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ON INFORMATION DESIGN

Edited by Petra Černe Oven and Cvetka Požar

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Reading on the Web: Implications for Online Information Design

Introduction

Over the past few decades information design has been in transition – moving from the creation of mainly paper-based communications to today's mix of paper and electronic artefacts. Information designers' repertoires must now include visual and verbal strategies for the Web. This shift in media compels us to consider what reading looks like in an electronic environment and to take seriously how information design can better support peoples' diverse reasons for engaging with Web content.

In this essay, I will argue that if information designers are to create effective electronic communications, they need a more nuanced understanding of reading on digital platforms. To set the stage, let me present two vignettes that raise some important issues about reading on the Web.

Vignette 1: The night the bed fell

It all started the night the bed fell. Nora was lying in bed one night when suddenly she heard a crack, a thud, and dead silence. She wondered what happened and jumped out of the bed. Even in the darkness she could see that one side of the bed had fallen to the floor and the beam holding the mattress in place had cracked in half. The bed had tipped and the mattress was sliding off. The frame was ruined. Unable to sleep, she went to her computer and decided to go shopping for a new bed. She had to work the next morning and was too busy to drive around to different stores, and she preferred shopping online anyway. So she started looking at websites.

The bed that fell was Amish in design in the Mission style of furniture making. (Amish furniture in America gained attention in the 1920s and is still

Angel Heart Crafts: Amish Best is	UpFront	Fig. 1. From a website for purchasing Amish
Master Card Visa Amex Discover Paypal	Angel Hearts Crafts Presents Amish Handmade Furniture BEST Made in the Heart of Amish Country in 6-3002 Lancaster, Pennsylvania We live near the Amish and Visit Often!	furniture.
HOME ABOUT US CONTACT	ALL DEPARTMENTS_CHECKOUT SHIPPING INFO_VEW CART	
CLICK to en AVAILABLE—Kidk ALLOW AN EXTRA MISH PRIN NOT MASS PF AMISH BEDROOM	nall us IMMEDIATELY Available 10 a.m. to 10 p.m. safe finish for kid's items 800-456-3002 or mail to a.n. to 10 p.m. A 10 DAYS FOR APPLYING angelheartscrafts.com Its FINISHI We welcome custom items. DOUCTS ARE USA HANDMADE RODUCED & Shipped FedEx Ground Furniture Amish Bar and Saddle Stools Amish Furniture NEW ITEMS!	
Authorize Weight Phone Credit Card Processing Processing Read How WE Tree Planning to visit Ar pickling up your ite	A Cur Customers! Wind Country in Pennsylvania? You can save \$'s by ms at cur store! Call for Details! REFER to the LEFT navigation for specific depts.	
Search KEYWORD	TOP > Amish Beds	
Search with this box!	Amish Bedroom Furniture USA	
Airplane Desktop Models Airplane Desktop Models Post WWII P Graham Dunn Furniture Adjustment Amish in Pennsylvania Amish Art in Ohio Amish Micker Baskets Amish Beds Amish Beds Amish Beches	AMISH BEDROOMS — SAVE \$\$\$\$ Because of the way the field to comparise charge to ship items, if you purchase two or more badroom items at once, you may save up to 15% per item. Call or email us at 800-456-9002 or angelseatscrafts.com TO view all pages of a SHH Bed Brochure — Please Click Herel To view a Uneyard Bed Brochure — Click herel To view an elegant bed brochure — Click herel To view an elegant bed brochure — Click herel Amish beds, Amish Mission Beds, Amish Shaker Beds, Sleigh Beds, Amish Mess and proud of it.	
Amish Bird Houses Amish Bookcases	Go back one page – displaying 17- 32 of 77 CLICK for Next Page.	

valued today for its simplicity and elegance.) Because she adored the clean lines of Amish woodworking, she searched for a bed similar to her original. She first went to Google and searched "Amish beds". Fig. 1 shows one of the first websites she visited.

As we can see in fig. 1, this website desperately needs to be rewritten and redesigned by an information design professional. Notice the lack of visual structure, the miniscule search box, the randomly positioned margins, the arbitrary line lengths, the chaotic mix of centred text and left-justified text, the overuse of boldface, and the word "testimonials" set in all capitals and rainbow colours. Perhaps worse is the text itself – not very informative and not written from the user's point of view. Content that should be on interior pages appears on the homepage and content that should be on the homepage is missing.

From the note next to the secretary's photo, it is clear that the company was proud that its secretary had learned to design a website after just one class. This is not surprising, given that organizations have tended to undervalue skilled writing and design. Many organizations are insensitive to good information design and unaware of the expertise an experienced professional can bring.¹

From Nora's point of view, the website was frustrating because it did not help her accomplish her purpose (to compare bed options). Nora was not impressed that she had to click into the site to see photos of the company's product line. Although this e-commerce retailer may have excellent products, the information design of its content failed to inspire confidence, leading Nora to conclude this was not the place to buy a bed.

Instead of giving up, Nora kept looking. She gave herself a time limit and hoped to find a bed in about three hours, though not necessarily in one sitting. Nora perused many websites and was intrigued by one that emphasized their manufacturing process. It described how they built Amish beds using hand tools and sustainable lumber. Those details interested her and spoke to her values, leading her to explore more of the website. Eventually after inspecting many beds, she found one in the Shaker tradition, almost as lovely as the original that had fallen apart.

Vignette 2: Going to hospital

A few months ago a friend of mine went into hospital for what he thought was a routine operation. He was supposed to be in for two or three days. On the day he was to be released, I called the hospital and asked about coming to get him. The nurse who answered said my friend had suffered a setback: "There's a complication. He has an AV block." I said, "A what?" She repeated, "He has an AV block and if you want to come by this afternoon we can talk about it." My years of information design projects for the consumer electronics industry initially led me to think "AV" meant "audiovisual" or "audio/video" rather than what it meant here: "atrioventricular". Once at hospital, the nurse said an AV block meant that the pulse rate was very slow and that he needed to be constantly monitored in intensive care.

I then used my smartphone to search Google for more information about atrioventricular blocks. I began my search on Wikipedia. As shown in fig. 2, the content is confusing. Notice that "first-degree AV block", or "PR prolongation",

¹ See my article "What We Know about Expertise in Professional Communication", in V. W. Berninger, ed., *Past, Present, and Future Contributions of Cognitive Writing Research to Cognitive Psychology* (New York: Psychology Press, 2012), pp. 275–312.

10 B		Lo	ig in / Create acco
	Article Talk Read Edit View histo	y Search	
KIPEDIA	First-degree atrioventricu	lar block	
ee Encyclopedia	From wikipedia, the free encylopedia	a	
ge	First-degree AV block, or PR pro-	First-degree	e AV block
S	longation, is a disease of the electri- cal conduction system of the heart in which the PB interval is lengthened	Classification a	ind external resources
d content	beyond 0.20 seconds. (1)	ICD-9	426.11
events	In first degree AV block the impulse	DiseaseDB	10477
article	from atria to ventricles through the AV node is delayed and travels slow-	eMedicine	emerg/233
	er than normal. It has a prevalence in		
action	the normal (young adult) population of 0.65-1.1% and the incidence of		
action	0.13 per 1000 persons.		
ikipedia			
nity portal	Contents [hide]		
changes	2 Diagnosis		
	3 Treatment		
wikipedia	4 Prognosis 5 See also		
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	The most common causes of first-degre disease, enhanced vagil tone (for exam myocardial infarction (especially acute in and medications. The drugs that most o block are those that increase the refract slowing AV conduction. These include c ers, cardiac glycosides, and anything th a cholinestrase inhibitors. Digital is a and also prolongs AV conduction.	e heart block are ple in athletes), r nterior MI), electr ommonly cause ory time of the A alcium channel b at increases cho sodium/potassiu	a an AV nodal nyocarditis, acute olyte disturbances first-degree heart V node, thereby blockers, beta-block linergic activity such m ATPase inhibitor
	Diagnosis		[edit]
	In normal individuals, the AV node slows through the heart. This is manifest on a normal PR interval is from 120 ms to 200 the initial deflection of the P wave to the	the conduction surface ECG as t 0 ms in length. T	of electrical impulse the PR interval. The his is measured from QRS complex.

Fea Cur Rar Dor Abc Cor Rec Cor Hell *Fig. 2.* From a search for the phrase "AV block": the Wikipedia article. Retrieved August 1, 2010.

In first-degree heart block, the diseased AV node conducts the electrical activ

is a disease of the "electrical conduction system" of the heart in which the "PR interval" is lengthened beyond 0.20 seconds. I thought, "What could this mean?"

Usually the content in Wikipedia is not so technical. After rereading the information I concluded that I still did not understand what a *PR interval* or the *electrical conduction system* was. I read to the bottom of the entry and realized that I did not fully comprehend the main point. This hard-to-understand content led me to look elsewhere on the Web. About two hours later, I had enough information to ask an informed question about my friend's condition.

Purposes Drive Reading or Not Reading

As the two vignettes illustrate, an individual's purpose for going to the Web shapes the kind of reading they do when they land on a webpage. When Web users are motivated by a driving purpose, they may persist in looking at many websites and may be willing to inspect the content in detail in order to answer a question or solve a problem.

As information designers, we can help people answer their questions by designing the content in ways that support their diverse purposes. As we saw in the first case, Nora sought to make an informed purchase of a bed, which led her to comparison-shop, delving into the details of optional products and their manufacturing process. In the second case, I wanted to understand the medical terminology well enough to ask good questions about it.

This essay explores how good information design can help make people's experiences with reading on the Web more satisfying and less burdensome. To begin, I discuss a few stereotypes about reading on the Web and characterize certain emerging trends. Next, I summarize two research studies; the first reviews some of the research on the characteristics of good writing and design, while the second surveys how people talk about online reading and their purposes for engaging with Web content. I conclude with two examples that show implications for online information design.

Stereotypes about Reading in Everyday Settings

Even a casual encounter with popular accounts of reading in everyday settings could lead one to draw the conclusion that no one reads anymore. Some of the frequently repeated stereotypes suggest that people never read texts such as:

- labels on food, toys, and other consumer products,
- instruction manuals,
- disclosure statements from banks and investment firms,
- privacy notices from banks, websites, and credit card companies,
- loan and mortgage applications, and
- insurance policies.

Granted, we rarely prefer to read such texts, but increasingly, we recognize that we may have to read them if we don't want to be cheated or taken advantage of (by banks or other industries). Texts of this sort are important to millions of people, helping them to understand and take action at work and in their personal lives. Unfortunately, texts from both business and government share the legacy of being written and designed in confusing ways, even for highly skilled readers. To address this problem and show the US government's commitment to clear communication, President Barack Obama signed the Plain Writing Act into US federal law in 2010.² His goal was to encourage government agencies to simplify their public communications. In this way, average citizens will more readily understand, for example, their Veteran's benefits, without having to hire an attorney. Although we may not look forward to reading texts about quotidian topics such as benefits, policies, and procedures, we do read these sorts of texts some of the time.

Popular accounts of everyday reading also lament that adults hardly ever pick up a newspaper and that even college students rarely read a lengthy book. And when it comes to the Web, no one ever reads anything. Rather, people merely skim and scan, hoping something will attract their eye.

Instead of construing Web users as engaging with content that interests them while ignoring content that does not, popular accounts have tended to portray people as mindlessly navigating from link to link, never paying attention to what they see. In fact, some have claimed that the Web is making people stupid. Nicholas Carr, for example, argues that the Internet is chipping away at our capacity to concentrate.³ He asserts that people do not have the patience for long-drawn-out arguments anymore.

Space constraints prohibit me from elaborating the counter evidence to these claims about reading (and the prominent role of poor information design in discouraging reading). Here I offer a few examples that contradict some of these sweeping generalizations.

Setting the Record Straight

People do read labels (sometimes)

A study conducted by the US Food and Drug Administration found that in 54% of cases, people say they often read food labels, particularly before they buy

2 I am currently completing a detailed report on the subject, "The Ebb and Flow of Plain Language in the United States: A Brief History from 1940–2012", those interested in obtaining a copy may contact me at kschriver@earthlink.net. A version of the report has been published in Estonian in K. Hallik, ed., *Selged Mötted, Selge Keel: Artiklite Kogumik* [Clear thinking, clear language: Collected articles] (Tallinn: Eesti Keele Instituute ja Autorid, 2012), pp. 63–76.

3 In his book *The Shallows: What the Internet Is Doing to Our Brains* (New York: W. W. Norton and Co., 2010).

a product for the first time.⁴ In addition, anecdotal evidence suggests that the flood of unsafe toys from China (containing lead-based paint or dangerous chemicals) have prompted parents in the United States to read the packaging and labels before purchasing toys.⁵

People do read the news (sometimes)

Despite the decline in readership for the print versions of newspapers, most people are not abandoning the news. Rather, they are turning to different information channels for viewing, listening, or reading (e.g. television, radio, and the Web).⁶ While most people who read news on the Web access it through the browser on their laptop or desktop computer, more and more people are reading for information and leisure using such multipurpose appliances as iPads, Kindle Fires, or large-screen e-readers, such as the Kindle DX.⁷

In 2009, a study carried out under the auspices of the Pew Research Center examined the online activities of six generations of Internet users (more than 1,500 people) in the age cohorts of 18–32, 33–44, 45–54, 55–63, 64–72, and over 73. The goal was to understand the generational differences in participation in online activities – such as using email, looking for health information, or reading the news. They found that for some activities, the youngest and oldest cohorts differed a lot. For example, younger people tended to use email less often than older people because younger people preferred text messaging.⁸

4 US Food and Drug Administration, "Fact Sheet: Key Findings from 2002 and 2008 U.S. Food and Drug Administration's Health and Diet Survey" (last updated 2 March 2010), http://www.fda.gov/Food/LabelingNutrition/ucm202780.htm (accessed 10 Sept. 2012).

5 B. Meier (New York Times News Service), "Reading the Label These Days: You Have to Read Between the Lines to Understand Whether a Toy Can be Harmful to Your Child", *SunSentinal.com*, 29 Jan. 1990, http://articles.sun-sentinel.com/1990-01-27/features/9001210334_1_toy-part-toy-industry-small-parts (accessed 10 Sept. 2012).

6 S. M. Kirschoff, *The U.S. Newspaper Industry in Transition*, Congressional Research Service report R40700, 9 Sept. 2010; available at http://www.fas.org/sgp/crs/misc/R40700.pdf (accessed 10 Sept. 2012).

7 P. Carton, "Impact of the Apple iPad vs. the Amazon Kindle on the e-Reader Market", *Investor Place*, 30 Nov. 2010, http://www.investorplace.com/2010/1/apple-ipad-vs-amazon-kindle-e-reader-market/ (accessed 10 Sept. 2012).

8 S. Jones and S. Fox, "Generations Online in 2009", Pew Internet and American Life Project, Pew Research Center, 28 Jan. 2009; available at http://www. pewinternet.org/-/media//Files/Reports/2009/PIP_Generations_2009.pdf (accessed 9 Oct. 2012).

However, when it came to reading news online, a 2010 Pew study showed similar patterns across all generations. People of all ages were turning to online sources for their news, with many people contributing to the creation of news (37%), commenting on stories (25%), tagging content (11%), creating original material (9%), or tweeting about the news (3%). The Pew researchers also found that 33% of mobile phone users reported using their handheld devices to access content.⁹ Table 1 shows the percentage of mobile phone users who reported using the Internet for news and other types of current events (since users could report more than one type of content, the percentages total more than 100%.)

Type of information	% of mobile users
Weather News and current events Application for news content Sports scores and stories Traffic info Financial info News via emails and texts	(who get this kind of news on a mobile device) 26 25 18 16 13 12 11

Table 1. Kinds of news mobile users (n = 1,891) accessed on their cell phones, ca. 2009. (Source: K. Purcell et al., 2010, p. 8).

Students do read lengthy books (sometimes)

More and more, schools and universities are digitizing their curricula for display on desktop computers, laptops and e-readers. By replacing paper texts with electronic ones, educators hope to create unique interactive educational experiences for students. While reading is fundamental to all levels of education, research on how students read textbooks online and, particularly, their

9 K. Purcell, L. Rainie, A. Mitchell, T. Rosenstiel, and K. Olmstead, "Understanding the Participatory News Consumer: How Internet and Cell Phone Use Have Turned News into a Social Experience", Pew Internet and American Life Project, Pew Research Center, 1 March 2010, pp. 7–8; available at http://pewinternet.org/-/media//Files/Reports/2010/PIP_Understanding_the_Participatory_News_Consumer.pdf (accessed 9 Oct. 2012).

use of e-readers is just beginning to emerge.¹⁰ Because e-textbooks are less expensive than their hardback counterparts, educators are opting for digital books, asking students to read lengthy complex texts online.

Despite this trend, most versions of e-readers and tablet PCs do not currently support academic reading very well. Instead, most e-readers are aimed at the market of leisure reading (such as reading on the beach). As manufacturers recognize the limitations of the current generation of e-readers, they will develop new technologies and better software for using e-readers for academic purposes (such as taking notes or building a list of references).

While not all students prefer to read their textbooks electronically, the trend toward online education continues to develop. Similarly, many older adults are using e-readers as continuing education devices, allowing them to develop new knowledge in subject matters of interest. And if sales on Amazon. com are an indicator of things to come, we should note that the online retailer's e-book sales for the first time surpassed those of printed books in the spring of 2011, according to a statement by Amazon CEO Jeff Bezos to the *New York Times*.¹¹ So much for people not reading online.

A Different Perspective to Reading on the Web

As we can see, an alternative to Carr's gloomy characterization of reading on the Web is emerging. Instead of construing the digital age as destroying reading, we might view it as enabling *reading differently* – expanding and transforming our ways of engaging with content. As the examples above make clear, evidence is accumulating that people will read when they need to or want to.

Moreover, people are developing strategies for managing their reading activities – recognizing strengths, limitations, and the "feel" of reading on different platforms. For example, people may read shorter texts on smartphones, while turning to laptops, tablets, Kindles, or iPads for reading longer texts. They

11 C. C. Miller and J. Bosman, "E-Books Outsell Print Books at Amazon", *New York Times*, 19 May 2011; available at http://www.nytimes.com/2011/05/20/technology/20amazon.html?_r=1 (accessed 9 Oct. 2012).

¹⁰ A. Thayer, C. P. Lee, L. H. Hwang, H. Sales, P. Sen, and N. Dalal, "The Imposition and Superimposition of Digital Reading Technology: The Academic Potential of e-Readers", paper presented at the ACM Conference on Human Factors in Computing Systems (CHI), 7–12 May 2011, Vancouver, Canada.

may prefer larger screens when they need to compare multiple documents or when examining tabular information. They may move to smaller screens when on the go and reserve the luxury of reading on paper for weekends.

One study of four million people who used the application Read It Later (now called Pocket) showed that users had saved over 100 million items to "read later" on their browser, smartphone, or tablet computer. It also found that people who used the service to read on laptops tended to read during the day, while people who owned iPads tended to read most often in the evening.¹² People now time-shift their reading just as they do their TV programming or recording of podcasts: they save Web content to be viewed or read later.

What people do depends on their purpose for reading, the technology available, and even the time of day. Interestingly, there was a gap between what people intended to read later and what they actually came back to and read later. The key predictor in what brought people back to a site was the quality of content, especially good writing.¹³

Indeed, even without services such as Read It Later to manage our reading, Web users need to be good at filtering what to read and what not to read. As Read It Later founder Nate Weiner put it, "The flood of content disrupts us all day as if we have a maniacal paperboy throwing new editions on our doorstep every 15 seconds."¹⁴ Because people are increasingly more willing to read on the Web – whether they read things right away or save them for later – it is crucially important for professional communicators to develop strategies for presenting clear and compelling content designed to persuade readers to linger longer. We need to pay attention to the ways in which good writing and design influence people's motivation to stick with our content. We want readers to be more than "drive-by" visitors to our messages. In the spirit of Malcolm Gladwell,¹⁵ we want

12 N. Weiner ("Nate"), "Is Mobile Affecting When We Read?", *Pocket Blog – Trends*, 12 Jan. 2011, http://getpocket.com/blog/2011/01/is-mobile-affecting-when-we-read/ (accessed 9 Oct. 2012).

13 C. Krumme and M. Armstrong, "Who Are the 'Most-Read' Authors?", *Pocket Blog* – *Trends*, 8 Dec. 2011, http://getpocket.com/blog/2011/12/who-are-the-most-read-authors/ (accessed 9 Oct. 2012).

14 Weiner, "Is Mobile Affecting When We Read?"

15 M. Gladwell, *The Tipping Point: How Little Things Can Make a Big Difference* (New York: Little, Brown & Company, 2002).

to know what kinds of information design are the "stickiest" – what encourages people to read.

Let's now turn to some of the strategies people develop for engaging with Web content.

Characteristics of Online Reading

The research on how people use the Web suggests that we come to websites by either browsing or searching. When we browse, we typically follow links without concern for where we are going. When we search, we are more focused on how we navigate because we are usually guided by an explicit goal – a particular question or task that directs our interests.¹⁶ For some Web searching, we know where to go to answer our questions because we have bookmarked a site or visit it so often that we remember the URL. But in other cases, we start by navigating to search engines such as Google, Bing, or Yahoo and then type in a query using keywords to narrow our search.

Once we land on content of potential interest, we tend to skim and scan it to inspect its relevance. We may continue our navigation by searching opportunistically or by foraging. *Searching opportunistically* refers to the practice of starting a search in one place, but through serendipitous associations, ending it in another. Put differently, the "scent of information" guides our attention and enables us to make connections among disparate content in ways that are revealing.¹⁷

For example, a user might be interested in the history of blues music. That might suggest looking in the arts section of the online version of a favourite newspaper, in which, for example, information about the Memphis blues might be profiled, perhaps with details about a few famous blues artists. That content might provide links to content about the development of the blues in Liverpool, England. And that content might provide links to the origin of the blues in other countries, leading, for example, to content about how Portuguese Fado music is often considered a kind of blues. Although along the way each site is related to the next, the user had no intention of learning about Fado music.

16 J. C. Redish, *Letting Go of the Words: Writing Web Content that Works*, 2nd ed. (San Francisco: Morgan Kaufmann/Elsevier, 2012).

17 P. Pirolli and S. K. Card, "Information Foraging", *Psychological Review* 106, no. 4 (1999): 643–675.

Foraging, by contrast, refers to users who form an intention or goal and then search for content specific to that goal.¹⁸ People interested in a particular news story may search the key terms for that story. For example, they may search "Chilean miners" to look for content about the fate of the Chilean miners who were trapped underground in October 2010. For other types of news stories, they might use a different search strategy.

How people search is important because it influences in important ways the amount of time and effort people are willing to spend with the content they encounter. The design of the content needs to create a positive impression at first glance; otherwise, users will take their attention elsewhere. In fact, some research suggests that users may make a decision about the visual appeal of a website in as little as fifty milliseconds.¹⁹

Once people arrive at a web page, they typically skim and scan it to identify whether the content matches their goals. To attract readers, information designers can structure the content so it signals its parts both visually and verbally in ways that anticipate readers' likely goals. An explicit structure allows readers to readily see the content's hierarchy, making it easier to infer a possible match between their purpose and the site's content.

As readers scan to figure out what might be relevant to them, they focus on key words and phrases, as well as dominant images and photographs. At this point reading is a kind of mental sorting process in which people try to infer the content's structure – filtering out irrelevant information and looking for points of entry. If readers decide to continue, they may read portions of the text and inspect the visuals more carefully, attempting to integrate what they see. And as people spend more time online, their reading is increasingly characterized by behaviours such as browsing and scanning, key-word spotting, non-linear reading, and selective reading.²⁰

Today's digital landscapes invite users to put together their own version of the beginning, middle, and end of a story. Good information design helps people

18 Ibid.

20 See Z. Liu, "Reading Behavior in a Digital Environment: Changes in Reading Behavior over the Past Ten Years", *Journal of Documentation* 61, no. 6 (2005): 700–712.

¹⁹ G. Lindgaard, G. Fernandes, C. Dudek, and J. Brown, "Attention Web Designers: You Have 50 Milliseconds to Make a Good First Impression!", *Behaviour and Information Technology*, 25, no. 2 (2006): 115–126.

build a coherent understanding of the content and contributes to a memorable experience.

Current Research

I would now like to provide a snapshot of two ongoing studies I have been pursuing that shed light on the role of information design in improving people's experience with their everyday reading. The first is a review of the empirical evidence about reading online from 1980 to 2010. The second uses the Google Alerts service to survey the purposes people bring to reading on the Web. In both studies, my aim is to understand how information design may help or hinder readers as they carry out their purposes.

Study 1: Research review on writing and visual design

To better understand how information design may influence people's experiences as they use the Web, I consolidated the research literature from 1980 to 2010 in two important areas: good writing and good visual design. Examining the research on these issues required an interdisciplinary perspective. This led me to explore the literature not only from the field of information design, but also from those of technical communication, rhetoric, reading and literacy, library science, cognitive psychology, educational psychology, human–computer interaction, psycholinguistics, and technology studies.

First, I integrated the empirical research on good writing. I focused on the characteristics of writing and the text features that help people to understand, remember, and appreciate online content – from words to whole-text considerations. My aim was to identify the empirical backing for writing decisions, asking what the research says about the impact of audience-oriented writing choices and the use of particular text features.

Next, I examined the research on the visual display of content and consolidated the research on visual design and graphic issues – from typography to the overall visual impression (e.g. typeface, grouping, hierarchy, contrast). I integrated the literature on how visual design and typographic design influence people's interpretations of what is important as they read.

The review sheds light on what we have learned about good writing and design that could be helpful in designing online content. Because space limi-

tations prevent discussing the study in detail, let me offer a snapshot of my findings.

Highlights of the research on writing. The research shows quite clearly that writing choices matter a lot when it comes to helping readers make sense of content. For example, word-level characteristics such as word length, word frequency, and concreteness are important predictors of how difficult a text will be, particularly for less able readers and those unfamiliar with the topic. The persistent use of longer words with many syllables may create comprehension problems for less able readers and irritate even good readers, causing either group to stop reading.

Similarly, word frequency is an important variable in cognitive processing. High-frequency words are recognized and understood more quickly than low-frequency words. For example, the English word "promise" has a much higher frequency than the word "hypothecate". Using low-frequency words – such as jargon from law, medicine, science, or technology – should be avoided unless the text is geared to experts in the subject matter (lawyers, doctors, scientists, or engineers).

When writers use abstract language (e.g. "inspiration", "friendship"), the ideas and concepts have no physical referents and readers' interpretations vary widely. When they employ concrete language ("baby", "sun"), ideas and concepts can be identified through the senses and are more vivid, easier to visualize, and easily understood. Research also suggests that the more concrete the language is, the more readily readers will grasp the main points.

At the sentence level, there have been many studies of particular features that make sentences hard or easy to understand (e.g. syntax, grammatical voice, the use of negatives, and conditionals). The research shows, for example, that complex and embedded sentence structures are less effective than simple and straightforward ones. It reminds us that the active voice is usually more intelligible than the passive. It suggests that readers can be slowed down by having to make sense of multiple negatives. Similarly, the use of conditionals – such as *if-then* structures, where "*if* …" presents a condition, followed by "*then* …" as a consequence – tends to confuse readers and lead them to incorrect inferences about the meaning.

At the whole-text level, the research shows that features such as headings, previews, and summaries are very important to readers. For example, they rely on headings and previews to guide them in determining what the content will be about. Readers look for a match between their goals and what they see in the text. When headings are composed using concrete keywords that resonate with readers' goals, they are more likely to inspect the sentences and paragraphs. Similarly, well-written leads, captions, labels, and other explanatory texts allow readers to more rapidly get a sense of the whole.

Highlights of research on design. The research literature on the visual display of text investigates the many ways that design matters in people's appreciation and understanding of content. For example, there have been a number of studies about design choices such as typography and grouping. This research can help information designers make more effective choices for their audiences.

In the research on typography, one finding appears repeatedly in the literature. Studies comparing serif and sans serif typefaces find that readers pay more attention to the degree of contrast among styles within a typeface (e.g. light, medium, bold, extrabold, black) than they do to the distinction between serif and sans serif faces.²¹ Research shows that when the typographic resolution is excellent, serif or sans serif typefaces are equally legible and equally fast to read. The legibility of either serif or sans serif typefaces at a certain point size may differ, for example, depending on the resolution of the computer monitor, smartphone screen, tablet computer, or video projector. It is common for type displayed on high-resolution screens to appear smaller but crisper, while type displayed on low-resolution screens appears larger but fuzzier.

Legibility matters a lot when busy readers must distinguish between pairs of characters such as *o* and *e*, *8* and *6*, or *O* and *o*. Practical situations in which readers must make rapid discriminations between numbers or characters include email addresses, URLs, credit card numbers, serial numbers, order numbers, and prescription numbers. Even though there is no difference in the legibility of serif and sans serif type when screen resolution is good, people still

> **21** See my book *Dynamics in Document Design: Creating Texts for Readers* (New York: John Wiley & Sons, 1997), and Ole Lund, "Knowledge Construction in Typography: The Case of Legibility Research and the Legibility of Sans Serif Typefaces" (PhD thesis, University of Reading, Department of Typography & Graphic Communication, 1999).

have preferences. And whether they are young or old, most people prefer sans serif type when they read online.

Research also suggests that visual grouping gives readers a sense of the overall structure.²² When text and graphics are organized into meaningful semantic clusters, it makes it easier for readers to "chunk" the content.²³ Grouping can also reduce cognitive load by helping readers to remember content, thus making it seem less complex and resulting in fewer errors and increased satisfaction.²⁴

When content is grouped in ways that allow readers to form meaningful relationships among the elements, they often make connections across the content that might otherwise be missed. Grouping content spatially makes it more coherent, allowing readers to recognize how the pieces of the message fit together.²⁵ In this way, grouping helps make apparent certain structures that might otherwise be invisible to the reader.

Grouping not only organizes the content, it also renders it visually conspicuous – which is quite important for busy readers, impatient readers, less able readers, and those reading in a second language. How the content is grouped may also influence readers' first impressions of the message,²⁶ setting in motion positive or negative attitudes about the content.²⁷ For this reason, as mentioned earlier, it is important to catch the reader's attention and make a good impression at first glance.

22 T. S. Tullis, "Screen Design", in M. Helander, T. K. Landauer, and P. Prabhu, eds., *Handbook of Human-Computer Interaction*, 2nd ed. (New York: Elsevier Science, 1997), pp. 503–531.

23 M. Kahn, K. C. Tan, and R. J. Beaton, "Reduction of Cognitive Workload through Information Chunking", in D. Woods and E. Roth, eds., *Proceedings of the Human Factors and Ergonomics Society 34th Annual Meeting* (Santa Monica, Calif.: Human Factors and Ergonomics Society, 1990), pp. 1509–1513.

24 M. Niemela and J. Saarinen, "Visual Search for Grouped Versus Ungrouped Icons in a Computer Interface", *Human Factors* 42, no. 4 (2000): 630–635.

25 K. A. Schriver, "What Do Technical Communicators Need to Know about Information Design?", in J. Johnson-Eilola and S. Selber, eds., *Solving Problems in Technical Communication* (Chicago: University of Chicago Press, 2013), pp. 495–531.

26 Lindgaard et al., "Attention Web Designers".

27 Schriver, Dynamics in Document Design.

Study 2: Google Alerts "reading on the Web" study

In a second study, I have been exploring how people reported on their experiences about reading online over a four-year period (2009–2012). To collect the data, I used Google Alerts, a notification service offered by the search engine company Google. The service requires users to select a search term (or set of terms) for the alerts they want. Once users are registered, Google automatically notifies them by email when new content on the Web matches their search terms. Google Alerts (and now also Giga Alerts) can be used for monitoring anything on the web – from tabloid gossip to information about people, products, trends, or news stories.

My concern in this study was to better understand how people talk about their experience of reading on the web. I wanted to know more about what motivates people to read online and their different reasons for coming to Webbased content. The study had two phases, each lasting roughly two years.

Phase 1	
Talking about reading online generally	Number of alerts
(on computers, mobile devices, and eReaders)	
Timeframe 1: August 2009 – September 2010	5,030
Timeframe 2: October 2010 – July 2011	4,993
	10,023
Phase 2	
Talking about purposes for reading online	Number of alerts
(for pleasure or more serious purposes)	
Timeframe 1: May 2010 – July 2011	6,183
Timeframe 2: August 2011 – August 2012	in progress
	6,183
Phase 2Talking about purposes for reading online (for pleasure or more serious purposes)Timeframe 1: May 2010 – July 2011 Timeframe 2: August 2011 – August 2012	4,993 10,023 Number of alerts 6,183 in progress 6,183

Table 2. Overview: Google alerts "reading on the Web" study.

The first phase sought to capture people's talk about reading online, especially as they discussed this in blogs, on listservs, on websites, and in the news. I focused on what people said about reading online generally, especially as they talked about their experiences with laptop or desktop computers, mobile

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devices, tablet computers, and e-readers. The Google Alerts I collected in the first phase also revealed a variety of purposes motivating people's engagement and experiences with online content.

The second phase examined these purposes in detail. Table 2 presents an overview of the two phases and their duration. The study is still in progress. Here I present the highlights so far.

Phase 1: Talking about reading online. Phase 1 of the study looked broadly at reading on the Web by searching phrases associated with digital reading (e.g. "reading online") and with reading on mobile devices or e-readers (e.g. "reading on cell" and "reading on Kindle") (see fig. 3). I collected the data from 2009 to 2011 (see table 2). Phase 1 had two timeframes, each lasting about one year. As table 2 shows, the two years generated over 10,000 alerts.

Phase 2: Talking about purposes for reading online. About nine months into Phase 1, a preliminary assessment of the data led me to collect alerts about people's purposes for reading online. Phase 2 focused on both the light-hearted and the serious, for example, "reading for fun" and "reading to compare" (see fig. 3). As in Phase 1, these data were collected over a two-year period,

Fig. 3. Search terms employed in the Google alerts

"reading on the Web" study.

+You Search Images Videos Maps News Shopping Mail More kschriver@earthlink.net

Google Alerts Search Terms

PHASE 1

Reading online generally

- "reading online"
- "reading on a screen"
- "reading on web"
- "reading on the web"

Reading on mobiles and eReaders

- "cell phone reading"
- "reading on cell"
- "reading on mobile"
- "reading with mobile phone"
- "reading on phone"
- "wireless reading"
- "reading on Blackberry"
- "reading on iPhone"
- "reading on Sony" "reading on Kindle"
- "reading on iPad"

PHASE 2

Reading online with a purpose

- "reading for fun"
- "reading to buy"
- "reading to understand"

- "reading to decide"
- "reading for pleasure"
- "reading for understanding"
- "reading to comprehend"
- "reading to analyze"
- "reading to compare"

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from 2010 to 2012 (see table 2). As of July 2012, only data from the first time-frame of Phase 2 (2010–2011) had been consolidated. This period generated over 6,000 alerts.

In my study of reading on the Web, I was concerned with the information landscapes people were negotiating and what made it easy or difficult for them to carry out their goals. I looked for comments that referenced what they were reading and their evaluations of what they found. I also sampled the hyperlinks associated with their comments to get a sense of the texts and graphics people were dealing with. I collected users' positive and negative statements about their experiences.

The limitations of the approach. A limitation with using Google Alerts to collect data is that it only captures what people say they are doing, not necessarily what they are actually doing. As an after-the-fact account of an experience, what people say could be true, false, or partly true. The method is also skewed by the search terms I used. Obviously there are many ways to phrase the activity of reading online and I may have inadvertently missed some of the important ones.

In addition, people often aim to achieve multiple goals while reading online, such as to understand and compare (e.g. inspecting alternative health plans to understand their differences and see which ones have the best coverage for the lowest price). In such cases, readers may not use the word "compare" in the comments that show up in a Google Alert, although when we inspect the trail of their comment, we see that they were comparing. Even with these limitations, however, Google Alerts proved to be a useful, non-intrusive tool that allowed for the collection of longitudinal data on a variety of topics about reading online.

The results of Phase 1. Phase 1 generated 10,023 alerts. Their distribution is presented in table 3. The data provided a wealth of information about people's experiences with reading in digital environments. Here let me summarize a few trends. People tended to discuss reading on computers generally (e.g. "reading online", "reading on the Web", "reading on a screen") about 65% of the time (6,488 alerts). By contrast, people mentioned reading on mobiles and e-readers about 35% of the time (3,535 alerts). As shown in table 3, reading on mobiles (e.g. phones, cells, iPhones, Blackberries, wireless devices) and e-readers (e.g. iPads, Kindles, Sony e-readers) were discussed more often in Timeframe 2.

Phase 1	Timeframe 1	Timeframe 2	Total / %
	(August 2009 – September 2010)	(October 2010 – July 2011)	
Alerts collected	5,030	4,993	10,023
Computers Mobiles & e-readers	69% 31%	60% 40%	65% 35%

Table 3. Proportion of alerts focused on reading on computers vs. mobile devices and e-readers.

Of the 3,535 alerts focused on mobiles and e-readers, 64% were about reading on mobile devices while 36% were about e-readers. The trend toward reading on mobile devices and e-readers will likely continue to grow as the prices for accessing the Web on various platforms come down.

A striking aspect of the Phase 1 data was that people frequently mentioned a purpose for reading online. In particular, users of Web content discussed purposes such as reading to understand, analyse, decide, compare, buy, play, explore, escape, and have fun. These data prompted me to generate ideas about aspects of reading online to explore in Phase 2.

The results of Phase 2. Timeframe 1 in Phase 2 generated 6,183 hits about reading for different purposes (see table 4). The results showed that when people discussed reading online, they mentioned reading for fun or escape most of the time, with 66% of the comments directed to the lighter side of reading (4,089 alerts).

Phase 2	Timeframe 1	Timeframe 2	Total / %
	(May 2010 — July 2011)	(August 2011 – August 2012)	
Alerts collected	6,183	n/a	6,183
Reading for fun	66%	n/a	66%
Reading for serious purposes	34%	n/a	34%

Table 4. Proportion of alerts focused on reading for fun vs. more serious purposes.

Comments about reading for pleasure tended to be devoted to talking about reading books over the summer, on the beach, or late at night – mysteries, romance novels, magazines, and fiction. Surprisingly, thousands of comments focused on reading horoscopes, reading tarot cards, and reading about how to play games (mainly poker games, such as Texas Hold 'em).

By contrast, people discussed reading for more serious purposes (e.g. understanding ideas) 34% of the time (2,094 alerts). Table 5 shows the proportion of the data focused on different purposes.

As shown, "reading for understanding" dramatically dominated discussion of all other purposes. The data underscore the need for plain language and clear visual design on the Web.

Purpose	% of alerts		
	(n = 2,094)		
Understanding	83		
Analysing	2		
Buying	8		
Deciding	3		
Comparing	4		

Table 5. Talking about reading for serious purposes.

Users' talk about their more serious purposes indicated that they typically came to the Web to answer a question or solve a practical problem. Here are a few examples:

- I was reading to understand salmonella and wondered what causes it.
- I resent needing to *read to analyse* risky investment strategies when my broker should have done it.
- How can I get started in *reading to buy* a hydroponic system for my organic garden?
- I have to do a lot of *reading to decide* to see if it is worth spending the extra money for the better chip in my laptop.
- If I want to improve my dyslexic's son's reading, what books should I *read to compare*?

Comments often referred to particular websites, which led me to explore whether the information design of the sites supported users in accomplishing their purposes. Space constraints prevent me from detailing people's experiences here. I will elaborate my findings in a forthcoming book.²⁸

Let me conclude with two examples that illustrate how information design moves can help or hinder people in using Web content as they wish.

Example 1: Reading to understand and compare

The first example comes from a young woman who wrote about her goal of needing to sort out what kind of long-term health insurance to buy for her aging mother. She mentioned that her mother was an independent soul who preferred to stay in her own home as long as she could. The young woman –

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LONG-TERM CARE INSURANCE

Home

Up

LONG-TERM CARE INSURANCE INTRODUCTION

In recent years long-term care (or nursing home) insurance has become widely available as an alternative source for the funding of long-term care expenses, whether received in an institutional setting or at home. Such policies are extremely fiexible, and can be designed to pay for all long-term care costs indefinitely and without regard to Medicaid eligibility, or as a supplement to Medicaid payments. They can also provide benefits during the limited period of ineligibility caused by having excess countable resources, including the situation where assets have been transferred during the look-back period.

Under recent amendments to the Internal Revenue Code, policies are issued as either tax qualified (TQ) or non-tax qualified (ND). Ihe tax treatment of qualified long-term care policies is described below, but generally NQT policies have tax liabilities open to further interpretation, posing greater risks of a large tax bil.

LEVELS OF CARE

In understanding long-term care policies, the different levels of care should be recognized:

<u>Skilled care</u> is acute nursing and rehabilitative care given by a RN or therapist, usually daily (i.e. round the clock) and supervised by a physician.

Intermediate care involves occasional (not around the clock) nursing and rehabilitative care under the supervision of skilled medical personnel.

Adult day care involves a fixed set of hours at a community facility under the care of skilled caregivers.

<u>Hospice care</u> gives round-the-clock end of life care by skilled nurses and physicians.

ANAYSIS OF LONG-TERM CARE INSURANCE

Home

Up

HOW TO ANALYZE A LONG-TERM CARE POLICY SCOPE OF COVERAGE

Institutional Care and Home Care. Coverage can be for one or more of the four levels of care described above. Specifically, it is important to know where the services can be received for a particular level of care—in a nursing facility, at home, or a combination of both. Because most individuals will want to stay at home for as long as possible, home care coverage is an important feature to include in a policy, usually as a rider.

Does the policy state that custodial care or home care has to be provided by a licensed or certified professional, or can it be done by a nonprofessional such as a family member?

The policy may permit non-professionals to provide care, but such flexibility will likely come at the cost of an increased premium.

COMMENCEMENT OF COVERAGE.

The policy should clearly define when coverage will begin. These starting points, commonly referred to as "benefit triggers," have progressed from the strict standard of medical necessity to a finding that the insured is unable to perform a minimum of two of the "Activities of Daily Living: (referred to as "ADL'S")—eating, dressing, bathing, transferring, toileting, and continence.

Coverage can be "first day" protection, or there can be a waiting (elimination) period (generally 20 to 365 days) before coverage begins.

LENGTH OF COVERAGE.

Policies can have a set benefit period, typically two to four years, for any one stay in a nursing facility, or they can remain in effect for the insured's lifetime.

> Figs. 4a and 4b show portions of a website she visited to explore these goals. Fig. 4a. An excerpt from a webpage about longterm health care insurance. Fig. 4b. The continuation of the content shown in fig. 4a.

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who had had no prior experience with long-term care insurance – set about learning exactly what it was and what the options were. She turned to the Web with two general purposes:

- to understand what long-term health care insurance was, and
- to compare prices so she could buy the best policy for her mother at the lowest cost.

An important thing to notice about these pages is that the creator of the website has failed miserably in designing the content. Obviously, someone has simply uploaded a print brochure ("brochure-ware"). The underlined elements are not hyperlinks. The paragraphs wander and present the content in a list-like fashion rather than integrating it for the reader. The poorly written and poorly displayed headings (e.g. the buried "Introduction" in fig. 4a) make it hard for readers to acquire a good sense of the content by scanning. The headings are also organized around topics rather than around readers' questions. Table 6, below, shows how the topic-oriented headings could be more action-oriented, allowing readers to recognize more quickly whether their purpose for coming to the website will be satisfied.

Original headings Revised headings Introduction Finding the right policy Levels of care Understanding differences in available care Skilled care Skilled care Intermediate care Intermediate care Adult day care Adult day care Hospice care Hospice care Scope of coverage Knowing your costs and benefits Institutional and home care Caring for a loved one at home or in hospice Commencement of coverage When will the policy start? Length of coverage How long with the policy last?

How much will the policy pay?

As we can see, both the writing and design of the website needs quite a bit of work, especially if people are to use its content effectively and efficiently.

Table 6. Revising topic-oriented headings to make them action-oriented.

Amount of benefit

Example 2: Reading to compare and decide

A second example comes from a man who expressed the goal of acquiring a new credit card with a low interest rate. He wanted to compare the benefits and features of different credit cards so he could make a wise decision. He mentioned that he was trying to improve his credit rating and was having trouble putting together the information about credit cards that he was finding on the Web. Although he did not go into details, when we look at a website he mentioned, we can see why he was having trouble. Fig. 5 shows a portion of a website devoted to helping consumers choose a good low-interest credit card.

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As shown, the website profiles different cards that offer low interest rates. The simple design makes it look easy to follow the three-step procedure at the top of the page. On the surface, the site appears to be very user-oriented.

%	Information The following Low for the credit card	about Low Interest Interest Credit Cards feat of your choice by filling of	est Credi ature either a ut a secure o	t Cards low fixed rate APR or a low ir nline application.	troductory APR. Apply
Search through the Low Interest Credit Card Offers below.	2 Compa determi	Compare are offers side by side in o ne which card is best for	order to A you. fi	3 Apply Apply for the Credit Card of year illing out a secure online appl	our choice by lication.
Top Pick in Categor Netizens Ventu Notizens Ban	y re Rewards k SILLS SILLS	Credit Card Olick "APPLY HERE" It 1.25 miles per dollar or Redeem miles for airlin Fly free on any airline, Use rewards for travel, 0% intro APR on purch No foreign transaction	o apply online e very purch: le tickets, hot any time with merchandise ases until Sej fees	r or call 866-542-0808 ase, every day el rooms, or car rentals and n no blackout dates , gift cards, and more ptember 2012	nore
APPLY HERE Intro APR 0% intro APR on methods	Intro APR Period until Sept. 2012	No annual fee Great travel insurance Regular APR 13.90% (V)	Annual Fee None*	e Balance Transfers Yes*	Credit Needed Excellent Credit*
		Earn \$50 Bonus Cash 0% Intro APR and no a Travel with the comfort Get 5% cash back in q department stores, subje Signing up is free and Unlimited 1% Cash Ba Up to additional 10% c	Back after firs nnual fee of insurance uarterly bonus to quarterly so easy ck on all other ash back whe	s categories like gas, home ir maximum r purchases with no spending m you shop online at select n	nprovement and tiers nerchants through
Intro APR 0%*	Intro APR Period 12 months on balance transfers'	Regular APR pay in full or as 9.9% (V)	Annual Fee None*	e Balance Transfers Yes*	Credit Needed Good Credit*
Bank of America 2254 9955 0002 2254 9955 0002 2254 9955 0002 2254 9955 0002 2254 9955 0002 2254 9955 0002 2254 9955 0002	Intro APR Period 18 months on balance transfers and purchases"	vards TM Signatu Get a \$50 statement or days of the account open Earn 3% cash back on and 1% toward other pur Carry on one free chec Rodeem rewards for a Get a 25% borus for a Get redemptions starti Regular APR 12.99 % (V)	re Visa (edit after spe ing date gas, grocery, shases ked bag on s check, credit, Il cash reward g at \$25, with Annual Fee None	Care(®) - \$50 State nding \$100 in retail purchase and drug store purchases fo elected airlines with purchass direct deposit or pay toward redemptions of \$300 or mori the capability to set up optito Bablino Transfers Yes*	ment Credit s within the first 60 r the first 6 months o of ticket an eligible mortgage e ons Credit Needed Good Credit*

Fig. 5. An excerpt from a website that allows you to compare credit cards.

However, upon reading the itemized content, we quickly find that the listed features are not parallel from credit card to credit card and each list seems to present random bits of information of questionable value. Put differently, the structure of the itemized content makes it hard to draw comparisons.

Fortunately, the content below the shaded grey bars does allow users to compare interest rates quite easily. Additionally, the content about interest rates (e.g. "Intro APR Period") is consistent across cards. Still, the text assumes that users know that "(V)" means "variable" interest rate. And users have to click on the credit card issuer's website to learn that the bank can raise the rate when it wishes or when markets fluctuate. As we can see, some information is not delivered at the point where users need it.

At its root, however, the problem may lie not with the choices made by the site's designers, but with the information made available to them by the credit card issuers in the first place. The problem of getting consistent and comparable information suggests a need for plain-language regulations about public information from the financial sector. Banks have tended to make it hard for consumers to compare their financial products – a fact that prompted the creation of the US Consumer Financial Protection Bureau in 2009.²⁹ Clearly, information designers face significant challenges in making financial information clear and compelling.

Conclusion

My purpose here has been to bring to the fore a number of issues about reading online. First of all, online engagement is not always about socializing or having fun. While people use the Web for building communities, making new friends, ordering pizza, or playing Angry Birds, they also use it for much more. Importantly, the data from my research shows that at least some of the time, people come to the Web with serious purposes in mind, such as reading to understand, reading to solve a practical problem, or reading to answer a nagging question.

For these more serious purposes, reading online may involve searching, scanning, comprehending, integrating, and interpreting. Such activities,

which in themselves can be cognitively demanding, are made even more difficult by websites that are poorly written, tortured by jargon and insider language, confusing to look at, and not organized in ways that help people accomplish their goals.

The research I have presented tells us that good writing and good visual design can help people carry out their serious and even not-so-serious purposes on the Web. Expert information designers have an important role to play in shaping experience and enabling people to accomplish their goals – whether skimming the text and graphics to get the gist or scrutinizing the content to interrogate its relevance. The examples discussed here, from the worlds of e-commerce, health, insurance, and finance, show why skilled information design is sorely needed across both the public and private sectors. They also remind us that in developing a content strategy for the Web, organizations need more than a plan for good visual design or good writing. Visual and verbal content must be carefully orchestrated so that people can envision how the information will help them achieve their goals. Simply put, information design on the Web matters.