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Is Google making us stupid?
Most experts surveyed in Pew Internet/Elon University study
say the Internet enhances and augments human intelligence

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A survey of nearly 900 Internet stakeholders reveals fascinating new perspectives on the way the Internet is affecting human intelligence and the ways that information is being shared and rendered.

The web-based survey gathered opinions from prominent scientists, business leaders, consultants, writers and technology developers. It is the fourth in a series of Internet expert studies conducted by the Imagining the Internet Center at Elon University and the Pew Research Center's Internet & American Life Project.

"Three out of four experts said our use of the Internet enhances and augments human intelligence, and two-thirds said use of the Internet has improved reading, writing and rendering of knowledge," said Janna Anderson, study co-author and director of the Imagining the Internet Center. "There are still many people, however, who are critics of the impact of Google, Wikipedia and other online tools."

Anderson and co-author Lee Rainie, director of the Pew Internet & American Life Project, asked a number of questions in the survey. Some of the most compelling responses were answers that extend the debate over criticisms leveled by tech scholar and analyst Nicholas Carr in a 2009 Atlantic Monthly magazine cover story titled "Is Google making us stupid?"

With that as backdrop, survey respondents were asked to share their views of the Internet's influence on the future of human intelligence. Here is a sampling of their remarks, among them, Carr's comeback to the survey question about his question:

Nicholas Carr
"What the Net does is shift the emphasis of our intelligence, away from what might be called a meditative or contemplative intelligence and more toward what might be called a utilitarian intelligence. The price of zipping among lots of bits of information is a loss of depth in our thinking."

Hal Varian, Google, chief economist
"Google will make us more informed. The smartest person in the world could well be behind a plow in China or India. Providing universal access to information will allow such people to realize their full potential, providing benefits to the entire world."

Paul Jones, ibiblio, University of North Carolina – Chapel Hill
"Google allows us to be more creative in approaching problems and more integrative in our thinking. We spend less time trying to recall and more time generating solutions."

Esther Dyson, longtime Internet expert and investor
"The problem isn't Google; it's what Google helps us find. For some, Google will let them find useless content that does not challenge their minds. But for others, Google will lead them to expect answers to questions, to explore the world, to see and think for themselves."

Craig Newmark, founder of Craig's List
"People are already using Google as an adjunct to their own memory. For example, I have a hunch about something, need facts to support, and Google comes through for me. Sometimes, I see I'm wrong, and I appreciate finding that out before I open my mouth."

Alex Halavais, vice president, Association of Internet Researchers
"The question is flawed: Google will make intelligence different. As Carr himself suggests, Plato argued that reading and writing would make us stupid, and from the perspective of a preliterate, he was correct. Holding in your head information that is easily discoverable on Google will no longer be a mark of intelligence, but a sideshow act. Being able to quickly and effectively discover information and solve problems, rather than do it 'in your head,' will be the metric we use."

Robert Acklund, Australian National University
"My ability to do mental arithmetic is worse than my grandfather's because I grew up in an era with pervasive personal calculators…. I am not stupid compared to my grandfather, but I believe the development of my brain has been changed by the availability of technology. The same will happen (or is happening) as a result of the Googleization of knowledge. People are becoming used to bite-sized chunks of information that are compiled and sorted by an algorithm. This must be having an impact on our brains, but it is too simplistic to say that we are becoming stupid as a result of Google."

Doc Searls, co-author of "The Cluetrain Manifesto"
"Nick [Carr] says, 'Once I was a scuba diver in the sea of words. Now I zip along the surface like a guy on a Jet Ski.' Besides finding that a little hard to believe (I know Nick to be a deep diver, still), there is nothing about Google, or the Net, to keep anyone from diving – and to depths that were not reachable before the Net came along."

David Ellis, York University, Toronto
"Google isn't making us stupid - but it is making many of us intellectually lazy. This has already become a big problem in university classrooms. For my undergrad majors in Communication Studies, Google may take over the hard work involved in finding good source material for written assignments. Unless pushed in the right direction, students will opt for the top 10 or 15 hits as their research strategy. And it's the students most in need of research training who are the least likely to avail themselves of more sophisticated tools like Google Scholar. Like other major technologies, Google's search functionality won't push the human intellect in one predetermined direction. It will reinforce certain dispositions in the end-user: stronger intellects will use Google as a creative tool, while others will let Google do the thinking for them."

Gene Spafford, Purdue University CERIAS, Association for Computing Machinery U.S. Public Policy Council
"Access to more information isn't enough – the information needs to be correct, timely and presented in a manner that enables the reader to learn from it. The current network is full of inaccurate, misleading and biased information that often crowds out the valid information. People have not learned that 'popular' or 'available' information is not necessarily valid."

Glen Edens, former senior vice president and director at Sun Microsystems Laboratories, chief scientist Hewlett Packard
"The problem with Google that is lurking just under the clean design home page is the 'tragedy of the commons': the link quality seems to go down every year. The link quality may actually not be going down but the signal to noise is getting worse as commercial schemes lead to more and more junk links."

Jamais Cascio, senior fellow, Institute for Ethics & Emerging Technologies
In response to this survey question, Cascio pointed out his essay in answer to Carr, carried in a subsequent article in Atlantic Monthly. In it, he wrote that while technology evolution is challenging humans' capacity to concentrate there are signs that we are developing "fluid intelligence – the ability to find meaning in confusion and solve new problems, independent of acquired knowledge."

Susan Crawford, former member of President Obama's National Economic Council, now on the law faculty at the University of Michigan
"I'm optimistic that Google will get smarter by 2020 or will be replaced by a utility that is far better than Google. That tool will allow queries to trigger chains of high-quality information - much closer to knowledge than flood. Humans who are able to access these chains in high-speed, immersive ways will have more patterns available to them that will aid decision-making. All of this optimism will only work out if the battle for the soul of the Internet is won by the right people - the people who believe that open, fast, networks are good for all of us."

Andrew Nachison, co-founder, We Media
"The answer is really: both. Google has already made us smarter, able to make faster choices from more information. Children, to say nothing of adults, scientists and professionals in virtually every field, can seek and discover knowledge in ways and with scope and scale that was unfathomable before Google. Google has undoubtedly expanded our access to knowledge that can be experienced on a screen, or even processed through algorithms, or mapped. Yet Google has also made us careless too, or stupid when, for instance, Google driving directions don't get us to the right place. It has confused and overwhelmed us with choices, and with sources that are not easily differentiated or verified. Perhaps it's even alienated us from the physical world itself – from knowledge and intelligence that comes from seeing, touching, hearing, breathing and tasting life. From looking into someone's eyes and having them look back into ours. Perhaps it's made us impatient, or shortened our attention spans, or diminished our ability to understand long thoughts. It's enlightened anxiety. We know more than ever, and this makes us crazy."

Many more thought-provoking responses on the question can be found in the full report, "The Future of the Internet IV." **Download the report in pdf format at: www.elon.edu/e-web/predictions/2010survey.pdf or at http://www.pewinternet.org.**

Survey respondents also wrote compelling answers to the following:

- Two-thirds said **reading and writing skills and the rendering of knowledge** will be enhanced by 2020 due to the influence of the Internet.

    "When I was a boy, homework consisted of writing a paragraph. Now, youth write paragraphs in a blink of an eye," observed *Robert Cannon*, senior counsel for Internet law at Federal Communications Commission. "They are mastering language only to reinvent it. They are using it in new forms. Tags. Labels. Acronyms. And the game becomes a written game of who can use written word most effectively. Reading, writing, and communicating will become much more fluid as youth are more engaged in the practice of these skills, and have a greater motivation to practice their skills."

    "The Internet will drive a clear and probably irreversible shift from written media to visual media," predicted *Anthony Townsend*, research director for The Institute for the Future. "Expressing ideas in the future will just as likely involve creating a simulation as writing an expository essay. Whether that will make our renderings of knowledge less intelligent is unclear, but I think it's likely that there are tremendous opportunities to enhance it. For instance, would it be more intelligent to render our knowledge of politics in Ancient Egypt as a book-length essay or a realistic, interactive role-playing simulation?"

    "We will be less patient and less able to concentrate on long-form texts," answered *Andreas Kluth*, writer for The Economist. "This will result in a resurgence of short-form texts and story-telling, in 'Haiku-culture' replacing 'book-culture.'"

- Eighty percent of the experts agreed that "**hot gadgets and applications that will capture the imaginations of users in 2020 will often come 'out of the blue.'**" Many of those surveyed said people have had little success in predicting the advent of key technologies and applications but they do expect major advancements in mobile technology devices.

    "It's incredibly difficult to predict… ," wrote *Dylan Tweney*, senior editor of Wired magazine. "It's far easier to predict in general terms, based on the direction that technology seems to be evolving: TVs will be bigger and thinner, they'll have higher-resolution displays, computing power will be cheaper and more ubiquitous, wireless data will achieve higher speeds, etc. But predicting specific hit devices – and the apps that they engender – is next to impossible. Who could have foreseen the iPhone, or its huge impact on the cellphone industry, even one year before it came out?"

    Andy Oram, editor and blogger for O'Reilly Media said there are clear trends: "More-powerful mobile devices, ever-cheaper netbooks, virtualization and cloud computing, reputation systems for social networking and group collaboration, sensors and other small systems reporting limited amounts of information, do-it-yourself embedded systems, robots, sophisticated algorithms for slurping up data and performing statistical analysis, visualization tools to report results of analysis, affective technologies, personalized and location-aware services, excellent facial and voice recognition, electronic paper, anomaly-based security monitoring, self-healing systems – that's a reasonable list to get started with. Beyond five years, everything is wide open."

- The experts were fairly divided on whether **anonymous online activity** will diminish, with nearly 40 percent predicting that anonymous Internet users will have their access sharply curtailed. Marc Rotenberg, executive director of the Electronic Privacy Information Center, predicted: "The privacy and civil liberties battles over the next decade will increasingly focus on the growing demands for identity credentials. New systems for authentication will bring new problems, as more identity information will create new opportunities for criminals."

- Concerns over control of the global network were expressed in a question about the **open Internet** and the future of the end-to-end principle and continued support for the core values established by the builders of the Internet. Nearly two-thirds responded that the Internet will remain as its founders envisioned, however many who agreed with the statement that "most disagreements over the way information flows online will be resolved in favor of a minimum number of restrictions" also noted that their response was a "hope" and not necessarily their true expectation. More than a third chose to agree with the statement that "the Internet will mostly become a technology where intermediary institutions that control the architecture and …content will be successful in gaining the right to manage information and the method by which people access it."

Researchers at the Pew Internet Project and the Imagining the Internet Center at Elon University conducted the survey from Dec. 2, 2009 to Jan. 11, 2010. While many respondents are at the pinnacle of Internet leadership, some of the survey respondents are working in the trenches of building the Web. The survey was an "opt in," self-selecting effort. That process does not yield a random, representative sample.

Download the full report in pdf format at: www.elon.edu/e-web/predictions/2010survey.pdf or at <http://www.pewinternet.org>.

This report contains the release of data in answer to just five of the 10 questions in the 2010 Future of the Internet IV survey, delivered at the annual conference of the American Association for the Advancement of Science Feb. 19 in San Diego. Results from the other survey questions are forthcoming in future reports. This fourth Future of the Internet survey follows reports in 2004, 2006 and 2008 that illuminated issues through the probing of attitudes held by technology experts. Expanded results are published in the "Future of the Internet" book series published by Cambria Press.

The Imagining the Internet Center (www.imaginingtheinternet.org) is an initiative of Elon University's School of Communications. The center's research holds a mirror to humanity's use of communications technologies, informs policy development, exposes potential futures and provides a historic record. Among the spectrum of issues addressed are power, politics, privacy, property, augmented and virtual reality, control and the rapid changes spurred by accelerating technology. Imagining the Internet has teamed with the Pew Internet Project to complete a number of research studies under the direction of Janna Quitney Anderson, associate professor of communications.

The Pew Research Center's Internet & American Life Project is a nonprofit, non-partisan fact tank that explores the social impact of the internet. Support for the project is provided by The Pew Charitable Trusts. The Project is an initiative of the Pew Research Center: www.pewinternet.org.