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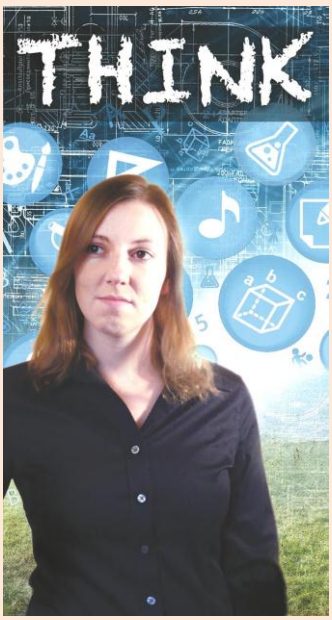

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Restoring Contemplation

How Disconnecting Bolsters the Knowledge Economy

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SUMMARY

While constant access to information enabled by digital devices has done much to improve our lives, it also exacts costs with respect to our attention and productivity that are especially harmful in a knowledge-based economy. Increased public awareness of the impact of our information consumption habits—and ways to develop a healthier "information diet"—will help mitigate the negative impacts of constant connectivity.

To build this awareness, librarians and educators can teach information consumers to differentiate actively between gathering and processing information and help them understand when and how each of these modes of thought will benefit them. Libraries also can provide services and spaces that promote contemplation within the modern information infrastructure. Software developers and system engineers can contribute by creating products and services that promote contemplation. Researchers can help us better understand the costs of constant connectivity and tailor an information infrastructure that better supports creative and analytical thought—and, ultimately, a higher quality of life.

In an idealized vision of the Information Age, all segments of society enjoy ubiquitous streams of digital content, enabling highly efficient workplaces, providing access to countless points of view, and bringing circles of family and friends ever closer. While it is true that modern technologies enable all manner of worthwhile connections, it is also true that developing a truly efficient system to make use of the perpetual influx of information entails a steeper learning curve than most appreciate.

Consider an example from the U.S. military, which operates a real-time information streaming network unmatched in human history. In February 2010, a Predator drone operator attempted to keep up with video, instant messages, and radio reports pouring in from a village in Afghanistan. The streams contained solid reports of children in a gathering crowd, but those bits were lost in the flood of information, and the operator mistakenly targeted a group of civilians, killing 23. A senior military officer said the deaths would have been prevented "if we had just slowed things down and thought deliberately."[1]

Meanwhile, today's teenagers face a different sort of pressure as they, too, manage never-ending information streams. With smartphones at their sides 24/7, they never experience a minute free from the pressures of the high school social sphere. An increasing number express nostalgia for a

disconnected past they never knew,[2] while many of their perpetually connected parents face a similar struggle to leave work behind.

> "The trouble with every one of us is that we don't think enough. Thought has been the father of every advance since time began. 'I didn't think' has cost the world millions of dollars."
>
> —Thomas J. Watson, Sr., later CEO of IBM, December 1911

As this stream of information becomes an ever-widening river, people of all walks of life—educators and their students, military personnel and civilians, adults and children, all types of professionals—increasingly are seeking balance and guidance. Books such as Nicholas Carr's *The Shallows: What the Internet Is Doing to Our Brains* and William Powers' *Hamlet's BlackBerry: A Practical Guide for Building a Good Life in the Digital Age* are *New York Times* bestsellers. Drawing on religious tradition, the Jewish organization Reboot has created the Sabbath Manifesto,[3] encouraging people to avoid technology for one day each week; the group also holds an annual National Day of Unplugging. Others who need a break might visit a resort with a "digital detox" package, in which hotel staff lock customers' connected devices away for the duration of their stay.[4] Some who struggle to focus more generally turn to addictive prescription drugs created for patients with attention deficit hyperactivity disorder (ADHD) such as Adderall and Ritalin.[5] A study of 119 colleges found that an average of 6.9 percent of students had abused such drugs with rates at some colleges as high as 25 percent.[6] The most common reasons cited for such abuse are to help with concentration and increase alertness.[7]

Even as many of us struggle to manage our information streams, we expect our family, colleagues, and friends to be within reach almost all the time, and we expect ourselves to uphold our end of this technological contract. Tethered to our phones, we risk spreading ourselves so thin that we do not allow even the most worthwhile activities to command our full attention; instead, we are in constant anticipation of the next granule of information, just in case what arrives is more important, or more interesting, than our current task.

This distraction-centered professional and social infrastructure is particularly threatening to knowledge workers, a key component of the 21st-century economy. The increasingly jumpy minds of hyperconnected multitaskers hinder sustained thought and make it difficult to delve deeply into a single task.[8] Writers need the mental space to develop a flow in their work. Analysts do not develop insights simply by pulling relevant information from an external brain and glancing it over with scattered attention. Scientists need to immerse themselves in the details of the problems they hope to solve. It was a programmer who protested the initial development of a multitasking windows interface, seeing immediately that it would damage his coding prowess.[9] Public safety and national security depend on the abilities of military, law enforcement, and intelligence professionals to focus and think carefully, but as noted earlier, these fields, too, are struggling.

To discuss the downside of hyperconnection is not to call for Luddite rebellion and the destruction of technology. Such regression would be neither possible nor desirable. These same knowledge workers benefit

tremendously from their ability to look up a needed fact with a search engine or scholarly database, or to send an important text message to a remote colleague, or any number of other valuable uses of digital devices. The issue is one of balance between connectivity and contemplation.

Consider how society's idea of a healthy diet has evolved. Just as being aware of the foods one eats and striving for a balanced diet generally is preferable to avoiding all sweets, carbohydrates, or fats, so, too, can citizens of the Information Age seek a balanced information diet. Even though people generally want to eat well, they do not automatically know how. They do not necessarily have easy access to nutritious foods or the discipline to maintain a healthy diet in a nation where junk food is the norm. Moreover, individuals can make choices, but they can do only so much to uphold personal regimes that go against the flow of society—hence the need for broader social awareness.

Responding to this need, the U.S. Department of Agriculture (USDA) created its first official nutritional guide in 1943.[10] It has evolved as society's understanding of nutrition has changed, and the government continues to provide guidance today. Educated consumers now support new fast-food menus that feature, for example, soup and salad instead of burgers and fries, making nutritious but convenient food a commercial success. Meanwhile, children are taught how a steady diet of unhealthy but enjoyable foods will affect them and are encouraged to moderate their consumption of such foods.

In a hyperconnected culture, our information diet is as important to our well-being as the food we eat. The remainder of this paper examines the impact of hyperconnection on the human brain before exploring ways in which librarians and other information professionals can help their users develop healthier information diets through resources, programming, and education. In particular, these activities should seek to distinguish between *information gathering* and *information processing*, thereby encouraging users to make room in their lives for contemplative activities.

Our Hyperconnected Brains

In a blog entry discussing the use of Google and the Internet, Michael Merzenich, a leading researcher in the field of brain plasticity, writes, "THEIR HEAVY USE HAS NEUROLOGICAL CONSEQUENCES [emphasis in original]. No one yet knows exactly what those consequences are."[11]

Scientists are, however, beginning to recognize patterns.

Neuroscientific research has demonstrated that the human brain has limits on its capacity for information processing and attention that severely constrain the ability to multitask.[12,13] This finding suggests that people perform cognitively demanding tasks effectively only when they devote their full, sustained attention. As they train themselves to respond to every incoming signal, chronic multitaskers also diminish their ability to filter out irrelevant information, sacrificing performance on their primary tasks.[14] These effects appear to persist even if heavy multitaskers consciously alter their surroundings and attempt to focus; their brains simply are not optimized to engage with a subject on a deep level. When the International Center for Media and the Public Agenda asked undergraduates to give up their connected technologies for 24 hours for a study, many felt acute withdrawal symptoms. One typical participant reflected, "My short attention span prevented me from accomplishing much."[15]

Reading on a connected screen also exacts a price. Even though studies conducted since the early days of hypertext have demonstrated that readers of this medium retain less than readers of linear books,[16] publishers continue to offer flashier e-book products with Internet connections, enabling readers to follow every thought that crosses their minds as they read. Even members of the generation that has grown up with the Internet are noticing the toll this takes on their ability to concentrate, as multiple studies have shown that today's college undergraduates still prefer printed textbooks to their digital counterparts.[17,18]

Casual observations of those who say they are finding it increasingly difficult to remember what they have read also are being supported by scientific research. A 2011 study by academic psychologists suggests that instead of remembering *content* learned on the Internet, users tend to remember *where* to find that information.[19] While we have always relied on external repositories of memory in the form of books or knowledgeable coworkers, the ubiquitous and expansive services of Google, Wikipedia, and the like dramatically reduce the apparent need for us to remember what we learn; instead, our brains are increasingly trained to let information flit in and out.

Such transient use of information is not always a problem, of course; as one of the scientists who conducted the 2011 study has noted, forcing students to memorize useless trivia has never been of much use. Still, the study prompts deeper questions about what it means to be educated and how the human mind turns bits of information into knowledge—and thence into wisdom. If we outsource too much of our memory, we decrease the material available to our subconscious mind as we synthesize seemingly unrelated fragments of information. This process of rumination is integral to developing the insights that drive discovery and invention, both scientific and humanistic.

Gathering and Processing in a Healthy Information Diet

Jumping from one bit of content to another, perhaps following a chain of links through Wikipedia entries or a discussion thread that has spun off multiple branches, is not negative per se. Indeed, this type of wandering may promote the initial stages of creativity through the synthesis of disparate information. The problem is that our learning and working styles are increasingly tipping toward this type of shallow, hypertextual gathering, rather than immersion in deep, focused processing. A balanced information diet, however, must include both.

To discuss the downside of hyperconnection is not to call for Luddite rebellion and the destruction of technology…. The issue is one of balance between connectivity and contemplation.

It is not possible to create a universally applicable rule as to when a user should disconnect from an information source and begin to process the gathered information. The answer will be different for each user in each situation, just as each person's nutritional diet differs depending on his or her age, size, level of activity, fitness goals, and so on. However, a sophisticated information consumer will realize two key points.

First, additional relevant information is always available. Until we have processed the information we have already collected and integrated it into our own internal knowledge banks, we cannot say what else we need. Information consumers who do not consciously recognize this will waste time gathering redundant information and have less time to absorb the knowledge.

In a hyperconnected world, learning how to learn takes on a new dimension: training our brains to use our knowledge-building technologies effectively.

Second, the distinction between gathering and processing applies not just to academic research tasks, but to many other information consumption activities as well. Taking documents into a quiet room to study certainly is one type of disconnected processing, but so, too, is downloading a music video and then taking it offline to listen to or sing along with it, or downloading pictures to view on an offline computer with friends or family. The point is to disconnect temporarily from media and people who are not related to our current goal and to focus on the media and people who are.

Libraries and Contemplation

At its core, the distinction between gathering and processing is an issue of information literacy. The American Library Association defines information literacy as the ability "to recognize when information is needed and have the ability to locate, evaluate, *and use effectively the needed information*…. Ultimately, information literate people are those who have learned how to learn"[20] [emphasis added]. In a hyperconnected world, learning how to learn takes on a new dimension: training our brains to use our knowledge-building technologies effectively.

Librarians are uniquely placed to help people balance their information diets. As part of their duty to promote information literacy, librarians should actively promote the basic distinction between gathering and processing behavior, helping information consumers recognize the benefits of each and make informed, conscious decisions about how they spend their time and mental energy. No one who is unable to differentiate between these two activities and switch between them effectively can claim true information literacy. Librarians can foster this capability by providing resources, programming, and education.

The first and most basic contemplative resource is disconnected space. While free Wi-Fi attracts one cohort, another would like somewhere Wi-Fi-free. Just as sleep experts say that eliminating television from the bedroom and training the brain that it is a place for sleep can help insomniacs,[21] perhaps our brains could be trained to focus if we went to a physical space that prevented us from following every tangential thought that crosses our minds. Developing quiet spaces designed to promote focus could be one step in helping information consumers train their brains to process the material they have already gathered. Users could bring disconnected computers into this space, as well as paper and pencil. Knowing that the Internet—not to mention an information expert ready to help—was nearby and would be available when it was time to resume information gathering might help reduce the sort of disconnection panic experienced by students in the aforementioned 2011 study by the International Center for Media and the Public Agenda.[22]

Libraries also could create contemplative resource centers. Many libraries already of-

fer "tech petting zoos" that allow users to try out e-book devices and video game platforms.[23] The contemplative resource center could showcase technological tools that help encourage focus and strengthen users' information processing capabilities.

Here, users would discover plug-ins such as Freedom,[24] StayFocusd,[25] SelfControl,[26] and Anti-Social,[27] all of which are aimed at creating space for contemplation by blocking certain websites (or the entire Internet) for a set period of time. Another addition might be software products such as FocusWriter,[28] WriteRoom,[29] or Dark Room,[30] word processors designed to improve concentration by removing almost everything from a computer desktop except the cursor—no formatting tools, no e-mail notifications, no other programs docked at the bottom of the screen. These tools may help some more than others; the contemplation resource center would facilitate their discovery by those who could benefit from them.

Image credit: David Ng Soon Thong (dnstdavid@gmail.com) and http://www.smashingmagazine.com/library-signs/

The center would also offer education on contemplation. On the simple end, this would include handouts of an information nutritional guide, the precise contents of which would be developed by librarians, educators, and researchers; more actively, the center might host workshops on managing constant connectivity, helping people structure their information flows in more proactive, healthy ways. Here, librarians would highlight the distinction between gathering and processing behavior and give in-depth instruction on the offerings of the contemplative resource center. Organizations that host programs not traditionally associated with libraries, such as yoga and meditation courses, might also partner with the resource center, where they might hold classes or at least advertise their services. School and university libraries could promote such a center and its programs as a healthier, longer-lasting alternative to study drugs.

Libraries also have a strong history of using books and exhibits to enable and encourage discussion. As our technological habits, especially those involving communication, develop alongside those of our friends and coworkers, the issue of connectivity becomes an important one for community discussion. Adam Davis, director of the Project on Civic Reflection, calls the library "one of the best available places to not only get people reading and thinking, but also to get people talking together."[31] The library could host discussions of books such as Sherry Turkle's *Alone Together* or William Powers' *Hamlet's BlackBerry*, welcoming those who like to read a page here and there on their iPads as well as those who prefer a paper copy. Guest speakers could supplement such discussions.

These discussions should not be confined to the contemplative resource center, however. Reference librarians already help overwhelmed information seekers identify the materials they need and inform them of additional library services that may be of use to them. These interactions provide opportunities to raise awareness about the information diet in a way that is immediately relevant to the user. Reference librarians could also offer handouts or start conversations regarding how best to process the information they have just provided. A librarian's brief spoken remark about processing printouts with pencil and paper or ink-based highlighters in the no-connection room could spark curiosity: why in the world, the hyperconnected seeker might ask, would a library offer such a thing? Creative librarians can surely devise ways to initiate this conversation that best suit their unique communities.

Instructional librarians also could contribute directly to these efforts. Along with courses on citation management programs, genealogy, Internet skills, or general database searching, librarians could teach "connection management" or "focus techniques," again highlighting the distinction between gathering and processing.

School librarians and educators have a critical role to play in promoting healthy information diets. The capacity for analytical thought is fundamental to our concept of an educated person. By making students expressly aware of the ways in which they think and learn, K–12 librarians and teachers could empower them to perform at the highest levels in later schooling and in their careers. Even in the digital age, there is an important place in the school day for contemplative activities such as silent reading. Students might later reflect and discuss what they like about quiet reading and what they like about digital exploration, with even very young students being encouraged to consider the benefits of both types of activities.

High school librarians, perhaps working with English or computer skills teachers, might discuss gathering and processing in greater depth in a seminar on optimizing cognitive resources. Like the library's contemplation resource center, this seminar would offer students guidance and provide a venue for them to discuss—and therefore more constructively and actively shape—their technological and cognitive habits.

Universities could tie these goals into undergraduate seminars or other programs. If such courses were required of all first-year college students, they could have a significant impact not only on grades and efficiency, but also on students' physical and mental health. Some colleges already are beginning to experiment with such programs. Stephens College has revived a program of vespers services; the service is nonreligious and offered on a voluntary basis, providing a brief respite from constant connection.[32,33] In April 2011, Amherst College held an event called Amherst Unplugged, in which students voluntarily disconnected for as long as they chose; sponsors of the event organized meditation, yoga, playground games, crafts, afternoon tea, and hiking.[34] Such contemplation-

centered events provide ready platforms for discussion of healthy information consumption habits, not just during a bimonthly service or yearly event but as part of students' daily lives.

Beyond the Library

As discussed above, libraries can promote contemplative thought, but it is critical that members of other professions participate in this effort as well. Most technology products and services are developed and supported by entities outside of the library community. Researchers exploring various aspects of contemplation are based in disciplines across the academic enterprise, and nearly all reside outside of library and information science departments.

Technology developers have a particular role to play. The aforementioned browser plug-ins and distraction-free word processors represent a first step; user experience designers might now try to create other types of tools that aid in and encourage contemplation. Indeed, games such as World of Warcraft often command deep focus from their devotees; perhaps this capability can be applied in a way that would appeal to those who wish to develop their analytical skills.

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What if instead of offering only discrete search hits, a company such as Google—or a third-party organization—could offer a calm, quiet virtual space to which we could retreat to make use of that information? What if it could encourage us to pause and absorb the information? Maria Andersen's SOCRAIT system, with its "Learn This" button, is one intriguing idea. Andersen has proposed a system that would use a browser plug-in to store information that an Internet user actively wanted to learn, prompting him or her to stop and write a question about the material for later review.[35] The program would store the information and prompt the user to reflect on it at a later time, assisting in the process of turning that information into knowledge. This may be a way to inject contemplation (if not a space free of distractions) into the act of Internet surfing.

Engineers should also consider building in support for contemplation when designing large-scale communications systems. The tools we use encourage certain types of thought and render others ineffective. Online communication often encourages rapid responses without research and review, limiting the discourse and the resulting products. Of course, sharing quick thoughts is sometimes the most appropriate type of dialogue and part of a balanced information diet, but tools that promote deep thought are currently lacking. How can engineers and designers shape the information infrastructure to encourage contemplation where it is most needed?

Academics in related fields—from psychology and sociology, to neuroscience, to economics, and beyond—also can perform research on this critical topic, filling in our knowledge gaps. Any individual can make a valuable contribution, but we know so little at this time, and the impact is potentially so significant, that a formally united, collaborative research effort on a large scale is the most powerful step we could take.

Envision a National Commission on Cognition in the Digital Age. This commission, with members from all the above disciplines and

professions, would determine the most pressing areas for research and coordinate large-scale initiatives to address the real problems facing information users. Commission members could visit schools and companies to study the effects of hyperconnectivity on education and business. The commission could undertake or initiate a study that would unite a team of brilliant thinkers to study these problems and offer expert insight on how best to encourage deep thought through the systems we design and develop. Some or all of these activities could be undertaken under the auspices of the National Academy of Sciences, funded by the Department of Health and Human Services, the National Science Foundation, the Institute of Museum and Library Services, or other public or private funders.

Deep thought needs a champion.

The American Library Association already works with celebrities to promote the cause of literacy through its READ poster series. Imagine what such representatives—political leaders, movie stars, admired entrepreneurs or innovators—could do for this cause. Deep thought needs a champion. Libraries can offer space and resources to encourage contemplation, but without the right sort of promotion, those resources will waste away. Imagine libraries with posters, alongside the famous READ banners, encouraging users to disconnect, delve deep, and "THINK."

In Conclusion

Given that the United States of America has a knowledge-based economy, citizens with the capacity to think deeply are one of its most precious natural resources. Tools that enable rapid communication and easy access to information can bring human thought to new heights in the 21st century, but only if we learn to use these tools effectively. The next step in the digital revolution will necessarily be social: individuals do not make technological choices in a vacuum. Hyperconnectivity is an inherently social and institutional problem, so its solution must also be social and institutional. If we simply accept without question that our future is one in which only a few stubborn individuals will struggle against the tide of interruptions, digital tethers, and shallow information skimming, we will succumb to a terrible sort of technological determinism. In a hyperconnected world, it is empowering to remember that ultimately, new knowledge is not plucked from the flow of information, but first gestates inside human minds.

We have long turned to libraries when needing space to learn and think. Entrepreneur and philanthropist Andrew Carnegie donated millions to build libraries because they empower individuals to improve themselves. He believed that library users were of more value to their community (and, presumably, as his employees) than their fellow citizens.[36] His money went not to the informational content itself, but to the space to house and use it—space that has value even in the Information Age, as many whose living spaces are full of distractions can attest. If a future Andrew Carnegie one day declares library users superior employees and community members, the reason may be that they are the ones who have nurtured the neural capacity to think deeply.

To strengthen our collective capacity for deep analytical thought, crucial to the nation's knowledge economy, we must construct an information infrastructure that promotes and provides space for contemplation. In this endeavor, our ultimate goal will be not to rebel against the Information Age, but to thrive in it.

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The Office for Information Technology Policy advocates for public policy that supports and encourages the efforts of libraries to ensure access to electronic information resources as a means of upholding the public's right to a free and open information society.

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