

Too Much Information

“We are drowning in information but starved for knowledge.” So stated John Naisbitt in his 1982 book *Megatrends: Ten New Directions for Transforming Our Lives*. Consider a definition of information: “data that is processed to be useful and provides answers to “who, what, where and when questions;” whereas knowledge is the “application of data and information, and answers the “how question.”¹ Knowledge is information that has meaning in the mind of an individual and is a result of processed information, context, and experience.² But, digital technology’s ability to amass information has far outpaced the human brain’s ability to assess that information and translate it into knowledge.

We exist in a culture of information overload attributable to the increasing availability of digital information, as well as the proliferation of technology that never sleeps. We are always connected, reachable, and multitasking, and the demands on our attention and time continue to increase. We expect to instantly access information, because it IS instantly accessible, and quickly produce a result by processing the information into credible knowledge. This onslaught is overwhelming and stressful, and we must find and implement ways to accommodate the inflow information to insure that we can appropriately process these large quantities, to store it, and then retrieve the knowledge derived from this input.

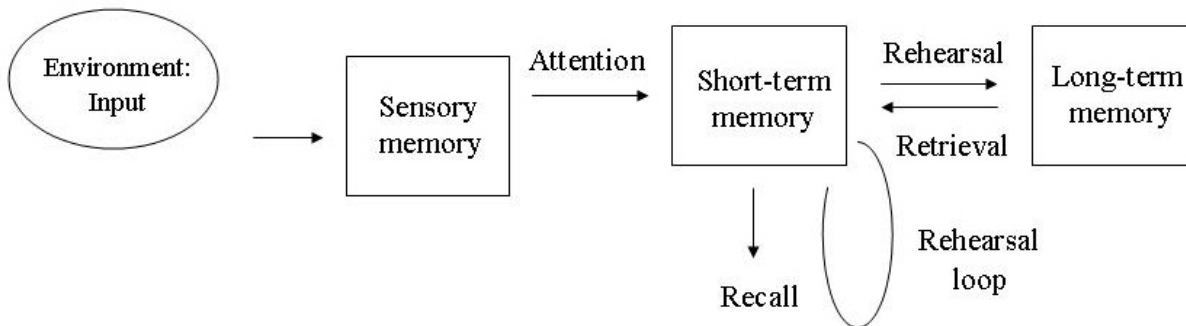
Our brains are actually being altered to think differently because of the constant daily use of digital technology; neurotransmitters are released and new neural pathways are developed,³ much like a stream of cars traveling on a muddy road. One widely accepted information-

¹ “Data, Information, Knowledge, & Wisdom”, n.d., <http://www.systems-thinking.org/dikw/dikw.htm>, (accessed April 28, 2011).

² Arlene G Taylor, *The Organization of Information*, 3rd ed. (Westport, Conn: Libraries Unlimited, 2009), 461.

³ Gary Small and Gigi Vorgan, *iBrain: Surviving the Technological Alteration of the Modern Mind*, 1st ed. (Collins Living, 2008), 1.

processing memory model known as the *Atkinson-Shiffrin model*⁴ describes the three memory systems inherent in the brain. A brief description here helps to understand the process by which memory is encoded.



Sensory memory is the first step to receiving information and is a result of environmental input through the visual or auditory senses. This is temporary, lasting no more than two seconds, much like a glance at a photograph. To the extent that one has paid attention to particular details in the sensory presentation, these bits of information then transfer to short-term memory. An average of seven items are held in this capacity for about eighteen seconds or less unless they receive some kind of additional mental processing. When short-term memory is at capacity, new items will displace current items much like older papers become buried beneath newer items on a physical desktop. If one does not attend to an item while here, it will be gone from memory within thirty seconds. The information that survives this thirty-second period in short-term memory is then encoded into long-term memory, which lasts from minutes to a lifetime, depending upon how often those memories are retrieved.

Knowing this, we can see how too much information would interrupt the process of encoding into long-term memory. It is not enough for the piece of information to be noticed or sensed; it must have conscious attention before it is transferred into any sort of retrievable

⁴ “Atkinson and Shiffrin | Multi Store Model of Memory”, n.d., <http://www.simplypsychology.org/multi-store.html>, (accessed April 29, 2011).

memory. Compare this process to the relative infallibility of computer memory, and it becomes obvious that the divide between information in digital databases, and knowledge in human memory and understanding is increasing at an exponential pace.

As we become older, we tend to assume more responsibilities, requiring more skills and techniques to navigate our daily lives. As we feel more overwhelmed, we tend to become more reactive to constant and varied demands upon us, resulting in a loss control of our own time. We check Facebook, text messages, emails, phone messages; and the constant diversions prevent us from sustained levels of concentration needed for deeper understanding of larger tasks, encoding to long-term memory, and thoughtful prioritizing and planning.

Many recent studies have shown that the effectiveness of multitasking is a myth. According to Dr. Edward Hallowell, an expert in treating attention deficit disorders and related symptoms, multitasking is like trying to play tennis with two balls at the same time.⁵ You may be able to hit at both balls, but you simply cannot play two games of tennis at once as well as you can play with just one ball.

Many of us multitask because we fear that we will forget to do something. Other times, we think the opposite way; we think we will remember, but we often we do not. What can we do to regain control of our mental desktops? Rather than making someone else's priorities or emergencies your own, or forgetting your own commitments, we should find a method of getting information out of our brains and record it in another way to eliminate having to depend on our unreliable memories. We need a list for any new information that we need to remember: tasks, ideas, names, notes, errands, due dates, etc. Think of this as a mental inbox; which we will then sort through later to plan and prioritize. One suggestion is to use available technology on a

⁵ Edward M. Hallowell M.D., *Crazy Busy: Overstretched, Overbooked, and About to Snap! Strategies for Handling Your Fast-Paced Life* (Ballantine Books, 2007), 19.

smartphone (assuming that this is a device that you always have available) such as a Notes application, a voice memo application, or your calendar. There are many organizing applications that are available if you have access to that technology; but keep in mind that you must choose a method that you find easy to use. Many people find it easier to simply use paper and pen, but you should choose a product that you will be able to always have available, both to record as well as to refer to in managing your information.

Having just a list is not enough; it is important to use a calendar/planner to keep track of appointments and commitments, to add to it from the list, and to plan the day. Batch similar tasks, plan study time, travel time, work and family responsibilities, and social time. Record due dates and then plan out the interim time needed to complete long-term or large projects to avoid procrastinating. . If possible, use digital technology that is available to you to sync calendars on computers and phones. Resist the digital distractions and other interruptions throughout the day, but do schedule time into your day so that you still attend to communications. Ask people who interrupt you if you can get back to them later. If you still feel the need to multitask, make sure that the two activities do not require the same type of cognitive effort.

Where is all of this information really coming from? In spite of the excess of information that threatens to overcome our abilities to manage, we tend to expect that we can find anything on the internet that we wish to know. As library and information science students, we must evaluate the usefulness of popular search engines; therefore, we must acknowledge that Google is probably one of the most used digital resources in the world. For the purposes of this paper, Google will serve as a representative of search engines in a discussion of how to design searches more efficiently and to make it a useful tool.

It is helpful to know some of the history behind the development of Google. In 1996, Stanford University graduate students Larry Page and Sergey Brin built a search engine called “BackRub” that used links to determine the importance of individual web pages. By 1998 they had formalized their work, creating the company known today as Google.⁶ The name is a play on the word “googol,” which refers to the number one followed by one hundred zeroes (raised to the power of a hundred or $10^{(10 \cdot 100)}$).

Google has indexed billions of web pages on the internet, making it the largest in the world in keeping with its corporate mission “to organize the world’s information and make it universally accessible and useful.”⁷ Google searches this immense collection of indexed web pages with an algorithm called PageRank™, named after Larry Page, its developer. The algorithm uses over two hundred different evaluations to rank each page’s usefulness, and Google updates these closely guarded algorithms on a weekly basis.⁸ Search results are personalized based on personal web history and location, and the average search response time is roughly one-fourth of a second.⁹ Because the results of the search are never edited or adjusted by any human intervention, the algorithm continues to be based strictly upon an automatic process. When changes are made, they are only made to the algorithm, never to the results.¹⁰ Similar to library ethics, the goal is to never introduce human judgment or to censor searches, but to allow the user to obtain relevant information based upon scientific and mathematical quantification.

⁶ Google, “About Google,” *Overview*, n.d., <http://www.google.com/corporate/index.html>, (accessed April 6, 2011).

⁷ Ken Auletta, *Googled: The End of the World As We Know It*, Reprint. (Penguin (Non-Classics), 2010), Kindle Location 146.

⁸ “Google Press Center: Fun Facts”, n.d., <http://www.google.com/press/funfacts.html>, (accessed April 6, 2011).

⁹ Google, “Technology overview – Company”, n.d., <http://www.google.com/corporate/tech.html>, (accessed April 6, 2011).

¹⁰ Randall Stross, *Planet Google: One Company’s Audacious Plan to Organize Everything We Know*, Reprint. (Free Press, 2009), 66.

What makes Google's search engine so successful? Co-founder Larry Page once described the "perfect search engine" as something that "understands exactly what you mean and gives you back exactly what you want." It uses software programs called crawlers, or "Googlebots" to visit a webpage, copy the content, then follow the links from that page to the pages linked to it, repeating this process many times. It then creates an index from these pages, similar to a book index, which is then divided into sections and stored across a large network of computers. The results generated are based on their links to other sites, and its credibility and relevance are based on many factors, including: the number of other sites to which it is linked, the amount of traffic each site receives, and the credibility of sources such as educational domains. Thus the relevance is determined by the users themselves, and is not affected by advertising on Google. When you type a search into the query box, your terms and qualifiers are compared with all the documents stored in the index, and the most relevant matches are identified. The system produces the most relevant pages along with the relevant sections excerpted in "snippets" beneath each result.¹¹ Google's detractors feel that the lack of human input is a drawback, but Google has vowed that adjustments will only be made to the algorithm itself in order to maintain what it feels is the search integrity.

Google Scholar should be mentioned here as it provides the user with the ability to limit a search to scholarly literature across a broad range of disciplines. It includes books, legal opinions, theses, and publications from academic institutions, dissertations, papers, and other websites. The full text is to be made available by the author according to the site's publishing guidelines.¹² Generally, Google Scholar's ranking algorithm will produce results that reflect

¹¹ Google, "Technology overview – Company."

¹² Google, "About Google Scholar", n.d., <http://scholar.google.com/intl/en/scholar/about.html>, (accessed April 7, 2011).

publications with highly cited articles, however, critics note that this can serve to prevent newer publications from appearing near the top while the highly cited articles continue to garner more citations. The home page provides a link to assist in an Advanced Search as well as Scholar Preferences that allow one to individualize results. Another option is the ability to set up an email alert, which is also available in Google, for any new web pages in your areas of interest. Generally, Google Scholar's ranking algorithm will produce results that reflect publications with highly cited articles, however, critics note that this can serve to prevent newer publications from appearing near the top while the highly cited articles continue to garner more citations. One cannot consider Google Scholar a comprehensive search engine for all scholarly articles, however. It is impossible to tell what is NOT included in its searches, nor will one be able to determine whether the most recent publications in any given area are included in search results. Thus, it cannot be considered a comprehensive index. It should also be noted that even though a publication may be indexed on Google Scholar, some publishers might still assess a fee or a subscription charge to access the information.

If one chooses to search on Google, one should know techniques that produce the most relevant results. The availability of information on the World Wide Web has dramatically changed how information is stored, accessed, retrieved, and used. It has opened virtual floodgates of information, democratized our searches, and freed us from having to remember the trivial. Along with this bounty comes the added burden of having to determine how to organize this information so that search results are comprehensive, have meaning, and are in context. Some consider Google to be too indiscriminate to be useful because of the large number of results that it produces. But, because of its incomparable number of indexed sites, it should still be considered an option and many use it as a starting point. However, there are techniques that

can be used, whether on Google or other search engines such as Yahoo, Bing, or Btjunkie to fine-tune the search query so the most relevant result rise to the top (not all techniques will work with all search engines, each site will provide its own guide):

- Use as many unique relevant terms as possible in your search.
- Use quotation marks around a phrase if it is important for those terms to be together.
- To search for similar adjectives, use a tilde “~” immediately before a word.
- Use Boolean operators to define relationships between words: OR, AND, NOT
- Use a minus sign “-“ to exclude terms that you do not want to appear
- Use an ellipsis “...” between numbers to indicate a range
- To search a specific site such as NY Times: “site:nytimes.com”
- To specify the file type such as an Excel file: filetype:xls¹³
- To truncate a word to find any version of the root word, use “*”¹⁴
- To search a word or phrase exactly as typed, use a “+” in front of the word or phrase
- Use quotation marks to enclose words that should be searched as inside the quotes
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Google can also provide results for the following quotations typed into the search query box:

- Currency conversions: “100 euros in dollars”
- Measurement conversions: “1 mile in kilometers”
- Time: “time Paris”
- Weather: “weather Paris”
- Maps: “123 S Main Street and Chicago”
- Flight status: “American Airlines 123”
- Translations: “translate.google.com”
- Definitions: “define discombobulated”
- Phone numbers: “phonebook: 212-555-1212” or “phonebook: john Smith Anywhere NY”
- Calculations: “5*9+(16/3)*4”
- Spell checker: “accommodate”
- Movie show times: “Fair Game 60010”

The next step in managing your information is to determine how to organize it. It is a myth to assume that as we transition from being young students to adults with responsibilities, we automatically acquire digital organizational skills. For instance, many of us either try to set

¹³ Douglas Merrill and James A. Martin, *Getting Organized in the Google Era: How to Get Stuff out of Your Head, Find It When You Need It, and Get It Done Right* (Crown Business, 2010), Kindle Location 1486-1531.

¹⁴ “More search help: Google search basics - Web Search Help”, n.d., <http://www.google.com/support/websearch/bin/answer.py?answer=136861>, (accessed April 24, 2011).

up file folders to save our emails, work products, and other information in our computers or other paper files, others may go to the other extreme and lack any organized system at all. However, it is important to have a system that is methodical and works well for the individual. It is not as important to have a folder for each possible subject, as it is to know generally where your information exists, or how to find it with minimal effort. Knowing how to use the search options on your computer should be a skill that everyone should have.

There are many different schemes designed to simplify naming file storage folders; one way is to name them by Action Needed that may include:

- To do
- Waiting for info
- Phone calls to make
- Email back
- Archive

Another idea is to name them according to Life Components:

- Home
- School
- Family
- Personal

One of the simplest ways to back up specific documents without special equipment or software is to send it in a web-based email, such as Gmail, to yourself as you are working on the process. This is an especially effective technique when one is working on an important document, such as a paper or presentation, and provides for off-site storage that is easily accessible from another computer. It will also allow you to work on your project from different locations, such as at home, and then at the library or an office. You can also use this technique to send yourself almost any other document, photo, or file that you wish to save in your own files for later reference. When completing the subject line, use words you would most likely use to search for it later. Then you don't have to remember where you filed it because it is now

searchable using your own terminology. A Gmail account is free, provides cloud storage, and allows personal communication to remain separate from an employer-based system.

As the use of email as a prominent means of business and professional communication has proliferated over the past fifteen years, so have the advantages and disadvantages become more evident. We love the convenience of being able to send, but responding to our own overflowing inboxes can represent a Sisyphean task. Our ability to control and efficiently use email affects the quality of our communications. Kenneth Zeigler, author of *Organizing for Success*,¹⁵ makes these recommendations for managing email:

- Check at scheduled times, not every time a new one hits your mailbox.
- Turn off email notification; it interrupts your concentration.
- Use email is for notification, but use the phone is for discussion.
- Know how to search and file emails.
- Digital communication is forever; do not use it inappropriately.

Sending:

- Briefly describe the reason for the email in the subject line.
- Be concise, use bullets points or lists to make is easier to scan and respond.
- Minimize the amount of text to read; you will get faster responses.
- Explain importance of any deadlines.
- Use a standard signature:
 - Your full name
 - Company
 - Position or title
 - Email address
 - Phone number

Responding:

- Change the subject line to reflect that this is a reply
- Respond directly within the original email but with a different font color, font or size.
- Reply or Reply to All as appropriate
- Add dates, meetings to your calendar immediately

¹⁵ Kenneth Zeigler, *Organizing for Success, Second Edition*, 2nd ed. (McGraw-Hill, 2010), 74-84.

These suggestions indicate a respect for others' time and efforts, as well as make it easier for email users to communicate more effectively. In addition, it favorably demonstrates your information management skills as an employee or colleague.

As digital technology takes over many of the more mundane information processing functions, the human brain struggles to keep up with the extraordinary amount of information that is available to be synthesized for human consumption and use. When evaluating digital technology, we should consider which functions previously performed by human brains can now be managed by digital resources. We can shift from rote memorization of facts to higher-order analytical thinking as we delegate lower-order processing to the phones in our pockets. But for much of the population, the understanding of how to use available technology to streamline repetitive human tasks with digital technology will be an ongoing challenge in which learning curves are quickly rendered obsolete as technology progresses. At a personal level, we have at our disposal a huge menu of resources from which we can select those items and techniques that will benefit us. But, we also have to understand and adapt to the changes that digital technology effects upon our brains and our lives. We cannot revert to pre-digital times, thus our continued survival and success depend upon our ability to adapt to change. Our challenge now and ahead is that of learning how to make sense of too much information within the context of our own lives.

(Used Zotero for citations)

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