.”

A **senior lecturer in media studies** wrote, "There are both positive and negative consequences from being always-on. Being always-on means that I can be in constant contact with my family who live on the other side of the world, but it also means that I receive work emails all throughout the day."

Frank Kaufmann, a scholar, educator, innovator and activist based in North America, commented, "Technology improves the lives of people who can avoid being dominated by it and forced into debilitating addictions to it. Technology allows me to grow and benefit from loving relationships among friends and family who can now be close despite geographical distance. Tragically it prevents the addicted from growing and benefiting from the most exquisite types of encounter, namely being in the physical and personal presence of another."

An **anonymous respondent** wrote, "Twitter is the greatest time-sink ever but a great source of interesting news and entertainment. However, I waste too much time on it when I could be reading the newspaper or a book."

Eric Royer, a professor based in North America, said, "Digital technology has fundamentally reshaped higher education, to the point where lectures are being replaced with online courses and information is readily available at the click of fingertip. This means that knowledge is no longer the domain of the 'Ivory Tower'; however, I hold concerns over the effect of the internet on actual learning and a love for education itself. As a consequence of digital technology, education has become a commodity, and students view it as a means to an end."

A **post-doctoral fellow at Stanford University** commented, "My family and I use our smartphones to send photos, video chat and send text messages on a daily basis, allowing us to stay in contact more frequently we did back when letter writing and telephone calls were our ways to stay in touch. On the negative side, I look at headlines way too much as a form of stimulus any time I have a second to spare – even when I'm with my children. I'd say I'm less present, less able to focus on reading long form text, than I was before my smart phone came into my life."

Richard Jones, an investor based in Europe, wrote, "Prior to 2010 I used physical newspapers, watched scheduled entertainment, used a voice phone which could also send texts, used a map to navigate. I used to get frustrated waiting for Windows to boot up. As of 2018, I expect instant service when I ask a voice assistant to play me music, to adjust the heating, to read me books, to adjust the lighting, to display directions and choose the route to drive anywhere. I have a continually curated email subscription list, I have several newspapers on my devices, I no longer use physical diaries on my tablets or other display devices and my handwriting has due to non-use deteriorated. I can switch between devices almost seamlessly, I expect – through the cloud – to continue wherever I am and to use the best screen physically available locally. I physically and mentally sense a torrent of information which I navigate through and, even though I feel some confidence relative to my peers that I'm staying on top of it, I sense youngsters' greater ease with some of it and a greater bewilderment as to where to focus. I guess this is due to the continuous split-second choices and discarded or simultaneous deep-dive leads presented by the networked nature of hyperlinks. We are all on personal journeys as we navigate these choices and attempt to prioritise effectively. This opens the door to effectiveness but also stress. Life could typically have been much more aligned with one's peers in previous decades. For instance one would study the same syllabus at university. One might go to broadly the same holiday destinations. But nowadays the opportunity to self-curate one's education by increasing access to material presented by the best educators, to go off piste [the beaten trail] in research, to use drone footage of holiday resorts not only to select but to remotely experience holidays through high resolution YouTube videos on huge screens in high definition is marvellous. I am particularly interested in the developments about to enrich the lives of elders' living arrangements: the potential to physically monitor their well-being (IoT sensors based on motion, heat, pulse and analysed by algorithms identifying exceptions to norm) or voice-controlled calls for help. I definitely suffer stress to do with feeling

out of control or discomfort because whereas I typically lead a single-focus style of life I now lead a much more immersive style of life. Deep-dive focus with the associated memory capacity and recall used to be a good approach. Now, as search engines augment our recall and the information available is so vast, Edward de Bono's 'experience blotting pad' becomes to me the only viable way forward; that means submitting to accelerated information throughput, letting the brain rank the leads by depth of import and relevance and cross-correlate the hodgepodge into useable conclusions."

A **senior lecturer based in Southeast Asia** said, "Time wasted on social media is negatively affecting well-being; positively, social media helps to bring people close, so that it helps to make a lively environment with intimate people. In education, it has been a good platform as well as a resource."

Seth Finkelstein, consulting programmer at Finkelstein Consulting, wrote, "When the Net was younger, many users of it were easily able to have *substantive* open forums where anyone could join. I very much enjoyed being able to have discussions with people who were at a status level far greater than I could have communicated with beforehand. On the other hand, that meant people at a correspondingly higher status level could be personally offended by what I wrote. In retrospect, for me, the trade-off was not worth it. This is now writ large in social media today. There's much more of a potential for becoming internet-famous, which can be a blessing or a curse. But it's possible that there are many more and powerful curses around than blessings."

A **vice president at a major entertainment company in the United States** commented, "Clearly, collective action (good or bad) happens with much more ease and speed. I marvel at the ease of organizing things that result in greater connectivity with my family – from renting a house in a far-away place for vacation to helping my children."

A **user-experience researcher** commented, "It has both profound positive and negative affects. On the profound positive side, there was the time my son called me from an ambulance after taking a bad fall on a ski mountain. I was on a chairlift; he called me from his cell phone to mine. He was only 10 years old. I immediately skied down and met him at the hospital. It turns out he was fine, but as a parent, it was important to me to know about this right away. On the profoundly negative side, whenever I am with my teenage children they spend much more time texting and playing with their phones than they do talking to me. I feel it makes it easier for them to separate themselves from their parents."

Andie Diemer, journalist and activist user, wrote, "I use technology in almost every aspect of my life, as everyone I know does. It helps me make quicker, more-informed decisions and it can

connect me to anything or anyone at any given moment. However I've also noticed the compulsions that come along with having technology so engrained in my life; the dopamine hit when you see you are receiving likes, the soothing feeling that can come from looking at photos of baby animals. Technology can make us feel anything whenever we want – all we need to do is hit search. As much as it's great to plug in and be connected and feel limitless, there is no real total opposite of that in our society anymore. There is no way to totally shut it off or opt out. Most jobs require you to be computer-literate or to have a cell phone that can be on your person at all times. Our greatest strength can also be our greatest weakness, and our human relationship with technology is a classic testament to that."

A **professor** based in Europe wrote, "My working days are longer! I wake up and check email and I am habituated like one of Pavlov's dogs to check my email regularly throughout the day and into the evening. Even though my boss has banned us from sending work emails after 6 p.m., I still check my email. As a result, I never truly feel disconnected from work – even during vacations."

Colin Tredoux, a professor of psychology at the University of Cape Town, commented, "The advantages of digital technology are clear, but there are also disadvantages. One memorable advantage was being able to track and keep in contact with my two young children, ages 12 and 7, when they were lost on a train in Germany. I was able to get them to approach passersby, and get them onto a train that would get them to a designated location even though I was in Cape Town at the time. However, I can also tell stories about how much the ubiquity of digital technology has made everybody feel unsafe – the slightest disappearance of children or friends or adults from instant communication makes everybody highly anxious, almost always for no good reason (last year my daughter, now 20, went offline in Paris, and we spent six hours fretting, worrying, etc). In other words, we need to weigh up the cost of worrying versus the benefit of making safe. My sense is that the former occurs with 100-times-greater frequency than the latter, so then the important question is what weight to put to the two."

A **research engineer at one of the top universities in the U.S.** commented, "Personally the internet has been my entire career (starting from ARPAnet days), so this isn't really a fair question for me. I will say, though, that even I get nervous if I leave the house without my smartphone. I'm not sure if that's good or bad, but I certainly never thought it would happen to me."

Simeon Yates, professor of digital culture at the University of Liverpool, wrote, "Digital life can be dominated by email and time-management tools. Even using these well leads to a significant increase in workload. This is not matched by changes in organisational structure and management practice to address this workload. This has long-term health impacts. But digital life is also good. Nearly everything we do for enjoyment has been helped by tools and apps: Going climbing (using

an app for route guidebook), reading (endless access to books), music (endless access to music), film (endless access to film and TV), keeping in touch with friends and family, organising time together. All of these are much easier."

A **chief of staff for a nonprofit organization** wrote, “FOMO (fear of missing out) is a problem, but digital life is also useful for communicating with loved ones far away.”

Daniel Schultz, senior creative technologist at the Internet Archive, commented, "This morning I rolled out of bed to see a note from a constituent on Twitter, an email from a public school think tank about the extreme need for more effective communication with parents, I logged onto Slack to catch up on notes from my coworkers and friends, and received a FaceTime from my daughter downstairs as a reminder that it was time to eat breakfast with her. The end of this story actually captures both the benefits and risks of technology. I was immediately drawn into my phone after waking up – I got information, some of it adding to my pile of tasks and increasing my stress, some of it enabling human connection, but it was also at the expense of spending my first moments with my family. My life would not exist in its current form without digital technology. I work from home, and as a result I am able to see my family any time of the day. My professional collaborations are coordinated and executed online. A large portion of my civic engagement and advocacy is done through the creation or use of technology to share a message or make a point."

Leora Lawton, lecturer in demography and sociology and executive director of the Berkeley Population Center, University of California-Berkeley, wrote, "In positive ways I have close friends that I met online through email lists, colleagues that I communicate with and the ease of doing business or personal matters no matter where I am in the world. I love being able to check things in Google on my iPhone as the thought occurs. I like apps on my phone. I get to listen (or watch) baseball and other sports anywhere. However, I dislike the continuing demise of radio and print newspapers. Online sources are a different experience. They have their plusses, but there's a reason why people still like vinyl over CDs. I feel the same way about radio. I take 25 hours off each week from the digital world – sometimes more – for religious reasons. Without the religious imperative I'm not sure I would do it, but I'm so glad I do. It's such a relief! My co-religionists all agree. Even the teens often agree (not always of course, but they are teens).”

Daniel Berleant, author of "The Human Race to the Future," commented, "We all remember the days when any group was subject to interruptions as someone's cell phone rang. Text messaging and email have made communication even easier, while alleviating the interruption factor imposed by a ringing phone. At the same time, it has presented a disadvantage: people often will not answer a phone call, especially young people. This has produced an adjustment problem in my own experience, whereby I would sometimes like to call a family member on the phone, but cannot get

through because they prefer a text message that does not interrupt them. I, and others, need to adjust expectations and tactics to the realities of modern cell phone based communication."

Charles Ess, professor, department of media and communication, University of Oslo, said, "An obvious example is the use of digital technologies to communicate with family and friends around the globe. On the one hand, all of this makes it wonderfully easy and convenient to stay in touch – including during critical life moments such as the birth of a new grandson, a sibling's loss of a job, a serious illness or death, et cetera. At the same time – as someone who grew up writing letters, e.g., the ones I wrote to my parents while working and then traveling through Germany and Europe in 1971 – I'm acutely aware of what is NOT communicated through digital channels (researcher Sherry Turkle addresses this more eloquently). First of all, such a letter demanded extended attention and focus – and, as research over the past 10 years or so has confirmed, the process of handwriting slows one down so as to open up silences and spaces for reflection that we elide quickly over if only using a keyboard. There is also the materiality of the letter. To not only see the words – but to hold in one's hand a piece of paper that existed with me and then with those close to me at a specific time and place decades ago – is utterly distinctive. I receive hundreds of emails a day and write 10 to 20 or more. My professional and personal life turn on them, along with many other digital and communication technologies, of course. But I strongly doubt that my children will be interested in or find much value in trawling through even just the emails sent to them after I am gone. While they have their own affordances – first of all, speed and convenience – they also suffer from a kind of immateriality and, usually, brevity. By contrast, I suspect they'll find my physical letters to be far more valuable and precious. I don't think this is just nostalgia. Rather, it resonates with the so-called 'death online' research, which – alongside evidence for the many benefits of grieving and mourning via social media, memorial sites, etc. – also documents how for some number of people, precisely young people, there is the discovery that grief requires embodied co-presence. This is ramified by the unpleasant sides of online grief, e.g., postings from 'friends' who ignore you the next day, etc. Again, there is some indication of not necessarily rejecting 'the digital' entirely in favor of 'the analogue' (with all the caveats those terms require) – but rather of attempting to find a better balance."

A **professor from North America** said, "For me (in my 50s) digital life has been positive – a way to keep up with old friends. However, for my teens, it can create sadness and feelings of being/having less than peers."

An **associate professor at a U.S. university** said, "My ability to stay connected to family and friends brings me great joy. And I'm able to connect to other academics when I am not on campus, which is more often than not. However my husband feels that I am too connected! In this regard it

may be hurting our relationship. At times using technology can border on addiction. For me that is."

Nathalie Coupet, an internet advocate based in North America, said, "My first thought in the morning, having just awaken, is: 'Do I have any emails?' The internet has taken over my life and made me a 24-hour-a-day connected pod to its mother ship. Without my smartphone, I dare not venture in the Big World out there. What if someone was trying to contact me? Ironically, I still remember the day when, sitting comfortably in a tram in Zurich, I had vowed to never carry a cellphone with me. To jealously safeguard my independence. To daydream in peace and be deliciously idle. Not to be so engaged all the time in a stressful awareness of place and time, people and events. To be left alone. It has now become a goal."

Craig J. Mathias, principal for the Farpoint Group, wrote, "I've benefitted from e-mail, other messing services including voice and video communications, access to a wide array of information via the Web, and access to many services I use regularly, like banking and healthcare. All of these are good, but I do worry about security and privacy, which still receive far too little attention. Stronger penalties are required for those who compromise these vital requirements."

An anonymous **research scientist** said, "On the one hand, I can communicate with friends who decades ago I would not be able to stay in touch with. On the other hand, we have a white supremacist in the White House."

An anonymous **professor of English** wrote, "What has been positive is the ability to follow along with positive facets of others' lives – birthdays, anniversaries, etc. This has been positive. Yet, again, a birthday card, a phone call, a conversation would be more meaningful."

Kathleen Hayes, a technology specialist based in North America, commented, "For the good, my 91-year-old mom checks emails and uses her tablet when she travels so she can stay connected. She uses the caller-ID on her home phone to ward off robo calls. For the not-so-good, on her new car some of the controls were difficult for her to figure out. What used to be a knob is now a screen with a vague description of what it may or may not do."

A **professor at a major U.S. state university** said, "I am able to share information with my family who live in other states more easily. We are able to see photos and share news to groups that would have taken longer in the past. I do often wonder if we really want photos of our children online, however. I feel concern about safety and well-being of children."

Theodora Sutton, a Ph.D. candidate at the Oxford Internet Institute, wrote, "... Digital technology is interwoven into my daily life as it is with everyone I know. The first thing I do when I wake up is usually check my iPhone for messages and news or scroll through Twitter on my laptop to help wake myself up. I find it to be an extremely useful and relaxing way to see what's happening in the world without necessarily engaging. I also often use resources online when I'm struggling to fall asleep, as there is a rich library of calming content and most of it is free. A problem that I have with my digital technology is the way that boundaries are blurred. For example, context collapse on social networking sites, which make posting content a minefield, and can cause unnecessary anxiety. Another way that similar boundaries are blurred is in the activities I use the laptop for – both working and relaxing can be provided by the same 'portal' of my laptop screen, which I find unhelpful, as when I'm working there is always a distraction available, and when I'm relaxing it's always possible to quickly check my work email, both things which can hinder the task at hand."

Richard Padilla, a retired system administrator, said, "Tech has changed the development of the lives of everyone. A need to refine its processes for better growth is now the requirement."

A **futurist** based in North America wrote, "Generally, very positive is the access to information. It is easier to do research, find out about current events, etc. Among the negatives are kids immersed in digital devices; staring at a screen as an acceptable activity."

A **professor** from North America said, "I've cut off from lots of digital media. I realized it was consuming lots of my time. It didn't make me feel good – what I was seeing and reading made me mostly angry and depressed. It was feeding negativity. I am happier without it. However, a friend who has a child with a chronic medical condition has monitoring so that medical personnel are notified when parameters are exceeded so interventions can occur rapidly. The child gets fast feedback, too, so they can change behavior or take action in a way that would not have been possible five years ago."

Michele Walfred, a North American communications specialist, said, "I have witnessed family members unable to join conversations, sit at a table and not bring their phones with them, etc. Social media platforms have provided everyone with a forum to express views, but, as a whole, conversations are more polarized, tribal and hostile. With Facebook for instance, there has been a huge uptick in fake news, altered images, dangerous health claims and cures and the proliferation of anti-science information. This is very distressing and disturbing. People are too willing to share without doing their due diligence and fact-checking first. People now get their news from sources that are only aligned with their belief systems or 'tribe' and freely shut out any information that they don't like or agree with. On a positive note, if one is interested in diverse opinions and views, the ability to make informed opinion and decisions is at one's fingertips. I learn something new on

the internet every day. GPS, maps, navigation have transformed my personal transportation. It has changed the way I shop, source local materials, find out what is going on in my own community, or – when I travel – immediately connect me to inside information about a new town or city. I used to bring along a Rand McNally map. Now I use Google Maps and, while I miss looking at maps, the technology now is so accurate and convenient. I am an avid photographer, and the multitude of editing apps is astounding. I have 40 installed on my iPad and they have transformed my artistic efforts. My grandson lives three and a half hours away in a very large city – not a pleasant drive for me, so being able to FaceTime him is a development I treasure."

An **executive director of a tech innovation firm** said, "Looking at my kids; they're connected and informed. And they spend too much time online."

A **director of technology** based in North America wrote, "In a positive way it has allowed me to keep in touch more easily with friends that live far away. In a negative sense it has provided a distraction to what is happening in the moment."

Timothy Leffel, a research scientist at NORC at the University of Chicago, one of the largest independent social research organizations in the U.S., said, "I probably spend more waking hours looking at a screen than not. And this seems to be the new normal, which is a bit jarring. If you'd told me 10 years ago that this is what everyday life would be like today, I'm not sure what I'd think. I'm not sure what I think today, even. I have superficial knowledge of any topic at my fingertips, which is incredible. But with that knowledge comes a highly addictive and hidden reward system that probably leads me to overestimate the positive impact of computers on my life."

Bouziane Zaid, an associate professor at Al Akhawayn University in Ifrane, Morocco, wrote, "Changes in quality of life, whether positive or negative, cannot be reduced to our uses of technology. It is a human tendency to idealize a past that probably was never as good as we think it was. Well-being is improved and lessened due to hyperconnectivity."

Kathleen Harper, an editor for HollywoodLife.com, said, "GPS has changed my life – for the better. It sounds dramatic, but I honestly don't know what I would do without it. I am what they call 'directionally challenged,' and I'd forever be lost without my handy-dandy smartphone (and my backup portable charger of course). Living in New York City can be intimidating, and it's quite easy to get lost. Without step-by-step GPS and my subway app, I definitely wouldn't be able to explore the city, attend events, and try new things as much as I do. Playing devil's advocate though, maybe without it, I'd be forced to actually learn and/or memorize the city, which would in turn expand that part of my brain and make me a more well-rounded person."

Mark Richmond, an internet pioneer and systems engineer for the U.S. government, wrote, "Twenty years ago my daughter met a man 8,000 miles away. Yes, it was via internet. They married and she has lived there ever since. Despite the distance we are able to stay in regular contact, including routine video chatting. My other children and grandchildren use social media either very little, or sometimes way too much. It helps to keep up with what everyone is doing, the joys and pains in their lives, but it also exacerbates things, especially for the younger ones. Every minor disagreement seems to be a major production, lived out on a stage. I am hopeful that as they learn, they will also learn moderation."

A **clinical assistant professor at a major U.S. university** wrote, "I am old enough to see the effects that cell phones have had on family dinners. In a positive light, some arguments are resolved more quickly – Wikipedia can often provide resolution to many debatable points and repair faulty recollection, leading to much more productive conversations. More negatively, the interruptions caused by text messaging and email often divide the attention of those dining together and can sometimes diminish the quality of time spent together."

A **research scientist** based in North America commented, "I'm 26, so the internet changed pretty much everything, right? It grew up with me, more or less. In fifth grade, I remember writing a research report about the gray whale. We had to go through all these crazy steps – finding books, writing down facts on notecards, putting them in those little clicky boxes that held notecards. Now, when was the last time you saw one of those? We were allowed to have internet sources, I think, but there were all these requirements about what constituted an appropriate source, as well as strict limits on how many internet sources could be used. The assumption was that somehow, finding information on the internet did not constitute real research, and this was our teacher's way of preparing us for the research we would be doing in the future. Fast forward to now, where I'm finishing up my Ph.D., and I do research practically every day. Do you know how often I have to seek out resources that I can't find online? It's never. Literally never. My dissertation uses about two, neither of which I sought out – just some books my advisor just unceremoniously handed me one day. Admittedly, my academic field is quite young comparatively, and there may be fields with more emphasis on works that cannot be found online, but still, this is mostly a good thing for my well-being, as well as for the productivity of my field. However, there are also more insidious consequences of the increased volume and availability of research. The most prominent consequence I observe is that there is simply more research than we as a field are able to deal with. There is so much research that is redundant or contradictory, and our field doesn't currently have the structure in place to reconcile it all. Hundreds of papers are published every day, and most of these will never be read, let alone cited (and that's assuming people are actually reading what they cite – ha!). There is so much pressure to publish research even when it's greatly flawed, as well as to frame every finding with a theoretical impact it cannot actually have. Instead of a gradual

forward trajectory, we're sitting on an unmanageable mound of contradictions. This research machine I live in is so unimaginably wasteful, with such deeply entrenched and utterly misguided incentives that I do not know how we will ever overcome it. This is not to suggest that this is entirely the fault of digital technology, although it certainly has enabled this trend. Moreover, in many ways our techniques and standards of rigor have improved over time, so I don't want to sound completely hopeless about scientific progress in my field. I think to an outside observer my field is flourishing, and we have much to offer the world. However, if we do not find ways to restructure and rethink what progress looks like, we will be crushed by our own weight."

A **solutions consultant** based in North America wrote, "Hyperconnection via text messaging has helped in a world where physical proximity and time constraints make it more difficult to connect. For me, a quick text, letting my husband know that I'm thinking about him, or giving him a heads-up on something important – is amazingly positive, and helpful. And it does so without detracting from my day. Same when I communicate with my son, who spends 50% of his time at his father's house, and 50% with me. It helps us stay in touch and positively connected. But we also do not overuse it – perhaps we are not as 'hyperconnected' as other users of technology, although, my mother, who is 80, says that the text messaging is 'just too much!' She believes that is hyperconnectivity."

Barry Chudakov, founder and principal of Sertain Research and Streamfuzion Corp., wrote, "As a researcher with colleagues in the communications sphere, I hear a recurring conversation about the new world realities of 'Me, Inc.,' made possible by ubiquitous digital technology. The good news is that concept-generation, creativity, programming, publishing or musical performance is no longer in the hands of indifferent gatekeepers – the greybeard editors of various industries who decided which voice and talent was worthy. But this coin has another side.

"Digital technology has, in many areas, hollowed out apprenticeship and expertise. Anyone with a tool (a digital camera or smartphone, editing software, some programming chops) can now be an expert and build an app or a reputation. Older communicators may marvel that newer digital tech tools enable fresh ideas, ingenious approaches and direct versus staged or canned presentations. On the other hand, in the 'Here Comes Everybody' world of digital tool mayhem, just having the tool is readily equated with expertise. Many people see in this the breakdown of 'guild wisdom' – learning a craft that took years of mentorship and trial and error, which results in reduced standards of excellence and quality. Often there simply are no standards. When there are no real experts, everyone can present her/himself as an expert.

"The impact on workers' well being is profound: from relying on buzz words to explain approaches that are highly conceptual but lack experience, to relying on data summations that cannot be

clearly articulated as beneficial to outcomes but provide a cloud of information that appears to be relevant – I see a high degree of insecurity and a struggle for clarity and standards. Whether you call yourself a designer, a programmer, a social media expert, a storyteller, a data analyst, a market research professional – you can now go through any door that is near you to get a job or build a career. But the mentors, for many, are gone. You will come up with brilliant insights that were ho-hum years ago; you will propose fuzzy solutions that appear to you clearly superior but are hollow as a dead tree; you will eventually consider your career and brand far more important and worth spending time on than your client's job – following the dictum that 'Me, Inc.' means Me First.

"My friends' lives in regard to well-being feel permanently insecure. The framework of progression, succession and apprenticeship is gone. 'Me, Inc.' rules. It's me and my software and my digital technology. But, of course, a new apprenticeship will likely appear and then gatekeepers and filter governors will once again be part of the scene, albeit in different form – probably algorithms. This is because newer digital tools enable cooperation and increased socialization, even if it happens through screens, platforms and crowds."

A **teen library specialist** wrote, "I have had both positive and negative impacts in my personal mental health courtesy of hyperconnection of digital connectivity. In the negative, the 'always-on' capabilities are big triggers for my anxiety around perfectionism and performance. In the positive, when working with my therapist on ways to bring myself more forward in relationships, social media was a key tool. She described Facebook (at the time that was the dominant tool) as disastrous for her work with narcissists but a dream for working with folks like me. I have grown more comfortable with expressing myself and I feel more visible in this format than in others within my communities. And I don't mean that I have more friends online than I have in the real world. I mean my 'real-world' relationships are richer because I share with the people in my workplace or family or church via social media in a way I never before did and still rarely do face-to-face."

An **anonymous respondent** commented, "We are able to keep in touch with family all around the globe. On the other hand, our family wouldn't have been so spread out in the first place without the internet."

An **academic leader based in Australia** wrote, "Digital technology has provided unthinkable access to information. Systems for doing business have enabled us to perform tasks and obtain and share information like never before. At the same time, digital transformation has meant each individual spends a lot more time navigating systems and doing work that previously would have been performed by other experts."

A North American **social justice advocate** commented, "Email emboldened me: to appreciate academic essays, to question journalists, to comment politically and when those strangers wrote back I felt very good. Email has kept me in touch with close relatives in ways that would have otherwise seemed burdensome. My handwriting isn't pretty, and keeping up with a flow of ideas by hand wore out my muscles. Word processing was a tool to write letters to newspapers, journal, take reading notes. Websites now encapsulate news for me; search answers questions so easily that I can indulge my curiosity. Technology enables me to honor my introversion without becoming isolated. On the other hand, much of my email is spam and getting worse. At holiday times and election times the requests for support are so overwhelming that I ignore them all. Social networking seems inefficient and entrapping. I use the desktop and telephone tools to silence as much of it as I can. And I have turned off the sound on my landline and cell phone. However, home computers and then email reshaped my life by enabling more participation in ways that I found comfortable."

A **principal research technologist** who works for the U.S. government commented, "In general, I find that easy access to Facebook, podcasts, blogs and other endless content increases my stress level as I strive to take it all in and feel 'caught up.' I am never caught up. It is not possible to be caught up. I have started setting aside 'screen-free' days (or at least half-days) where I do not drink from that fire hose. I find that my mood improves, my stress declines, I notice the world around me and I am overall happier. I read more books, write letters and find other ways to entertain myself and connect with friends and loved ones. It's surprising how it takes a conscious effort to step away from the screen and rediscover these options. [The good:] I have more frequent (but more shallow) contact with distant friends than I could ever have imagined. I get to 'eavesdrop' on my friends' adventures through Facebook without having a conversation. In some ways this feels strange; I'm better informed but less connected."

John Senall, founder of Mobile First Media Group, said, "Digital technology has offered additional career opportunities and advancement to me. However, the type of career opportunities for me and countless others usually involve sitting at a computer screen, working more hours and being stuck to a smartphone. All have made communication more seamless and constant, but have, in part, played a role in decreasing my health quality. I love meeting many new people from across the world through digital mediums. But I have noticed culturally a decrease in actual face-to-face human interaction or even a voice phone call with emotion and true connection, accuracy and depth. I ponder what it all may mean for my young children and their friends and classmates, down the road when there will be deeper technology and more communication changes. The benefits of a hyperconnected life are amazing and rewarding. Yet, I think many of us yearn, at least occasionally, for a simpler, less digital time."

An **entrepreneur** based in North America wrote, "I feel like technology has made our life better (instant access to information) and worse (instant access to entertainment)."

A **professor based in Europe** wrote, "When I replaced my mobile I gave the used, but still quite-powerful one to my granddaughter aged 10. She made nice pictures with it, which I appreciated. But she also got obsessed with certain internet games, leading to conflicts."

An **assistant professor of political science at an Ivy League university** wrote, "As a parent this is easy. My kids (ages 4 and 7) are steeped in technology. They have iPads in their classrooms (which help with engaging them and I think are a net good), but they also want to be on iPads at home (which may not be as good). They think every screen is a touch screen. Even at 4 years old, my son's first instinct when he doesn't know something bit of information is to Google it or ask Siri. My kids love to read books on Kindle (and much prefer it to paper books) so even the educational activity of reading is now deeply intertwined with technology. In some ways that is good, on Kindle they can highlight the words they don't know as they read and – something that has proven very important for my 7-year-old – they cannot see how thick the book is, so they tend to read more without lamenting about length. At the same time, they have little interest in libraries and miss out on books that are not available via Kindle. They can FaceTime family who live far away, but sometimes they see that as a substitute for actual visits. In short, there is good and bad but there is little doubt that technology structures our daily life in profound ways."

William J. Ward, president of DR4WARD, said, "After spending a lot of time on digital I found my physical and mental health declining. I now spend much less time on digital and much greater time doing physical activity like yoga to counteract the damage to the body that spending too much screen time inevitably causes. I also invest more time in face-to-face and social activities and finding a balance where digital is helpful but does not distract from relationships."

An **anonymous respondent** wrote, "It has made work communication easier but often less thoughtful since constant connectivity fuels the expectation of an immediate response. It also has diminished the opportunities to disconnect from work for a proper break, but it does give me flexibility to not be tied to my office."

A **North American researcher** wrote, "Technology has changed my life because I now work for a company in a different state. My contributions are made at my home, via telecommuting. This is both good and bad – on the good side, I'm able to help take care of my disabled son, and to help my wife through a battle with cancer. But, on the down side – there's no opportunity for the water cooler discussions that can speed up development work. There's no opportunity for facetime with managers and VPs to get that all-important rapport with senior management. In other words,

there are no opportunities to exercise and grow the ‘soft skills’ necessary to progress in the organization."

Cliff Zukin, a professor and survey researcher at Rutgers University, commented, "The only way I can reach my children is by texting; this is disjointed asynchronous communication, not conversation. However, I can walk out of the house not knowing how to get where I'm going or needing a map, which I love."

A **college student based in North America** wrote, "Technology is the biggest culprit in my life and my friends’ and family's when it comes to interfering with normal sleep patterns. Our phones keep us up much later than we should be. Before I had my phone, I never had the distraction of apps, social media, and more to keep me from sleeping. The more we ignore that, the more we will lose our creativity. However, the connectivity has been wonderful for when I am at college to video chat with friends and family when I miss them, which is lovely. Also, social media has helped my family and I connect with friends that we lost touch with years ago, and I was able to make my own website to share my work with the world. It is also a way for me to get feedback on the book I am writing as I write it. Digital life increases our stress levels anytime we misread or read too much into a message. Sending a text is not the same as talking face-to-face or on a phone – you do not get to hear the sincere emotion from the voice behind the message. I have learned to never argue via text and to clarify in real life what someone meant to say to me before I blow it out of proportion."

A **college student** said, "I am not too proud to admit that I also suffer from the FOMO (fear of missing out) that comes from living a hyperconnected lifestyle. I hold lengthy Snapchat streaks with friends to bond with them, I check my social media accounts for approximately three to four hours daily. Daily I catch myself peering at my phone the moment I awake to learn about the events I may have missed while I slept. While my Snap streaks do provide a satisfying, quick dopamine hit each time I respond, overall, I cannot say that living a hyperconnected lifestyle has enhanced my life in any way. But I would also argue that it has not hurt my mental well-being either. While I am willing to admit I struggle in certain areas to balance my digital distractions with the important things in life; overall, I don’t think that it has had a negative effect on my life. I do think that some people are negatively impacted, but most will work to find a balance after some trial and error as new tools for digital life continue to appear and we adjust."

Christopher Wilkinson, internet pioneer, wrote, "I do not agree with the epithet 'hyperconnected.' We are far from it. Life-changing events: 1) Wordprocessor spell/grammar checkers in several languages. 2) Sending SMS by Skype (disgracefully discontinued by Microsoft). 3) Negative: Demise of the handwritten letter."

Llewellyn Kriel, CEO of TopEditor International, said, "Humans will grow into the future – a next step in evolution. It is inevitable and unavoidable. The process will be painful and discomgoogolation [sic] will be the ubiquitous bedfellow of digitality. I have experienced a multitude of changes personally, but the digital world has proven immensely less stressful than the personal one. As a long-time sufferer of major depressive disorder, I find the interactive world much more accessible and, indeed, easier to manage – even control – than the unpredictable, capricious, vindictive and volatile world of conventional human interactions. That is a world where personal control does not exist for people such as me; where direct bullying is far more harmful and traumatic than anything I've experienced on the internet. But I have had to learn to assert myself digitally. This is what people will have to learn. It dictates new power dynamics, new ways of sifting wheat from chaff, right from wrong, malicious from inconsequential. It is far easier in the digital world to identify that which matters from that which does not."

A series of scenarios tied to potential future concerns of digital life

Peter and Trudy Johnson-Lenz, owner-operators of Pathfinding Smarter Futures and participants in this canvassing, submitted in response to the request for digital life anecdotes the following series of scenarios they wrote in 2005 in order to spark discussion of potential issues.

Auto Angel I: Your commute co-pilot

You're yawning as you slowly merge into the through lane on the long ride home. Your comfy biofueled hybrid-electric car is programmed to keep you alert and relaxed. The new ATM (autonomous traffic management system) keeps everything flowing smoothly without slow-downs or jam-ups, but you still have miles to go before you sleep. The music seems to keep pace with the flow of traffic, and you slip into a kind of driving flow state. The ATM is intelligent, but not smart enough to have autonomous lanes to do the driving for humans, nor do most people want that. Crack! The burst of sound and light, and the gentle spray on your face, with the aroma of peppermint, eucalyptus, and rosemary, brings you back to full alertness. Damn! You'd nodded off again. Fortunately, it was only a second, thanks to Auto Angel, your co-pilot on the two-hour commute from the agile economy enterprise zone to the only affordable housing in the tri-county area. Too bad your insurance doesn't cover that latest wakefulness drug that's all the rage. Auto Angel advises you to pull over as soon as possible and take a short power nap. You can set Angel's alarm so you won't sleep longer than 20 minutes and get groggy. You start looking for a safe place to stop and rest.

Auto Angel II: The high price of Drowsiness

The e-alert from your doctor's office is surprising. "We're concerned. Please come in at your

earliest convenience. Press star for an immediate appointment." What could possibly be the matter? What do they know that you don't? At the clinic, you're confronted with a stark, unforgiving choice. Auto Angel has reported one too many instances of drowsiness for your automobile insurance company to allow you to continue to drive under your existing policy. Either you must get the much more expensive hazardous driver rider or be treated immediately for "driving drowsiness" (suspected narcolepsy or sleep apnea, now on your medical and insurance e-records). If you're actually diagnosed with narcolepsy, your doctor must report it to the department of motor vehicles. You'll be subject to random monitoring for treatment compliance. Your health insurance doesn't fully cover this treatment because driving is now considered an elective activity. There are drugs available, but they're not on your formulary list. You're advised to take public transportation. Of course, some can still afford fully private transportation, just they can afford health care and higher insurance premiums. You're not one of them. And the public transit system doesn't extend all the way out to your community yet.

HealthGuardian

You're in Mexico City on your way to your next business appointment. "Señor, amigo, come with us -- NOW! You're at risk for a heart attack. We're from HealthGuardian. We'll get you to the hospital pronto." Your HealthGuardian biosensors are supposed to provide alerts of impending medical emergencies. Uniformed men with insistent voices grab you by both arms and hustle you toward an official-looking van. Are they really from your HealthGuardian monitoring service, or are they kidnappers? How can you verify their identity? Are you really in danger?!? Your heart races and your head spins. You feel pressure in your chest, and it's hard to breathe. What's going on?!?

Alexi, ever-faithful e-valet

Soft chimes announce his voice. "Sir?" Alexi, your e-valet, continues close to your ear. "May I suggest that you eat something soon? You're moving into your danger zone." His interruption irritates you as you walk briskly along the crowded sidewalk. "Sir, the bistro four doors up on the right fits your dining profile and has two very nice specials today. Or I can recommend the Thai restaurant around the next corner." Your blood sugar level is dropping precipitously close to where even deciding to eat, let alone where, is becoming a chore. "Sir?" "OK, OK, Alexi," you say to yourself. Your gait slows, you check the bistro menu in the window, and go inside. What ever would you do without Alexi's constant and respectful attentiveness?

Your privacy - priceless!

Your doctor half-jokingly calls your new medication an "executive enhancer." It helps you think fast and clearly, keeping you alert, mentally flexible, relaxed, and emotionally unflappable.

You always feel refreshed and ready for anything. Just the edge you need in your highly competitive business -- better living, decision-making, and higher profits through chemistry. And who knows how it will enhance your performance in other ways? At the pharmacy, you pay cash to keep the transaction anonymous. The pharmacist assures you at check-out that the routine RFID tag deactivator and the special privacy bag he sells you give you dual layers of privacy and protection. You're confident and satisfied. Ten days later the first whispers appear on line, speculating that your company may be in trouble. Nothing too specific. Rumors, innuendo. Your communications people are monitoring the situation and say there's nothing to worry about. Unattributed stories about your impaired capacity are next, suggesting that you may be unreliable or even unstable, and within 24 hours, you're smeared with the charge that you're taking a powerful psychiatric drug for an undisclosed but probably serious condition. Your company's stock price drops 60%.

Who is responsible?

The distinctive ring on your mobile is your daughter's. "Waaah! The bus didn't come, and it's our last practice before Saturday's big match! You've gotta drive me NOW. Plueeease???" Just then the mobile beeps twice. "Just a sec, sweetie." It's an automated request for you to approve entry of your new drug prescription into the GVS Registry database. You'll deal with that later. "OK, I'm back. I'll try to get someone to cover for me. Pick you up in 15 minutes, OK?" The next evening in a heavy rainstorm, a drunk driver ploughs into your Viridian hybrid. As they stabilize you on the way to the Trauma Center, the EMTs read your implanted VeriChip to get your updated medical information. In the ER, your condition suddenly worsens in a most peculiar way, and the doctors suspect a bad drug interaction. But how could that have happened? Did the EMTs make a mistake? Were you taking something they didn't know about? Right now they'll save your life. What happened and who's responsible will come later.

Scrambling your identity

At WuMart's self-service checkout, you're fuming. You've ducked into the store on your lunch hour to pick up a few essentials for this afternoon's flight, and you're in a real hurry. Nothing is scanning right. The dental care travel kit scans as reading glasses, vitamin C as laxatives, and deodorant as antacid. You call loudly for a supervisor. The young man sighs. "Yeah, it looks like somebody in the store hacked our RFID tags again and scrambled the data. It'll get straightened out when the machines go through their data consistency and reliability power cycle in about ten minutes. Sorry about that." He puts an obviously used, dog-eared "Out of order - please try again later" sign on the scanner. "If you'll just step through the electronic gate over there, we'll have you on your way in no time." You stride through the metal archway with your goods, and the human checker enters the products numbers to ring up your purchases. The finger touch system debits

your account. Finally! You have just enough time to get back to the office. Later, when you try to enter the restricted area to get the data reports you need for your trip, you're stopped cold. Your implanted VeriChip doesn't properly authenticate your identify, and security forces are there in moments. Missing your flight will be the *least* of your problems.

The mail knows you better than you do

As you stroll through the environmentally controlled mall, your mobile flashes a steady stream of personalized messages from nearby merchants. "Jeans tops - 30% instant discount!" "Free skin-care consultation!" "Shakira CDs all on sale!" The automated ads have no way of knowing that the RFID-tagged jeans, derma-repair cream, and pop diva CD in your shopping bag are purchases for other members of your extended family. You're not interested in more purchases like them or to go with them. You're done. Nearby, the animated window display of dancing cookware catches your eye, and you linger a few moments, watching with great amusement. Flying frying pans? Flipping spatulas? Spinning plates? What were they thinking?!? The mall looks more like an amusement park every time you come here. But now the stream of messages is all for cookware, tableware, stemware, cooking schools, and related products and services. You're beginning to feel you're being stalked instead of enticed with great offers. How did they know what you were looking at? What else do they know about you? And how do they know it?!? This is creepy.

Shopper's Revenge

"Undecided shopper's discount! Pick up prod, put back 2x, RFID shelf reader -> instant 25% off coupon." Intrigued by this alert from Shopper's Revenge ("Don't get mad -- get bargains!") on your mobile screen, you check for something you actually want, walk over to the right shelf, pick it up, and put it back. Rinse, repeat. Voila! This is too easy... A month later, the store catches on and raises the bar. You still get the coupon if you pick up the product, wait for over a minute, and put it back three times. A little tedious, but worth it for some pricier items. That works for three more weeks. A few days later, your Shopper's Revenge e-coach tells you to vary the pattern so you'll look more "natural" -- to fit the store's learning agent's evolving model of an undecided shopper. Thanks to Shopper's Revenge, you're saving money, outwitting the technology, and looking more and more like a very hesitant shopper every day.

The Future of Well-Being in a Tech-Saturated World

You can also find all of the responses to this canvassing and the written reports online here:

The 86-page version of the report:
http://www.elon.edu/e-web/imagining/surveys/2018_survey/Digital_Life_And_Well-Being_Home.xhtml

The 272-page extended version of the report:
http://www.elon.edu/e-web/imagining/surveys/2018_survey/Digital_Life_And_Well-Being_Full_PDF.xhtml

All credited responses to the main question on well-being:
http://www.elon.edu/e-web/imagining/surveys/2018_survey/Digital_Life_and_Well-Being_credit.xhtml

All anonymous responses to the main question on well-being:
http://www.elon.edu/e-web/imagining/surveys/2018_survey/Digital_Life_and_Well-Being_anon.xhtml

All credited responses to the question on potential interventions:
http://www.elon.edu/e-web/imagining/surveys/2018_survey/Digital_Life_and_Well-Being_Solutions_credit.xhtml

All anonymous responses to the question on potential interventions:
http://www.elon.edu/e-web/imagining/surveys/2018_survey/Digital_Life_and_Well-Being_Solutions_anon.xhtml

All survey participants' responses to the request for them to share anecdotes:
http://www.elon.edu/e-web/imagining/surveys/2018_survey/Digital_Life_and_Well-Being_Anecdotes.xhtml

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