Experts Optimistic About the Next 50 Years of Digital Life

On the 50th anniversary of the first host-to-host computer connection of ARPANET, experts predict digital life will primarily change humans' existence for the better over the next 50 years, but they also warn of the need to better serve individuals' rights, security, safety and equality

ELON, N.C. (Oct. 28, 2019) – Experts say digital life will mostly bring positive changes over the next 50 years, but they warn these benefits will only happen if people embrace reforms allowing better cooperation, security, basic rights and economic fairness, according to a new report by Elon University's Imagining the Internet Center and Pew Research.

"The Next 50 Years of Digital Life" report, part of a 15-years-plus series about the future of the internet, features insights from 530 technology pioneers, innovators, developers, business and policy leaders, researchers and activists. In celebration of the Oct. 29, 2019, 50th anniversary of the first computer-to-computer connection of the Internet's precursor, the ARPANET, they were asked to respond to a series of questions about how individuals' lives might be affected by the evolution of the internet over the *next* 50 years.

Overall, **72%** of these respondents said they hope and expect that the next 50 years might bring *significant change for the better*; **25%** say they fear there could be *significant change for the worse* and **3%** said they expect there will be *no significant change.* Most of the experts shared detailed comments.

Leonard Kleinrock, the UCLA professor who co-led the networking of the first computers in the ARPANET, predicted, "The internet will evolve into a pervasive global nervous system… My hope is that life will calm down and provide a more balanced physical/digital presence. Screens will diminish considerably, bringing us back to enriched human-human interaction, notwithstanding that a significant fraction of our interaction will be enhanced with software agents, avatars and AI devices (robots, embedded devices, etc.). Customization of interfaces will be better matched to what we desire. This will enable humans and AI devices to participate in a joint exchange far more easily than is the case today."

Dame Wendy Hall, executive director of the Web Science Institute, warned, "By 2069 the brain-machine interface will be fully developed. If we think applications of AI might be terrifying for the future of humanity, brain-computer interfaces are the stuff of nightmares if legal and ethical frameworks are not considered from the outset."

Vint Cerf, vice president and chief internet evangelist at Google, who was on Kleinrock's research team at the dawn of ARPANET, wrote, "The computing and communication environment is positive and constructive but it does create avenues for harmful behaviors... International agreements and mechanisms for traceability of actors in the network will be needed to respond to harmful behavior."

Baratunde Thurston, futurist and former director of digital at The Onion, predicted, "Once it was proven in 2045 that a hybrid human-networked intelligence could manage and draft legislation far better than inconsistent and infinitely corruptible humans, the U.S. Congress was replaced with a dynamic network model accounting for the concerns of citizens yet bound by resource constraints and established laws."

Here are the major themes of the report:

CREATING A FAIR AND EQUITABLE DIGITAL FUTURE

Humanity's responsibility: Digital life will continue to be what people make of it. For a better future, humans must make responsible decisions about their partnership with technology.

Public policy and regulation: The age of a mostly unregulated internet will come to an end. Elected officials and technology leaders will move ahead with regulatory frameworks aimed at protecting the public good. The lawless alternative has caused dangerous disruptions across society.

Internet of everything: In 50 years, internet use will be nearly as pervasive and necessary as oxygen. Seamless connectivity will be the norm, and it may be impossible to unplug.

Visions of the future: From amazing advancements to dystopian developments, experts imagine a wide array of possible scenarios for the world 50 years in the future.

HOPEFUL VISIONS OF 2069

Living longer and feeling better: Internet-enabled technology will help people live longer and healthier lives. Scientific advances will continue to blur the line between human and machine.

Less work, more leisure: Artificial Intelligence (AI) tools will take over repetitive, unsafe and physically taxing labor, leaving humans with more time for leisure.

Individualized experiences: Digital life will be tailored to each user.

Collaboration and community: A fully networked world will enhance opportunities for global collaboration, cooperation and community development, unhindered by distance, language or time.

Power by the people: Expanded internet access could lead to further disruption of existing social and political power structures, potentially reducing inequality and empowering individuals.

WORRISOME VISIONS OF 2069

Widening divides: The divide between haves and have-nots will grow as a privileged few hoard the economic, health and educational benefits of digital expansion.

Internet-enabled oppression: A powerful elite will control the internet and use it to monitor and manipulate, while providing entertainment that keeps the masses distracted and complacent.

Connected and alone: The hyperconnected future will be populated by isolated users unable to form and maintain unmediated human relationships.

The end of privacy: Personal privacy will be an archaic, outdated concept, as humans willingly trade discretion for improved healthcare, entertainment opportunities and promises of security.

Misallocated trust: Digital life lays you bare. It can inspire a loss of trust, often earns too much trust and regularly requires that you take the plunge even though you have absolutely no trust.

There is no planet B: The future of humanity is inextricably connected to the future of the natural world. Without drastic measures to reduce environmental degradation, the very existence of human life in 50 years is in question.

The authors of the "Next 50 Years of Digital Life" report said its results reflect optimism and concern over internet evolution.

"In just 50 years the internet grew from a handful of interlinked computers to a worldwide network connecting billions of active users across all corners of the globe," said Kathleen Stansberry of Elon University's Imagining the Internet Center, the lead author of the report. "This vast experiment in human collaboration has not been without cost, but these experts believe that by enacting thoughtful reform today the vision of the internet as a tool of equality and enlightenment can still be realized."

Janna Anderson, executive director of the Imagining the Internet Center, noted that most experts expressed hope that upcoming digital advances will lead to longer lifespans, greater leisure, more equitable distributions of wealth and power and other possibilities to enhance human well-being. She added: "At the same time, even the most optimistic experts warned about the likelihood of even greater surveillance and further data-abuse practices by corporations and governments, the porous security of digitally connected systems and the prospect of greater economic inequality and digital divides unless solutions are found to correct the many negatives emerging today."

A selection of comments from additional experts who participated in the study:

Micah Altman, a senior fellow at the Brookings Institution, said "How technology affects people and society depends in large part on what values we embed into their design, and who controls them. With appropriate governance, information, communication and AI, technologies can vastly increase human capability IF we as a society establish the rights of users."

Fiona Kerr, industry professor of neural and systems complexity at the University of Adelaide, Australia, "The internet is the best and worst of human development and adoption, making us a strange mixture of connected and disconnected, informed and funneled, engaged and isolated, as we learn to design and use multipurpose platforms shaped for an attention economy."

Jerry Michalski, founder of the Relationship Economy eXpedition, said, "Many futures seem possible; I'll describe one. Software has 'personhood.' It has rights, personality and limited responsibility… Few people have privacy or full-time jobs. Facts hardly exist: Everything is easy to fake, so everything is in doubt. Digital platforms still haven't figured out how to stop stalking us and use their presence and power to help us govern together better."

Elizabeth Feinler, the original manager of the ARPANET Network Information Center and an Internet Hall of Fame member, said, "It will be interesting to see whether the internet and computers augment our intelligence and lives, or whether they replace them. Surely, many more things will be automated which will mean that jobs will be lost, and humans will be less involved in the daily performance of their lives. We will need a whole new social paradigm to deal with this."

Ben Shneiderman, distinguished professor and founder of the Human Computer Interaction Lab at University of Maryland, said, "The future will be shaped by those who understand how to support trust, empathy, responsibility and privacy."

Andrew Tutt, an expert in law and author of "An FDA for Algorithms," said, "Empathetic machines will go a long way toward making people feel less lonely and more important. They may also help to teach us to be more moral."

Thad Hall, a research scientist and coauthor of "Politics for a Connected American Public," wrote, "The ability of the news media to report facts will be hampered by a cascade of alternate news, with different video and audio of the same event… There will be greater segmentation of the population and divisions that separate people. People are likely to become more polarized and tribal over the next 50 years."

William Uricchio, media scholar and professor of comparative media studies at MIT, commented, "'Technology will only amplify the social structures that created it… Digital technologies have the capacity to be terrific enablers – but the question remains enablers of what? Of whose vision? Of what values? These, it seems to me, are the defining questions."

Brad Templeton, chair for computing at Singularity University, software architect and former president of the Electronic Frontier Foundation, responded, "It's been the long-term arc of history to be better. There is the potential for nightmares, of course, as well as huge backlashes against the change, including violent ones. But for the past 10,000 years, improvement has been the way to bet."

Charlie Firestone, communications and society program executive director and vice president at The Aspen Institute, commented, "We could be on our way to re-speciation with genetics, robotics and AI combined to make us superhuman… We have to believe that our successors will opt for ways to improve and extend the human species rather than annihilate it or re-speciate."

Ken Goldberg, distinguished chair in engineering, director of AUTOLAB and CITRIS at the University of California – Berkeley, said, "Advances in AI and robots can inspire us to think deeply about the kind of work we really want to do, how we can change the way we learn and how we might embrace diversity to create myriad new partnerships."

Susan Etlinger, an industry analyst for Altimeter Group, "We should embrace the opportunity intelligent technologies give us to see and better understand our biases so we can optimize for the world we want rather than a more-efficient version of the world we already have. Innovations will mean little if the algorithms and technology used to develop them are not applied with the same attention to human consequences as they are to innovation."

Randy Marchany, director of Virginia Tech's IT Security Laboratory, "I suspect governments will find themselves at odds with the corporations that collect data. For example, if Facebook can influence an election, does a government fear it, partner with it, or take it over completely?"

Bob Metcalfe, Hall of Fame co-inventor of Ethernet, founder of 3Com, "Vint Cerf wanted to network ARPANETs around the world. I wanted to use it to network Ethernets inside buildings. We got a network of networks of networks. This growing up and down will continue, beyond Mars and down to molecules, somehow."

Teus Hagen, Netherlands internet pioneer, and member of the Internet Hall of Fame, "The problem is not that there is one entity that controls information, but so many different people from so many cultures and jurisdictions. The internet has been technology-driven, but it will become politically driven if we keep building the Towers of Babel."

Lindsey Andersen, an activist at the intersection of human rights and technology, "The losses in future will likely come in the form of jobs, autonomy and even freedom. But, perhaps for the first time, we are in a position to mitigate these losses because we can predict them."

Esther Dyson, founding chair at ICANN and founder of Wellville, "The internet has given us the opportunity to satisfy many of our short-term desires instantly; we need to learn how to think longer-term."

Paul Vixie, an Internet Hall of Fame member known for designing Domain Name System protocol extensions, said, "Centralization of transactions and personal information will be irreversible due to the extreme cost of creating a viable competitor in an information hegemony in which corporations, churches and foreign governments know more and have more influence than anything that can be understood by a democratically elected government."

Greg Shannon, chief scientist for the CERT Division at Carnegie Mellon University's Software Engineering Institute, said, "Pervasive/complete/competing memories - capture/network/storage tech will allow complete digital records of each life, with fast recall for discussion, disagreements and manipulation. What will it mean to not have to remember, that you can re-call the video with higher fidelity than one could ever remember?"

Grace Mutung'u, co-leader of the Kenya ICT Action Network, responded, "There will be loss of autonomy as humans integrate more with technology... Technology will increase existing inequalities. Most of the world's population is in low- and middle-income countries and already disadvantaged by it. They are likely to suffer technology colonialism."

Ken Birman, a professor in the department of computer science at Cornell University, responded, "Historians will be harsh when they judge us relative to this one aspect: The harm to entire cultures that oppressive monitoring and surveillance can cause is frightening, and those future historians will be in a position to document that harm – harm that people are actively inflicting today for all sorts of reasons."

Vian Bakir, a professor of political communication and journalism at Bangor University, responded, "Assuming that the commercial impetus remains dominant, that international regulation remains weak, and that people remain willing to give away their data for access to the internet and apps, then I foresee a dysfunctional future where dataveillance reigns supreme, and where privacy (and associated freedoms) has become a distant memory."

Geoff Livingston, author and futurist, commented, "This is a great period of transition. The internet forced us to confront the worst aspects of our humanity. Whether we succumb or not to those character defects as a society remains to be seen."

Read the full report: https://www.elon.edu/u/imagining/surveys/x-2-internet-50th-2019/