What Do Technical Communicators Need to Know about Information Design?

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Author's note
This chapter is from a book aimed at college students taking courses in technical, scientific, or professional communication. The editors requested that each chapter follow a prescribed structure: (1) the posing of a practical problem of communication, (2) a brief literature review, (3) a heuristic exploring how to solve the problem, (4) an extended practical example that shows the heuristic in action, and (5) a set of discussion questions for classroom use.

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solving problems in technical communication

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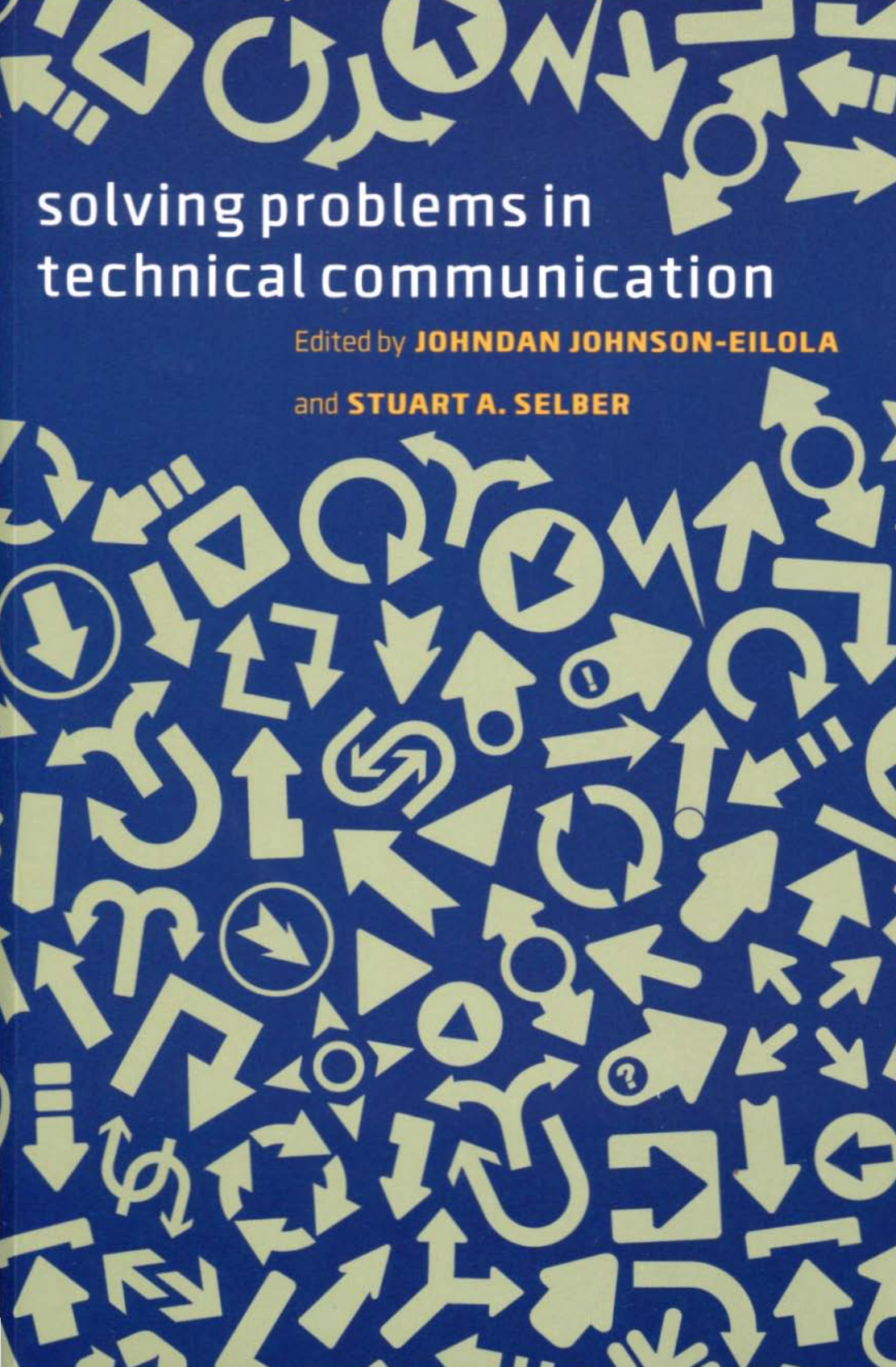

KAREN SCHRIVER

16 What Do Technical Communicators Need to Know about Information Design?

SUMMARY

As a technical communicator, you will need to develop your expertise not only in writing, but also in information design. Whether you are designing reports about the environment or manuals for smartphones, you will need to be concerned with how to present your messages visually and verbally. As organizations around the globe expand the audiences for whom they create products and services, the demand for well-designed text and graphics has become increasingly important. Although most technical communicators have honed their skills in verbal expression, they often lack knowledge of information design and have few strategies for integrating visual and verbal content. They may not be familiar with the growing research on information design that could help them make decisions about designing content spatially and typographically. This chapter offers a heuristic for structuring content visually and for making the structure salient through grouping, organizing, and signaling.

INTRODUCTION

Miguel recently acquired a new job with a government agency within the U.S. Department of Agriculture. His department's mission is to spread the word about healthy eating habits to families across the United States. Miguel's supervisor started him off in his new position with two tasks. The first task is to revise a flyer for parents about healthy foods and their benefits. The flyer consists of a list of foods that research has shown to be nutritious, and gives reasons why they are nutritious. Miguel's second task is more demanding. His supervisor asked him to create the first in a new series of documents to inform parents about issues related to nutrition—issues such as obesity, nutritional supplements, weight gain, natural cures, and myths about healthy eating. The supervisor expects that Miguel's document will serve as a template for the series. He told Miguel that the research on healthy eating has changed substantially since the department last printed its information, rendering the previous content

obsolete. Miguel must begin with a careful review of the current research on nutrition. He recognizes that to do the task well, he must synthesize the most recent nutritional research and then design the content from scratch.

Miguel's overall goal for these tasks is to create easy-to-understand texts that can be presented on paper or on the department's website. He begins by searching many nutrition-related databases with an eye toward compiling the available data that could be used to make recommendations for healthy eating. Initially, he thinks the task is obvious and straightforward, but he begins to feel a bit overwhelmed when he finds that the amount of available research is enormous, and that it is scattered across professional and popular literature in print and on the web. Moreover, much of the information he finds is contradictory, making it hard to understand and to draw conclusions from.

What approach could Miguel take to meet these rhetorical challenges? How should he proceed in making decisions about the content? Once he gathers the appropriate content, how can he design the information so that it will be easy for any parent to understand? What are the alternatives for organizing the material visually and verbally? What are the options for displaying the content spatially? What sorts of graphics could he use? Could his choice of typography encourage reading?

This chapter presents a heuristic that Miguel could use for addressing these rhetorical challenges or other complex problems in technical communication. In particular, the heuristic explores three information-design principles for making one's thinking visible to readers: (1) grouping content rhetorically, (2) organizing content visually, and (3) signaling structural relationships. Each of these principles will be explored through practical examples that illustrate how they can guide technical communication. Taken together, the ideas presented in this chapter can help you place more emphasis on designing visually—attending carefully to issues of graphics, spatial display, or typography—and focus more attention on making the structure of your content visible to readers. When technical communication skills are combined with sophistication in information design, it can lead not only to more effective professional communications, but also to the development of the communicator's expertise (Schriver 2012). This chapter will help you expand your repertory of strategies for solving communication problems by drawing on evidence-based principles of information design.

WHY RESEARCH ON INFORMATION DESIGN IS USEFUL

As the above scenario from the Department of Agriculture shows, technical communicators could benefit from research about strategies for visual de-

sign. In this way, they could both manage their own creative process and do a good job in persuading supervisors that their design choices are sound. Research on information design helps technical communicators understand how different people typically engage with visual and verbal content. It provides insight into the kinds of textual or graphic "moves" that tend to make content clear and understandable—promoting comprehension, satisfaction, and usability. Moreover, information-design research shows us how visual design may influence the persona projected by the content and how design can influence whether readers believe in the credibility of the content and the trustworthiness of the authors (Schriver 1997).

WHAT IS INFORMATION DESIGN?

Information design is the art and science of integrating writing and design so that people can use content in ways that suit their personal goals. Information design involves making communication artifacts by shaping verbal language and visual language (and increasingly, in many technical and scientific contexts, mathematical language). A fundamental goal for information design is to enable and enhance relationships among stakeholders for an artifact—that is, among the variety of audiences, clients, critics, readers, listeners, users, and viewers who have a stake in the content. The field of information design focuses on devising novel ways to enable relationships among people through the effective design of content (Frascara 2010). By drawing on principles of information design, technical communicators can design more rhetorically effective communications.

As technical communicators shape their communications for stakeholders, they need to orchestrate word and image in order to achieve the optimal selection of content, the most appropriate organization, the best level of detail, and the best mix of media. Of course, achieving the optimum is not easy. Research tells us that technical communicators need to acquire sophisticated skills in modeling stakeholders' processes of interpretation (Schriver 1989, 1997). When research is available that can help them make better choices, experienced technical communicators opt for writing and design strategies that have been evaluated for their effectiveness with readers.

Experienced technical communicators recognize that they may perceive content differently than their audiences, who typically bring different knowledge, background, experience, or culture to bear during interpretation. Experts pay close attention to the findings of empirical research in order to understand the kinds of writing or design choices that may help or hinder readers as they attempt to make sense of text and graphics.

The stakes are high because bad information design can leave stakeholders with a lasting negative impression, inviting them to ignore a message, misunderstand it, poke fun at it, or simply give up and stop reading. Technical communicators need to worry about people's cognitive and emotional responses to their content.

INFORMATION DESIGN EMPHASIZES THE VISUAL

The emphasis on designing content visually stems from information designers' long-standing belief that the appearance of a communication influences whether people will want to read it. Studies of reading show that people who are confronted with content begin to interpret that content immediately (Anderson 2009), and that the visual display of that content can help or hinder people's interpretation. Research suggests that people may form immediate opinions of the visual display of content. For example, website users found it easy to rate a website as attractive or unattractive, and surprisingly, they could make such judgments reliably and consistently based on their looking at a webpage for only one-twentieth of a second (Lindgaard et al. 2006).

Moreover, researchers have shown that people remember content presented visually more easily than content presented verbally (Paivio 1969). Importantly, research finds that a careful integration of both words and pictures engages people more effectively than either alone (Sadoski and Paivio 2001). When designers provide access to their content through both visual and verbal means—what psychologists call "dual coding"—readers will have two ways of understanding the content and are more likely to remember it (Paivio 1990). Studies show that people tend to remember more when they acquire new content visually and verbally, rather than just visually or just verbally.

Because the human eye is hardwired to interpret and organize what we see, people tend to make immediate inferences about what they see in their field of vision. This aspect of human interpretative processes has implications for information design. On one hand, if the visual display meets the readers' expectations, readers will recognize the structural cues, be able to navigate the content, and be more likely to sustain their reading. On the other hand, it also means that if the visual display of the text does not attract viewers or confuses them, reading may never begin or will stop before much of the content is considered.

While research on information design is broad and diverse, technical communicators can most productively start with three areas central to displaying content visually:

- grouping content rhetorically,
- organizing content visually to show contrasts, and
- signaling structural relationships.

GROUPING CONTENT RHETORICALLY

Technical communicators already know how important it is to shape their writing with a reader or viewer in mind. Taking an audience-centered perspective applies to grouping content as well. Information designers are concerned with making sure the visual display of the content is rhetorically effective. This means formatting the content into meaningful groups that readers will notice, expect, and appreciate.

Research suggests that visual grouping gives readers a sense of the overall structure (Tullis 1997). When text and graphics are organized into meaningful semantic clusters, it makes it easier for readers to chunk the content (Kahn, Tan, and Beaton 1990). Grouping can also reduce cognitive load by helping readers remember content, which can make the content seem less complex, leading to fewer errors and increased satisfaction (Niemela and Saarinen 2000).

Grouping Can Be Visual or Verbal

Technical communicators are highly adept at grouping verbal content according to its purpose. For example, in authoring user assistance, writers separate overview information from procedural information. In constructing a report about a scientific research study, the writer purposely separates information relevant to the literature review from material about the study proper. In fact, a good part of technical communicators' work involves grouping content strategically, striving to make implicit structures explicit for readers.

Technical communicators can make verbal groups more evident by employing visual devices such as sidebars, itemized lists, boxes, shading, color, and white space. When content is formatted consistently (e.g., all procedures use enumerated lists with a short line length while all overview text is formatted with a longer line length), readers can readily perceive intended relationships among the content elements.

In addition to technical communicators' developing skills in visually structuring verbal content, it is also important for them to develop strategies for grouping visual content spatially; for examples, see Brumberger and Northcut 2012. Structuring visual content involves grouping visual materials to make an argument or to tell a story, creating purpose-driven groups from source materials such as photos, technical illustrations, digital art, tables, charts, diagrams, and data displays.

Grouping Can Have Cognitive and Affective Benefits for Readers

When content is grouped in ways that allow readers to form meaningful relationships among the elements, readers can often make connections across the content that they might miss otherwise. Grouping content spatially makes the content more coherent, allowing readers to recognize how the pieces of the message fit together. In this way, grouping helps make what otherwise might be invisible structures apparent to the reader. Grouping not only organizes the content, it also renders it visually conspicuous—quite important for busy readers, impatient readers, less-able readers, and people who are reading in a second language.

How the content is grouped may also influence readers' first impressions of the message (Lindgaard et al. 2006), setting in motion positive or negative attitudes about the content (Schriver 1997). This makes it important to catch the reader's attention and to make a good impression at first glance.

Grouping Can Simplify Complex Content

Technical communicators are often faced with the task of reorganizing lengthy content into meaningful groups, particularly as they help their clients move content from paper to the web. Breaking the text into short paragraphs (e.g., one to three sentences) promotes faster reading, and importantly, the shorter length influences readers' sense of how much effort it will take to read. Researchers at the Poynter Institute for Media Studies used eye tracking to investigate how people read print and online newspapers. They found that readers skim and scan the content, following the modular clusters of the newspaper's layout (Stark Adam, Quinn, and Edmonds 2007). In a related study, readers tended to give stories with short paragraphs twice as much attention as those with longer paragraphs (Outing and Ruel 2004).

Grouping Can Show Semantic Relationships

By clustering content in ways that make the text simple and inviting, technical communicators can make reading less effortful. We can also use grouping to show how the content is logically and semantically related. For example, we can use white space to group semantically related content. When groups of content are positioned in close proximity, whether on a page or screen, readers can easily infer their relatedness. In this way, proximity is a powerful grouping tool.

Grids (discussed later in this chapter) are ways to structure space. They are modular visual design systems for organizing pages, screens, and three-dimensional spaces. They can be powerful tools for showing semantic

relationships among elements of information spaces. Technical communicators can benefit from gaining familiarity with concepts related to the design of typographic grid systems—concepts such as layering, grouping, separating, zoning, and highlighting (Müller-Brockmann 1985; Keyes 1993; Samara 2002). Some of these concepts, mainly developed by design practitioners, have been tested; for example, research finds that by aligning content elements and by consistently positioning them, designers can help viewers find information more quickly (Parush, Nadir, and Schtub 1998).

The overall visual look, including the layout, significantly shapes users' perceptions of consistency and their satisfaction in browsing tasks (Ozok and Salvendy 2000). When readers can form judgments about the nature of the content quickly and see how elements are related, they are more likely to continue reading. Studies of how people read on the web suggest that getting people to sustain their reading represents one of the biggest challenges for authors of websites, and that people expect content that is organized to fit their unique reasons for coming to the content (Schriver 2010). Getting people to read and keep reading is an important benefit of grouping content rhetorically.

Organizing Content Visually to Show Contrasts

In the early part of the twentieth century, Gestalt psychologists systematically studied how the properties of the visual world shape our perceptions (Wertheimer 1922; Köhler 1947). One of the earliest discoveries of Gestalt psychology was that the way things look depends not just on the properties of their elementary parts, but also, and more importantly, on their organization. They pointed out that *contrast is fundamental to human perception* and that the human eye is attracted to areas of high contrast (dark-light, large-small, thick-thin, saturated color–unsaturated color).[1] In designing content, contrast can be rendered graphically or typographically.

Enhancing Contrast

Technical communicators can create graphic contrast by juxtaposing changes in size, shape, color, weight, saturation, and position (Mullet and Sano 1995; Tufte 1983). When used purposefully, contrast can reveal the architecture of the content, making the hierarchy visually present and helping readers see relationships among the parts (Ivory, Sinha, and Hearst 2001). Contrast also helps people as they search for content. It highlights key information on a page, segregating main points from minor ones (Jenkins and Cole 1982; Scharff, Hill, and Ahumada 2000). Contrast can be achieved in many ways: for example, through integrating pictures within pictures, text within text, and pictures in relation to texts. When the eye

is confronted with contrast, it provokes curiosity and invites the reader to look closer to see what is going on.

The best typographic contrast is achieved by using black type on a white background. In every study in which this aspect of the text has been studied, the same result was obtained: the darker the type and the whiter the background, the better the legibility of the text (Scharff, Hill, and Ahumada 2000; Muter and Marrutto 1991). Moreover, studies of low-vision readers suggest that contrast is a fundamental perceptual aid to their seeing the text at all. Reece (2002) found that low-vision readers rely heavily on typographic contrast to see the text, adding extra reason for technical communicators to concentrate on building effective typographic contrast into the overall design of their content.

Researchers have studied the role of typographic features in text design since the 1800s. Consequently, most of what we know about typographic design has been derived from the way people read on paper. In the past decade or so, researchers in journalism, information design, usability, and human factors have conducted studies of online typography. Some findings of the typographic research apply to both print *and* online information design, while other findings apply particularly to print or to electronic displays (computer screens, tablet displays, smartphones).

Typeface: Serif or Sans Serif?

Research that applies to both print and online applications tells us that typographic *contrast* is a critical feature of good design. Good typography clearly signals the hierarchy and structure of content. When the contrast is working well, readers or viewers can easily make discriminations about how the content is organized. Moreover, good contrast facilitates search and rapid retrieval of information. Typographic contrast can be signaled in many ways, including contrasts of light to dark, thick to thin, roman type to italic, uppercase to lowercase, serif to sans serif. Figure 16.1 shows the difference between a serif typeface (16-point Palatino) and a sans serif typeface (16-point Myriad Pro).

In the research on typography, one finding appears repeatedly in the literature. Studies comparing serif and sans serif faces find that readers pay more attention to the amount 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 (Schriver 1997; Spencer, Reynolds, and Coe 1974).

Research shows that when the typographic resolution is excellent, serif or sans serif typefaces are equally legible and equally fast to read. Thus, when text is printed on paper at high resolution, the text will be

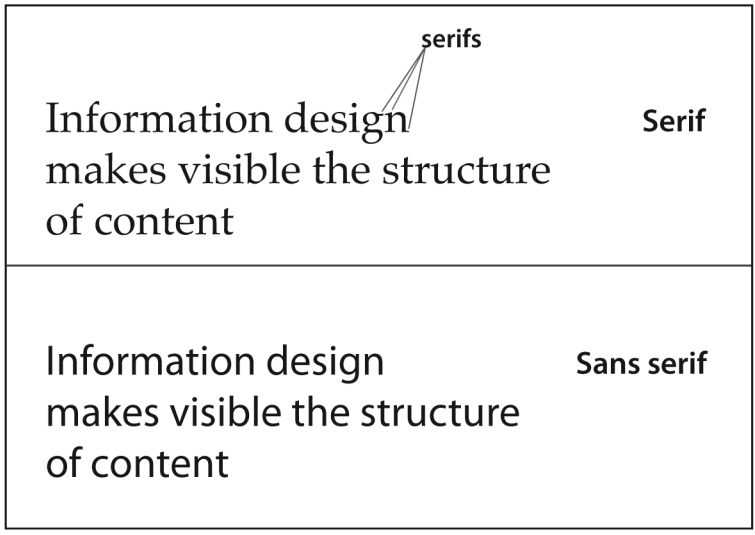

Figure 16.1. Differences between serif and sans serif typefaces

equally legible whether the type is serif or sans serif. However, when the resolution is average or poor, sans serif is more legible (Bernard et al. 2001). 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*'s and *e*'s, *8*'s and *6*'s, *o*'s and *o*'s. Practical situations in which readers must make rapid discriminations among numbers or characters include e-mail addresses, URLs, credit card numbers, serial numbers, order numbers, and prescription numbers.

Research on paper documents showed that when Americans engage with continuous text, such as a short story, they preferred serif faces, but when reading more technical prose, such as found in instruction manuals, they preferred sans serif (Schriver 1997, 289–303). Anecdotal reports suggest that Europeans are as comfortable with sans serif typefaces for reading continuous text as they are with serif faces. Researchers conclude that people tend to prefer what they are accustomed to reading.

Even though there is no difference in the legibility of serif and sans serif type when the screen resolution is good, people still have preferences for typefaces. And whether they are young or old, as they read online, most people prefer sans serif.

In a number of studies, low-vision readers (that is, severe loss of vision even with glasses) and readers with "normal" vision (that is, 20/20 with or without glasses), were found to prefer sans serif to serif type in computer displays 87–95% of the time (Reece 2002). Readers also preferred roman (nonitalic) type to italic type (67–82% of the time). Overall, Reece's study underscores the importance of typographic contrast for low-vision readers and suggests that both reduced-vision readers and normal readers show strong preferences for sans serif typefaces online. Theofanos and Redish (2005) remind us that it is important to think about low-vision users when we design text for online displays because vision impairments are more prevalent than we think and the number is growing as the baby boomer generation ages.

Type Size

Generally speaking, research on type size has investigated the impact of point size on reading speed, reading accuracy, and reader preference. Most studies have concentrated on the point sizes that are most legible for body text: 10-point, 12-point, and 14-point type (Bernard and Mills 2000; Bernard, Liao, and Mills 2001; Dyson 2004). The results of these studies are fairly consistent, leading researchers to draw these conclusions.

- Ten-point type is read more slowly, but more accurately, than 12-point.
- Twelve-point is read faster, but less accurately, than 10-point.
- Smaller typography slows reading, but tends to be read with better accuracy (perhaps because more concentration is required to see it).
- Most readers prefer larger type (12-point to 14-point) rather than smaller type (10-point).
- Children (ages nine to eleven) prefer 14-point sans serif.
- Older readers (ages seventy and above) prefer 14-point sans serif.
- Partially sighted or visually impaired readers prefer 14-point to 16-point sans serif.

Uppercase versus Lowercase Type

When sentences and paragraphs are displayed using upper-case type (all capital letters), they can be hard to read (Vartabedian 1971). When text is set in all uppercase, the text is rendered a uniform rectangle, without the distinctive word shapes that allow for rapid reading. In fact, when the body text is displayed in all capital letters, reading speed can be slowed about 13 to 20% (Breland and Breland 1944).

Recent discussions of typographic case remind us that there is nothing inherently unreadable about uppercase (Weinschenk 2009). Rather, readers' familiarity with upper- and lowercase may underlie the superior reading speed associated with mixed case. In short, we read typographic displays more quickly when the text is formatted in ways that are more familiar, which for readers in Western cultures means type set using upper- and lowercase letters. Vartabedian's research also shows that when uppercase is employed sparingly, it can make it easy to locate those items because they stand out due to the contrast.

Reading speed is optimal when uppercase and lowercase letters are used together (Rickards and August 1975). The variation in character height among upper- and lowercase letters allows rapid discrimination of letters and facilitates word recognition (Paterson and Tinker 1946). Thus, a combination of upper- and lowercase makes the reading process more smooth and efficient, enabling the eye to track the text more easily. When extra emphasis is needed, bold has been found to be a better cue than uppercase (Coles and Foster 1975).

SIGNALING STRUCTURAL RELATIONSHIPS

Technical communicators signal the content's structure in two primary ways: visually (through layout and typography) and verbally (through cues such as topic sentences, logical connectives, and overviews).

Signaling Visually

To signal the structure visually, we can use a variety of graphic and typographic techniques—size, position, weight, style, repetition, and alignment. For instance, suppose a technical communicator wanted to show that three textual elements were of equal importance in the hierarchy of a communication. It would be appropriate to signal the elements by (1) aligning them vertically as columns of equal size, and (2) giving each column a heading using the same typographic styles. These visual signals would show the parallel nature of the elements within the structure.

Size and position are primary visual cues to signal importance. When a message is dominated by a few large elements (e.g., photos), their size tells the reader they have priority in the message structure. Alternatively, when textual content is placed in a focal position for the reader (such as on the first page of a website), that position indicates the element's significance within the context.

Signaling the various levels of the text's structure can be accomplished through choices in typography. When well chosen, the typographic treatments allow readers to distinguish among, for example, first-level, second-

level, and third-level headings. By signaling the structure conspicuously, readers are more likely to notice important relationships in the content and to recognize thematic continuities.

In cases in which encouraging the reader to notice is critical, such as a warning label on a medicine bottle, designers often employ *double signaling*—that is, using more than one cue to draw attention to the message. For example, signals could involve size, weight (e.g., boldface), color, or position. However, it is important to be judicious in signaling with typography, as too many signals (e.g., too much boldface) or too much repetition of a particular cue (e.g., too many itemized lists in a row) can flatten the visual hierarchy, making it hard to tell what is important because nearly everything is signaled.

Designers strive to make their layouts show at a glance the rhetorical relationships among message elements. They do so by using features such as grids, colors, shapes, backgrounds, orientation, and size; for a case study of forms redesign, see Schriver 2011. Research suggests that these dominant features are perceived immediately, making it important that they are well designed and that they cue the structure effectively (Malamed 2009).

Signaling Verbally

Lengthy or complex content may be signaled by layering the content into levels, with more abstract or general content at the top level and more specific content at lower levels of the hierarchy. Technical communicators aim to make the structure explicit through careful composition of verbal cues, including previews, summaries, sidebars, headings, subheadings, topic sentences, advance questions, logical connectives (e.g., *and*, *or*, *consequently*, *next*), structural cues (e.g., *first*, *second*; *on one hand*, *on the other*), metadiscursive cues (*recall my first point*, *imagine the opposite interpretation*), pull quotes, legends, and captions (Spyridakis 1989a, 1989b).

Many print and online documents have a hierarchical structure, signaled by making broader topics (or more important topics) more prominent than specific topics (or less important topics). Subtopics are typically cued by subordination (Farkas 2005). For example, a website's home page is at the top of the hierarchy, its links provide branches to content at a more specific level, and these branches are split again at each level of the hierarchy. While simple content often has a structure only two levels deep, more complex content often requires a four-level or five-level structure.

Designers can improve the quality of their content by (1) organizing it into logical and semantically related rhetorical groups, (2) thinking carefully about how many levels of content are needed, (3) determining how

the groups should be organized to orchestrate a message, and (4) using verbal devices such as labels, names, captions, and headings that enable readers to make quick judgments about the nature of each group.

USING INFORMATION DESIGN TO SHAPE CONTENT: A THREE-PHASE HEURISTIC

As a way of summarizing what technical communicators need to know about information design, figure 16.2 presents a heuristic for structuring content visually. It assumes that a thorough analysis of stakeholders' needs and expectations has been conducted and that the communicator has some content to work with. As shown, the heuristic has three interactive phases: grouping, organizing, and signaling. Technical communicators can use the heuristic to remind themselves of considerations they need to take into account as they plan the display of their content.

PHASE 1: GROUP CONTENT INTO RHETORICAL CLUSTERS

The first phase of the information-design heuristic involves grouping content into rhetorical clusters. A *rhetorical cluster* is a collection of coordinated text elements (visual, verbal, or mathematical) that is designed to guide the reader in engaging with the content. A key feature of a rhetorical cluster is that its elements are interdependent, dynamically shaping the reader's interpretation (Schriver 1997, 343). For example, a newspaper

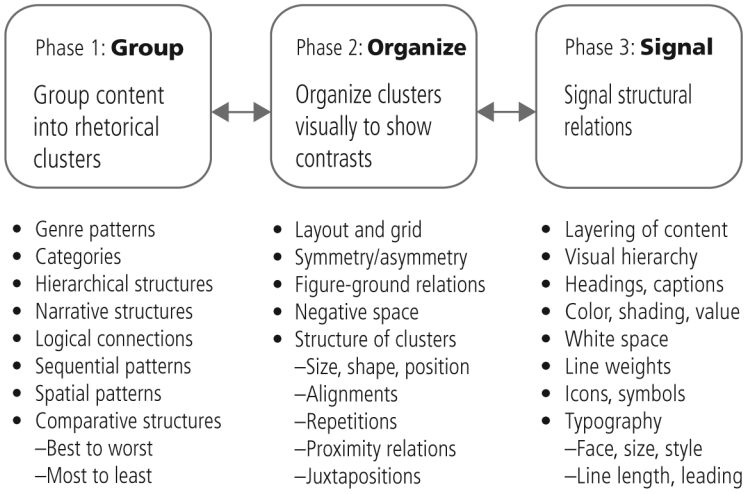

Figure 16.2. A three-phase heuristic for structuring content visually, depicting recursive activities for making structure salient through information design

story might be composed of text, a few levels of headings, a photograph, and a caption. Readers who examine a newspaper might be attracted first to the photograph. Many readers would then inspect the caption in order to interpret the photograph. This coupling during interpretation makes the photograph and the caption work in concert as a rhetorical cluster. The idea is to guide interpretation and to arouse the reader's curiosity.

Rhetorical Clustering versus Chunking

A rhetorical cluster is not a chunk, a commonly used term in technical communication to describe written text that has been segmented into short self-contained topics suitable for presentation on a screen. Chunks described by technical communicators do not correspond to those discussed by psychologists who study human memory. For psychologists, a chunk represents a package of related information in long-term memory (Miller 1956). When technical communicators characterize chunking, they mean introducing white space to break up large sections of text, or designing itemized lists or tables in lieu of lengthy paragraphs. Chunking can help busy readers see a lengthy text as more manageable. It can also facilitate readers' scanning, particularly when each chunk has a clear heading or caption.

Chunking is usually considered an editing strategy for tightening the writing in order to make the chunks of content stand on their own while fitting them into a larger text structure. In contrast, rhetorical clustering is an invention and planning strategy for writing or design, encouraging audience-centric groupings of content for maximum rhetorical impact. While chunking focuses on breaking up an existing text into smaller topics, rhetorical clustering organizes visual and verbal content in ways that allow readers to see important relationships among textual and graphic elements, for example, hierarchical relationships, logical connections, semantic or temporal relations. It is a good idea to consider these relationships prior to considerations of chunking, but certainly they interact.

Devising Preliminary Groupings for the Content

Before choosing a scheme for grouping the content into rhetorical clusters, consider readers' likely purposes and goals for using the information. Draw on what you know about their knowledge, beliefs, expectations, culture, and reading level as you devise a preliminary grouping. Make use of familiar genre patterns (such as problem-solution, if-then, or cause-effect) as you think about optional designs. Sketch a few structures for the content, exploring different ways of grouping the key ideas.

Figure 16.3 shows how a technical communicator's goals for the content can be paired with familiar patterns for organizing ideas. It presents a few typical goals for content and some attendant grouping techniques.

- Explain: flowcharts and hierarchy maps
- Unfold in layers: pyramids—iceberg and inverted pyramids
- Narrate: temporal sequencing
- Instruct: topical progressions or action/step sequences
- Compare: itemized lists, matrixes, tables
- Illustrate part-to-whole: picture-in-picture, hierarchical flow
- Detail cause and effect: node networks (or concept maps) and flow diagrams

These grouping techniques offer ideas for organizing an overall structure or for nesting different structures. Using multiple types of rhetorical clusters in the same artifact adds visual contrast and interest to the content, especially to those typically text-heavy genres such as letters, instructions, reports, and proposals. Figure 16.3 shows only a few of the many grouping techniques available to technical communicators.

Good communicators know that the same content can usually be presented in many ways. But even skilled technical communicators may fall short of planning innovative designs because they ignore the generative power of "trial balloons" en route to a good prototype. Because they work under the pressure of tight deadlines, technical communicators may rely on the first organizational pattern they think of, or merely dump their content into predetermined slots of a template.

Rhetorical clustering is a practical way to try out different structures early in the writing and design process before too many commitments are made. By exploring alternative organizational patterns, technical communicators are more likely to generate a better structure for their content.

Rhetorical clustering allows communicators to form a visual roadmap, helpful in planning an artifact's big picture as well as its little picture. For example, a technical communicator may organize a website using the iceberg approach, also called progressive disclosure or staged disclosure (Lidwell, Holden, and Butler 2003; Nielson 2006). In using the iceberg approach, the technical communicator strives to simplify complex content by organizing it as layers, deferring details or advanced topics to lower in the structure (see figure 16.3, "unfold in layers"). Layer 1 is the top level, or tip of the iceberg. For websites, this is the home page, and here technical communicators must integrate a number of key rhetorical clusters—such as one devoted to organizational identity (logo, name, taglines), another to products or services, and others to navigation and structure. When these

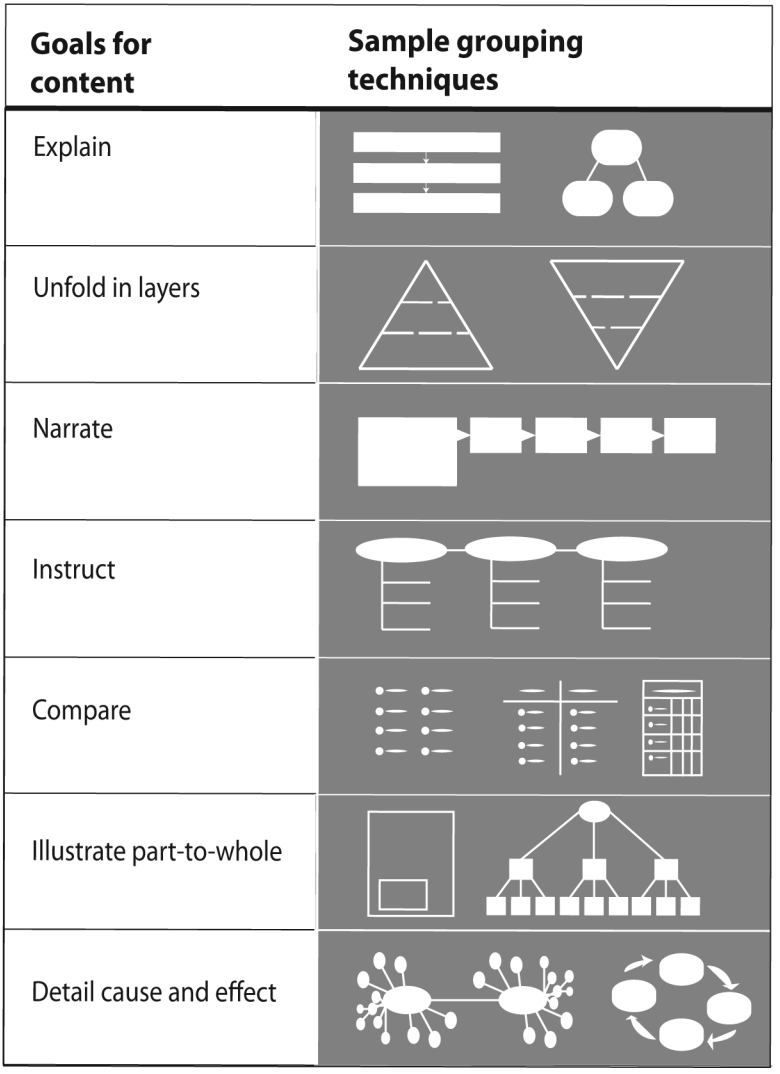

Figure 16.3. A few sample techniques for organizing content into rhetorical clusters

rhetorical clusters are both well designed and carefully integrated, the content provides an explicit trail of what to expect, what some have called good "information scent" (Pirolli and Card 1999), making viewers want to engage with the message, following the trail of cues to lower layers of the message. Layer 2 in the iceberg approach usually refers to the body of the content, and for websites, this is associated with attractive and easy-to-use interior pages. Layer 3 is the detail level, and with websites, this usually

means supplementary information (e.g., audio, video, PDFs) and links to related content.

In contrast to the iceberg approach is the inverted pyramid, another technique for layering content, typically used by journalists (see figure 16.3). With this method of structuring content, the most important or newsworthy information is presented first (represented by the widest part of the pyramid). The key rhetorical cluster for the beginning of a news story—the lead—concisely capsules who, what, when, where, why, and how. Level 2 of the news story provides the details, often with rhetorical clusters of text, photos, charts, and graphs. And the third level offers more background information that completes the story. As we can see, the iceberg approach and the inverted pyramid can make it easier to organize the text at the global level and to construct reader-oriented goals for each rhetorical cluster.

PHASE 2: ORGANIZE CLUSTERS VISUALLY TO SHOW CONTRASTS

The second phase of the heuristic (shown in figure 16.2) points to the need to organize rhetorical clusters visually, with the goal of making visible the intended contrasts among elements. Research reminds us that readers tend to form first impressions of content quickly, cuing on the structure and the tone. It is important to organize the visual display of the text and graphics by considering the order in which readers (or viewers) may look at them. This means striving to guide the reader's eye through the content by making the structure visibly clear. The reader's priorities for using the content should dictate the overall spatial display and the need for predictability in the content's positioning.

Some of the time, it will be useful to visually organize the layout by using a grid—a modular system for spatially displaying the content in columns and rows. Grids allow consistent positioning of textual and graphic genre elements (e.g., all first-level headings of a report will fit on one line spanning columns 1 and 2; if the headings need more horizontal space, the designer will shorten them to fit the grid). At other times, the content needs to stand out from the rest of the text or graphics (the surround), and the grid will need to be broken. Providing contrast sometimes means interrupting the rhythm of a sequence. For example, we can break the flow of well-organized but heavily textual content with dramatic changes in size and proportion by interspersing occasional full-page graphics. Sometimes no grid is preferable. Space limitations for this chapter prohibit an extended discussion of layout and grid design, but technical communicators can profit from exploring the graphic possibilities afforded by designing grid systems. Technical communicators need practice in trying out alternative

grids for their projects, in learning when to make purposeful deviations from a grid, and in realizing when to abandon a grid entirely; for a discussion of making and breaking of grid systems, see Müller-Brockmann 1985 and Samara 2002.

In organizing rhetorical clusters visually to show desired contrasts (e.g., differences in hierarchy, function, logic, semantics, time), it is important to try out different spatial displays and gauge their relative impact. Once a few alternative displays have been fleshed out, it is a good time in the design process to assess people's interpretations of the prototypes. Obtaining early feedback offers a crucial sense of how people (outside of the design team) may construct the persona projected by the information design (e.g., serious, playful, manipulative, corporate, condescending). Feedback from stakeholders can help technical communicators reconsider issues such as the shape, size, position, and proximity of clusters, as well as about how different clusters interact when juxtaposed (Schriver 1997).

PHASE 3: SIGNAL STRUCTURAL RELATIONS

Once the content has been grouped and meaningful contrasts have been established, technical communicators need to ensure that readers will readily grasp the structure of the message. This requires revisiting stakeholders' likely purposes for engaging with the content, to determine which content elements should be signaled explicitly. The third phase of the information-design heuristic (shown in figure 16.2) asks technical communicators to signal structural relations. The signaling phase operates recursively with the processes of grouping and organizing—each set of decisions dynamically influences the others. For example, the choices a technical communicator makes in designing the page or screen using typographic cues may lead to a reconsideration of proportions for the grid design. A change in the shape of a text element might suggest a change of color to make that shape recede or become more prominent. Indeed, every information-design decision can have an impact on every other.

The technical communicator's goal in carrying out the third phase of the heuristic is to guide the reader's eye through the content by carefully choosing signals that establish the structure and tone. This can be accomplished, for example, through strategic use of white space, color, shading, typography, line length, or other signals. As we saw in the research reviewed earlier, signaling can be visual or verbal—carried out graphically, typographically, or linguistically. Above all, choose graphic and typographic cues that reveal meaningful relationships in the hierarchy of the content.

If the message is primarily textual, strive for typographic cues that emphasize contrasts that bring the structure to the fore. Let us take an

Abstract Reading online is a complex interaction among people, technology, text, and graphics. This four-part article reviews the research literature from 1980 to 2010 about how people read online. Part one investigates the purposes that people bring to reading online, exploring how differences in goals, expectations, and reading skill influence what people do. Part two explores the impact of computer and mobile technologies on reading, asking how technologies enable and constrain reading. Part three integrates the research on good writing and focuses on the text features that help people to understand, remember, and appreciate online content—from words to whole-text considerations (e.g., noun strings, voice, headings, structure, and text density). Part four examines the research on the visual display of content and consolidates the research literature on graphic issues from typography to overall visual impression (e.g., typeface, line length, grouping, hierarchy, and contrast). This article consolidates key issues of interest for information designers and summarizes what we have learned about reading online in order to more effectively fulfill our goals as advocates for readers.

Figure 16.4. The original version of an abstract

example. Figure 16.4 is the original version of an abstract for a scientific paper. The content is formatted as a single block of text. It displays the text in the serif font Times Roman, using a justified format (sometimes called justified right). This format gives the text a solid rectangular shape. Notice that the typographic treatment renders the text a uniform shade of gray and the only prominent visual cue is the bold italics employed for the word *abstract*.

In evaluating such a text with an eye toward creating meaningful typographic contrast, it is important to identify the structure of the message and how to signal it more explicitly. In lengthy structures, this entails selecting a heading style for each level of the text (for example, major headings, minor headings, and subheadings). For each level of the hierarchy, choose a typeface (font), font size, style (light, regular, bold, italic, black, extrablack), and a color. Keep in mind that readers notice the differences among the styles within a typeface (e.g., light, regular, bold, black) as well as whether text is displayed in sans serif or serif. In choosing typography,

it is important to apply styles purposefully and consistently. Choose a typeface with excellent contrast among the styles within the face (that is, it has good contrast between the boldface and the regular style). In general, limit the number of typefaces to two that contrast well, such as one sans serif and one serif.

Figure 16.5 shows a second iteration of the abstract presented in figure 16.4. The technical communicator reformatted the abstract to display the text in ragged-right format by removing the justification of the type. She also introduced vertical line spacing to designate six chunks, a visual cue to make the organization of the abstract more apparent. Even so, the abstract could profit from more effective signaling of the structure.

In figure 16.6, the technical communicator modified the design a bit further by introducing a sans serif type (Frutiger bold) to highlight the linguistic cues designating the four parts of the article (e.g., "Part one").

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Part three integrates the research on good writing and focuses on the text features that help people to understand, remember, and appreciate online content—from words to whole-text considerations (e.g., noun strings, voice, headings, structure, and text density).

Part four examines the research on the visual display of content and consolidates the research literature on graphic issues from typography to overall visual impression (e.g., typeface, line length, grouping, hierarchy, and contrast).

This article consolidates key issues of interest for information designers and summarizes what we have learned about reading online in order to more effectively fulfill our goals as advocates for readers.

Figure 16.5. An initial revision of the abstract in figure 16.4

Abstract Reading online is a complex interaction among people, technology, text, and graphics. This four-part article reviews the research literature from 1980 to 2010 about how people read online.

Part one investigates the purposes that people bring to reading online, exploring how differences in goals, expectations, and reading skill influence what people do.

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Figure 16.6. A second revision of the abstract in figure 16.4

In figure 16.7, the final iteration of the abstract, the technical communicator shifted the visual display from a series of indented chunks to an itemized list. Notice that this display explicitly nests the four parts of the review within the body of the abstract, making them a visually distinct group yet part of the same rhetorical cluster.

As we can see, each successive version of the revised format introduces more visual segregation among the content elements. The final version of the abstract makes it easier for the reader to rapidly accomplish an important goal: to determine if the content of the scientific paper is of interest.

Let us consider a second example that emphasizes the need for graphic and linguistic cuing rather than typographic cuing. Imagine a technical communicator who is designing a customer catalog of laptop computers and smartphones that range in price from $100 to $3,000. Because the

message must be conveyed primarily through graphics, it will be important to consider the size and position of each graphic and whether any layers of content are needed. The process might start with a collection of images of laptops and smartphones of many different sizes.

The technical communicator's first task would be to devise ways to make all images of laptops a similar size, and then repeat the process for the smartphone images. When same-size images are displayed in the catalog, they instantly cue potential buyers of the parallel nature of those products. The next consideration would be to devise a way to display items in parallel fashion, for example by their functionality and price. The technical communicator could use shading or bounding boxes to help readers see relationships among items (such as orienting the laptops left to

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Figure 16.7. A final revision of the abstract in figure 16.4

right and putting a gray box behind all laptops that are $500 or less). The idea is to use graphic cues such as size, position, alignment, background, and color to make relationships salient for readers. In this way, readers can glance over the content and quickly determine how items are related, which ones look interesting, and which items to skip.

Readers of such catalogs would expect that similar products would have descriptive blurbs of about the same length. Having text that is visually parallel shows readers that they are scanning a family of competing products. By drawing on both textual and graphic cues, the technical communicator could call attention to particular products that have special features, such as smartphones that have GPS tracking. The technical communicator might decide to use a large table format with images on the top row and blurbs on the second row, enabling readers to compare each product picture by picture and feature by feature.

As we can see, the writing and design processes interact recursively. While sometimes technical communicators start their work with mainly images, at other times they start with mainly text. As they execute their plan for a communication artifact, the writing may influence the design or vice versa. It is important to allow for this healthy symbiosis between writing and design by thinking about the integration of the visual and verbal during the invention and planning phase of technical communication.

Consider Preferences for and Familiarity with Cues

Most people prefer sans serif typefaces as they read online—whether they are children, college students, senior citizens, or people with low or corrected vision. A sans serif face for electronic communication will likely satisfy the preferences of most online readers (Schriver 2009). Children, older adults (average age seventy), and readers who are dyslexic have been found to benefit from reading typefaces (either serif or sans serif) set between 12 points and 14 points, with most people preferring 14-point type over 12-point type (Bernard, Liao, and Mills 2001; Wilkins et al. 2009; O'Brien, Masfield, and Legge 2005). However, as we consider people's preferences for typographic cues, it is important not only to consider the point size of a typeface, but also its *x-height*, a key factor in typeface identification and legibility (see figure 16.8).

The x-height refers to the height of a lowercase *x* in the alphabet of a given typeface; it is the distance between the baseline of a letterform (bottom of lowercase *x*) and the mean line of a letterform (top of lowercase *x*). Figure 16.9 illustrates how x-heights may vary from typeface to typeface. X-heights vary not only in the amount of vertical space they occupy, but also in the amount of horizontal space they require. In choosing

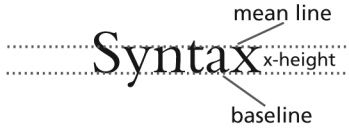


Figure 16.8. An example of x-height; the typeface is Bembo (24 point).

Figure 16.9. How x-heights vary for different typefaces set at the same point size

a typeface, then, it is important to compare competing typefaces at the particular point size deemed appropriate for the task (e.g., what would be required for displaying paragraphs or captions). Typefaces with small x-heights tend to make the text look smaller than one would expect for a given point size (e.g., 12-point type may appear to be 10-point). In such cases, it makes sense to increase the point size to enhance its legibility. Conversely, typefaces with large x-heights may make the text look crowded and dense, requiring the designer to increase the leading (the space between the lines of type) in order to increase the legibility.

Anecdotal reports suggest that most readers prefer what they are accustomed to. North American readers tend to prefer serif typefaces for the body copy of lengthy text presented on paper. In contrast, because sans serif faces were popularized in European countries, Europeans may exhibit a higher tolerance for reading lengthy texts displayed using sans serif faces. Even so, many European books and newspapers employ serif typefaces for the body copy. Because attitudes about typography are evolving, it is important to study the culture of the people who will engage with the artifact and attempt to employ cues they will prefer, find comfortable, and negotiate easily.

One thing we can say with certainty is that people from every culture appreciate good contrast between the headings and the body copy. This can be achieved by using one of the following: (1) sans serif type for headings and serif type for body text, (2) a serif type for both headings and body text, as long as it has good contrast within the face, or (3) a sans serif face for both headings and body text, again, as long as it has good contrast within the face.

Assess the Quality of the Design and the Intelligibility of the Cues

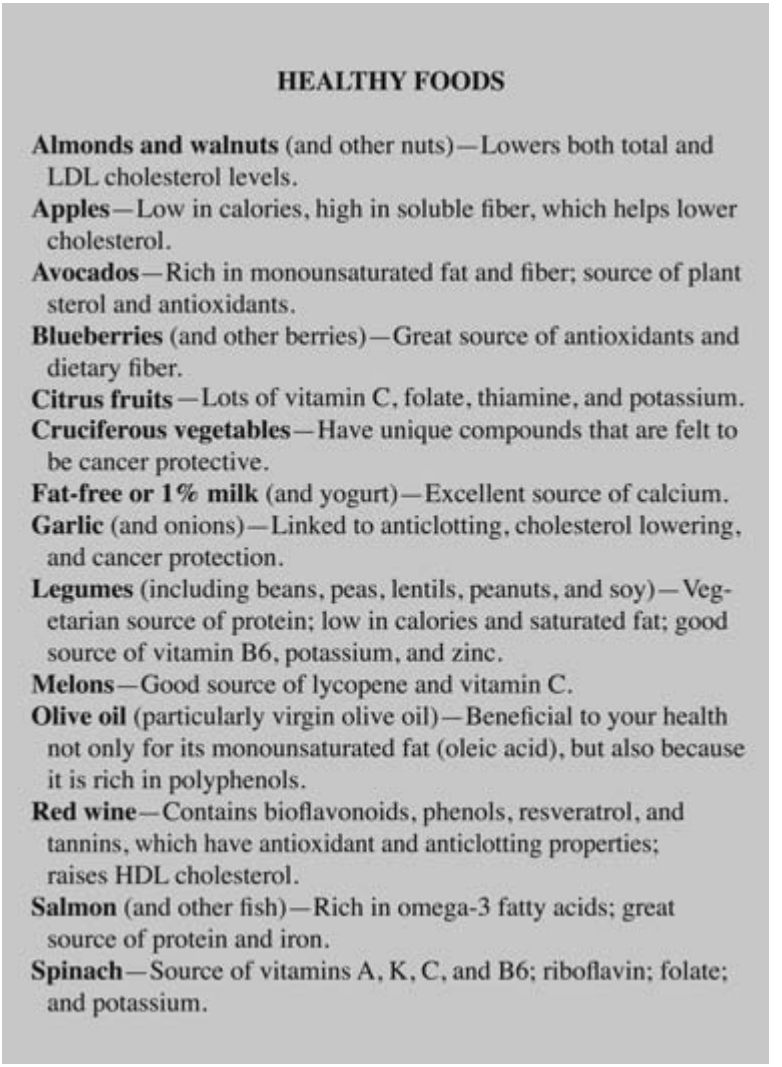
Even when one has a good idea of the reader's likely strategies for using the content, technical communicators must evaluate the goodness of their predictions by evaluating the content with readers. For example, it may be that people read typefaces set at smaller point sizes (such as 10-point type) more slowly because they are less legible, but readers may also remember more about what they have read and construct a more accurate understanding of the text because they are spending more time interpreting it (Dyson 2004). Usability testing can alert us to such speed-accuracy trade-offs, forcing us to make decisions about which is more important for the situation. Moreover, usability testing can guide technical communicators in revising their overall design as well as their visual and verbal systems for signaling the structure. The findings of usability testing can alert us to visual or verbal cues that are missing, incomplete, inconsistently executed, or just plain unclear (Schriver 1991, 1992). As it turns out, unclear content and omissions make people shut down and stop reading. When technical communicators combine the use of evidence-based design heuristics with user-experience testing, they increase the likelihood that their designs will be read.

EXTENDED EXAMPLE

To illustrate the heuristic above, I return to my introduction, in which Miguel was assigned two tasks: designing the first in a series of documents about healthy eating, and revising the visual design of a flyer that Miguel's supervisor thought could be used in the series. Let's look at how Miguel was able to draw on information-design research and the three-phase heuristic in his redesign of the flyer and design of the prototype.

TASK 1: REDESIGN A FLYER

Miguel began his revision task with the original flyer, shown in figure 16.10. The supervisor felt the design looked a little dull, but thought the content was good. The original flyer extended over two pages and was intended to function as a summary of the foods that research had found



HEALTHY FOODS

Almonds and walnuts (and other nuts)—Lowers both total and LDL cholesterol levels.
Apples—Low in calories, high in soluble fiber, which helps lower cholesterol.
Avocados—Rich in monounsaturated fat and fiber; source of plant sterol and antioxidants.
Blueberries (and other berries)—Great source of antioxidants and dietary fiber.
Citrus fruits—Lots of vitamin C, folate, thiamine, and potassium.
Cruciferous vegetables—Have unique compounds that are felt to be cancer protective.
Fat-free or 1% milk (and yogurt)—Excellent source of calcium.
Garlic (and onions)—Linked to anticlotting, cholesterol lowering, and cancer protection.
Legumes (including beans, peas, lentils, peanuts, and soy)—Vegetarian source of protein; low in calories and saturated fat; good source of vitamin B6, potassium, and zinc.
Melons—Good source of lycopene and vitamin C.
Olive oil (particularly virgin olive oil)—Beneficial to your health not only for its monounsaturated fat (oleic acid), but also because it is rich in polyphenols.
Red wine—Contains bioflavonoids, phenols, resveratrol, and tannins, which have antioxidant and anticlotting properties; raises HDL cholesterol.
Salmon (and other fish)—Rich in omega-3 fatty acids; great source of protein and iron.
Spinach—Source of vitamins A, K, C, and B6; riboflavin; folate; and potassium.

Figure 16.10. The original document listing healthy foods

to be the most nutritious. The first thing Miguel noticed was that the flyer was worse than dull; it was ugly. He doubted whether members of the intended audience would read it. He diagnosed the problem as one of lack of contrast, noticing that it did not signal the content very well. Miguel wanted to employ a less routine typeface than Times Roman. He felt that he could come up with a better layout that would cue the relationship between the names of the food and the explanation about why those foods were healthy choices. Miguel also questioned whether the alphabetical

structure made it boring, but decided to keep that organization and focus mainly on revising the visual display of the content.

Figure 16.11 shows Miguel's revision. He employed the same content, but gave it a more explicit structure. First, he changed the visual format from a list to a table. In so doing, he removed the gray background to increase the contrast and thereby improve the legibility. Miguel suspects that shifting the display to a tabular format will promote quicker access of the content, but he decides to wait until he pilot tests the redesign before he makes this claim to his supervisor.

Second, he changed the typography from a serif face (Times Roman) to a sans serif face (Frutiger), employing mixed styles and weights within the Frutiger family for the side heads and the body copy. He used Frutiger bold condensed for the side heads "healthy foods," Frutiger light condensed for the elaboration of the foods, and Frutiger light for the explanations—the part that he felt needed typography with a larger x-height. Miguel also revised the typography for displaying the major heading "healthy foods," from 12-point Times Roman set in all capital letters to 24-point Apple Chancery using title capitalization. These typographic updates improve the attractiveness of the flyer and increase the contrast between the major heading and the list of foods, their elaboration, and the explanations. Third, Miguel altered the verbal structure by shifting from the topic-based title "healthy foods" to the question "healthy eating?"

In addition, Miguel paired the heading "healthy foods" with the scenario heading "why they're good for you." Scenario headings orient the content from the reader's perspective (Flower, Hayes, and Swarts 1983). Miguel highlighted these linguistic cues by reversing the type for the column heads (white type on gray background). Miguel's tabular format for the body copy makes referencing why a given food is nutritious easier than the original format, which made the blurbs appear as miniparagraphs. Although Miguel's revision is clearly better than the original, we can see that the text needs further modification if it is to be understood by parents. Miguel reassures his supervisor that in his next iteration, he will replace words such as *monounsaturated* and *bioflavonoids*.

TASK 2: DESIGN A PROTOTYPE

Miguel's second task was to design a paper prototype for the series on nutrition. His supervisor recommended that he start with a one-page handout, suggesting that after it met with his approval, he would assign Miguel more complex tasks. His supervisor was interested in seeing whether Miguel could draw on his original research to design the content for the prototype.

Healthy Eating?

Healthy Foods	Why They're Good for You
Almonds and walnuts	Lowers both total and LDL cholesterol levels.
Apples	Low in calories, high in soluble fiber, which helps lower cholesterol.
Avocados	Rich in monounsaturated fat and fiber; source of plant sterol and antioxidants.
Blueberries (and other berries)	Great source of antioxidants and dietary fiber.
Citrus fruits	Lots of vitamin C, folate, thiamine, and potassium.
Cruciferous vegetables	Have unique compounds that are felt to be cancer protective.
Fat-free or 1% milk (and yogurt)	Excellent source of calcium.
Garlic (and onions)	Linked to anticlotting, cholesterol lowering, and cancer protection.
Legumes (including beans, peas, lentils, peanuts, and soy)	Vegetarian source of protein; low in calories and saturated fat; good source of vitamin B6, potassium, and zinc.
Melons	Good source of lycopene and vitamin C.
Olive oil (particularly virgin olive oil)	Beneficial to your health not only for its monounsaturated fat (oleic acid), but also because it is rich in polyphenols.
Red wine	Contains bioflavonoids, phenols, resveratrol, and tannins, which have antioxidant and anticlotting properties; raises HDL cholesterol.
Salmon (and other fish)	Rich in omega-3 fatty acids; great source of protein and iron.
Spinach	Source of vitamins A, K, C, and B6; riboflavin; folate; and potassium.

Figure 16.11. A revision of the list of healthy foods in figure 16.10

Phase 1: Group Content into Rhetorical Clusters

Miguel began by thinking about his audience as he sorted through the information he had collected in his research. He had identified what he thought were the top fifty empirical findings about nutrition. Miguel was surprised that so many things he had heard about healthy eating were either only partly true or completely wrong. He felt that many people might be mystified about the science of nutrition and that his goal would be to help to set the record straight.

Miguel had also collected many photographs, drawings, and cartoons in order to illustrate healthy choices. For example, he had assembled drawings of people eating, photos of fruits and vegetables, close-ups of whole grains, cartoons of people overeating, photos of lean meat, drawings of the U.S. Department of Agriculture's food pyramid (and its revision, the food plate). This abundance of material proved a bit overwhelming, and Miguel needed a strategy for organizing the first piece in the series.

Figure 16.12 presents a progression of pencil sketches Miguel created in coming up with ideas for the prototype. He began by grouping the findings about nutrition according to topic (left side of top row), starting with types of foods: fruits, grains, vegetables, protein, and so on. He considered what the topics might look like if arrayed as a list or as links with nested content (right side of top row).

Next he organized his photos and visuals by sorting them according to size, kind of image, and color (left side of middle row). This led him to draft a few additional structures (right side of middle row). He considered a paragraph-photograph sequence arranged vertically, which he thought might serve to associate key photos with the text. Then he entertained a picture-in-picture format, with a collage of foods as a background image and several small photos that highlighted the immediate topic. He also thought about using a line chart (showing how the average American's weight had increased over the years) with a pop-out textual blurb about the problem of obesity.

Still not convinced he had a workable structure, Miguel then explored designing rhetorical clusters for the goals of (1) narrating and explaining and (2) showing comparisons and explaining (third row of figure 16.12). He first sketched a time line that integrated text and graphics to show how ideas about healthy eating had evolved (left side of third row). Then he considered using a few matrix formats to show key comparisons among pieces of the content, such as ideas about healthy eating in the 1980s versus 2010s, or things that people believe to be true about healthy eating, but that are actually false (right side of third row).

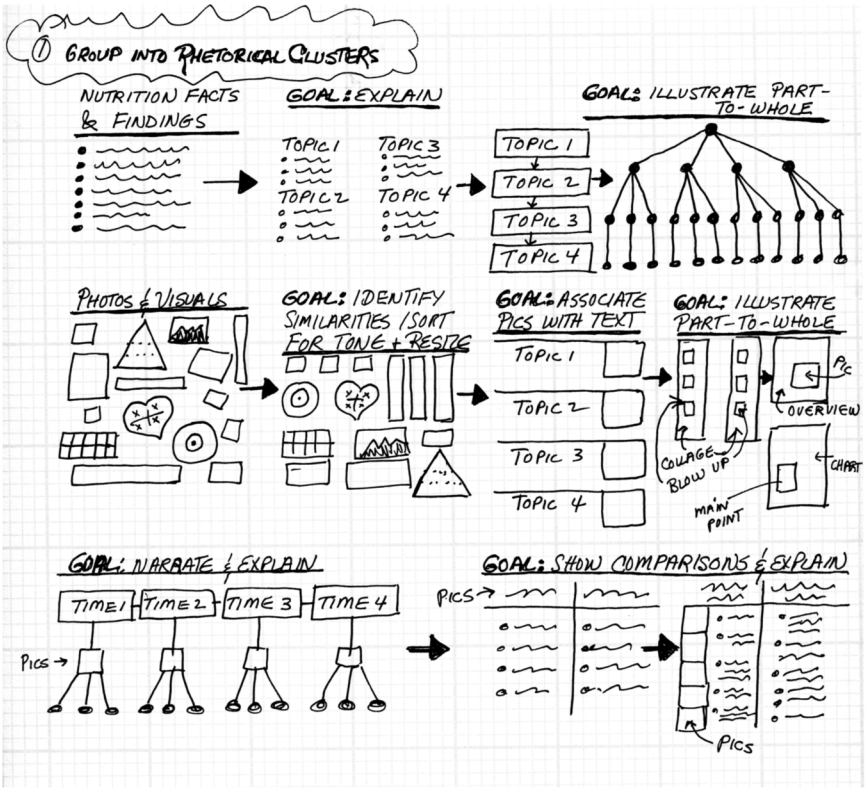


Figure 16.12. Phase 1 of the information-design heuristic, "group content into rhetorical clusters." Miguel sketches ways to group the content as he plans a prototype for a handout about healthy eating.

Phase 2: Organize Clusters Visually to Show Contrast

Next Miguel took the sketches from this first phase of the heuristic (grouping into rhetorical clusters) a step further. Drawing on phase 2, Miguel organized the clusters into a few very basic layouts, trying to get a sense of his visual options and to see which ones might present the content better to his audience. Figure 16.13 shows a series of pencil sketches Miguel made to visually organize the rhetorical clusters for contrast.

As Miguel tried out these alternative ways of viewing his content, he began to imagine the words and images he might use. He tried to predict what an audience of parents might conclude about healthy eating as they read each version. This led Miguel to scrutinize whether his goals for the project should be to explain (top sketches in figure 16.13), to narrate and explain (middle sketches), or to show comparisons and explain (bottom sketches).

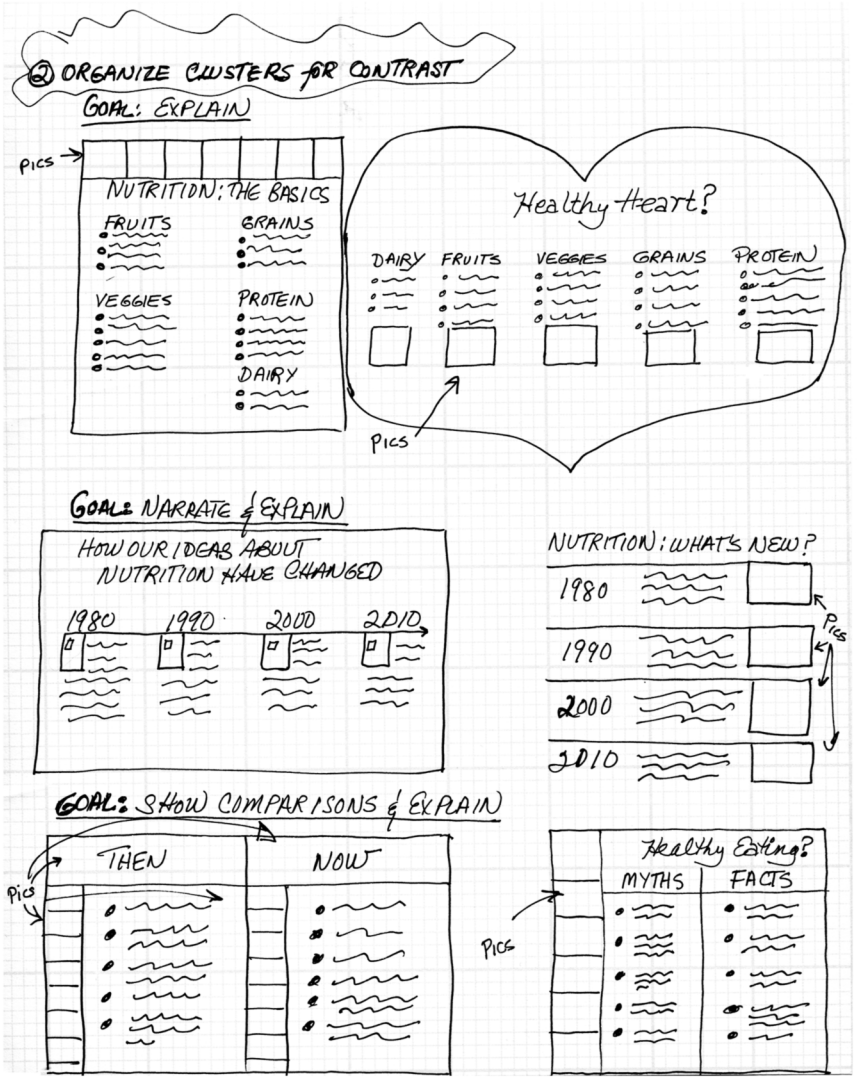


Figure 16.13. Phase 2 of the information-design heuristic, "organize clusters visually to show contrast." Here Miguel sketches a few structures in order to plan some advice about healthy eating.

Miguel concluded that for this first piece in the series, he would focus on helping parents see a few comparisons between what they think about nutrition and what research actually shows about nutrition. He decided that holding the single goal of "explaining about nutrition" was too narrow for his purposes and chose not to use the top sketches. He rejected

the structures he sketched for "narrate and explain" on the basis that parents probably do not care about the history of nutrition; they care about what to do about nutrition. He felt he could make the strongest case for his content and for his readers (and to his supervisor) by using the structure shown in his last sketch, "myths and facts."

A lesson Miguel took from the sketching exercise was that seeing the content through the lens of alternative structures proved useful—helping him generate new ideas about how to present the message. It was not until he had seen the alternatives side by side that he realized how visualizing the structures helped him clarify his rhetorical goals for the project.

Feeling that he had made a good decision, Miguel turned to his computer to execute the plan. He began working on ideas for the layout. He divided his attention between thinking about visuals, the optimal typography, and how much vertical space he needed for the text. After Miguel designed a few iterations of the layout in which he placed sample text and photos, he concluded that a simple three-column grid was what he needed. His final grid is shown in figure 16.14.

Miguel chose the three-column grid because it allowed him to organize the content using column 1 for the visuals and columns 2 and 3 for the text. He decided that the space he had available in column 1 was too narrow for anything complex, and that the rhetorical function should be

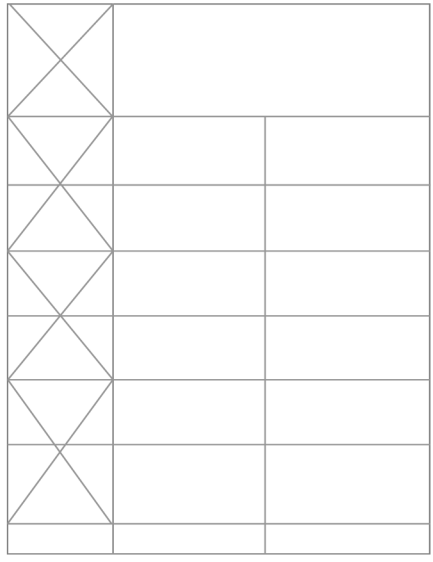


Figure 16.14. The grid Miguel employed to design the flyer presented in figures 16.15 and 16.16

to set the tone and to attract the eye to inspect the content. He sorted through the many visuals he had collected, looking for photos that had a similar look and color value, especially for realistic soft-edge photos of nutritious food. Once he made his selections, he resized the photos and cropped them to fit the grid. He wrote and edited the text for the set of "myths and facts," so that each item was roughly the same length.

Phase 3: Signal Structural Relations

Miguel then worked through the final phase of the heuristic, "signal structural relations," to produce a draft of the prototype. He attempted to integrate the overall appearance of the layout with a major heading that spans columns 2 and 3, "Healthy Eating?" (He purposefully employed the same major heading and displayed it using the same typeface as the first flyer. Miguel's intent with these repetitions was to start a document family, one with a unified visual and thematic identity.) Miguel then formatted the body text to fit columns 2 and 3 and gave each a heading, "Myths" and "Facts." He stacked the photos of fruits and vegetables in the first column and removed any white space between them. Once he completed the draft, he asked his information-design colleague Louise to look it over and offer some feedback. Miguel's initial draft and the comments from his colleague are displayed in figure 16.15.

As Louise's comments show, there were several problems with the information design of Miguel's prototype. The headings "Myths" and "Facts" that were to preview the itemized content did not function very well because their spatial position violated the Gestalt principle of proximity, which suggests that "elements that are close together are perceived to be more related than elements that are farther apart" (Lidwell, Holden, and Butler 2003, 160). The headings "Myths" and "Facts" needed to be closer to the actual content. As Louise pointed out, the "headers float within the gray bar." Similarly, a Gestalt problem of proximity was created by the horizontal position of the itemized "myths" (in column 2); the text was too close to the photos, and there was too much white space between columns 2 and 3.

Louise noticed that the heading "Facts" (column 3) was touching the major heading "Healthy Eating?," a typographic oversight on Miguel's part. Louise also mentioned that the heading "Facts" was not centered over the column, but shifted slightly to the right.

Louise's biggest problem by far with the prototype was the spatial positioning of the itemized content. The horizontal positioning of the items was unhelpful in guiding readers to make quick and appropriate comparisons between the myths and facts. That there were six clusters of myths

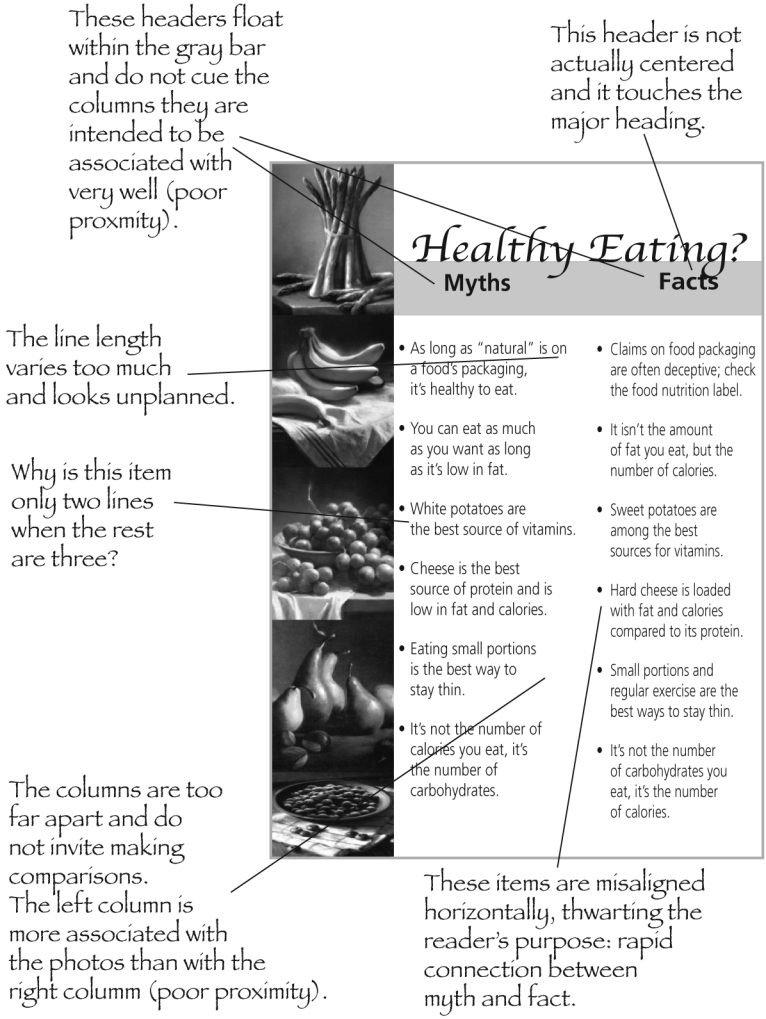


Figure 16.15. Phase 3 of the information-design heuristic, "signal structural relations." Miguel's first draft, with comments about the signaling from a colleague experienced in information design.

and facts was not immediately apparent. The columns were too far apart. While the horizontal alignment for items 1 to 3 was only slightly off, bulleted items 4 to 6 were completely misaligned. Moreover, the line length employed for the itemized content appeared to be random, with some lines jutting out much farther than others.

To improve on the next iteration, Louise suggested that Miguel try a different visual strategy for signaling the itemized content. She recom-

mended that Miguel think of a clear way to make it obvious that there were six clusters, each with two items, a myth and a fact.

Miguel considered each of Louise's constructive criticisms. He began his revisions with the easier ones to execute. First he worked on improving the proximity relations between the headings and the itemized content. He did so by moving the headings to align with the bottom of the gray bar (at the top of the layout) and by making sure the headings were indeed centered over columns 2 and 3. Next he standardized the line length of the items, so that each had a similar visual shape and occupied no more and no less than three lines of type. This move allowed him to achieve the horizontal alignment he sought, displaying each myth on the same line as each fact. Miguel realized that while he had worked hard to make the writing for the "myths and facts" parallel, editing each item for length and syntax (e.g., see item 6), he had neglected to use clear visual signals to make those parallels evident. Miguel agreed with Louise about the need for a different strategy for signaling the itemized content. After a few more drafts, Miguel made the six clusters more visible with two additional revisions. Initially he moved the columns closer together (creating better proximal relations). Then he inserted a thin gray rule between each cluster, making the format resemble that of a table. Miguel's final version is shown in figure 16.16.

Miguel was pleased with his final result, but wanted the opportunity to test his draft before he considered it finished. He was curious to know if the design encouraged reading and whether the main points were clear. As he looked over the six clusters of myths and facts, he questioned whether it was a wise idea to include messages about only two foods—potatoes and cheese—in the context of more general points about nutrition (see items 3 and 4). He considered moving those items to another text he would create later, but ran out of time before he needed to meet with his supervisor.

Miguel's supervisor was very satisfied with his work and believed it was an excellent prototype on which they could base other short pieces. He felt it would make a good first impression with readers—that it was clear and conveyed a positive persona—and would show that the Department of Agriculture cared about helping citizens understand healthy eating. Of course, he noticed the advice about potatoes and cheese. He said that including these items made the content's level of abstraction inconsistent across the list. But he thought the advice was good and that these foods had been connected to obesity. His final call was to keep the spotlight on potatoes and cheese. He also approved Miguel's request to test the prototype and suggested that Miguel create a plan to assess the quality of the entire series.

Figure 16.16. The final version of Miguel's prototype flyer about healthy eating

CONCLUSION

In this chapter, we have seen that by drawing on principles of information design, technical communicators can improve the quality of the content they create. When the structure of a message is made prominent visually and verbally, readers are more likely to attend to the message and respond positively to it. Technical communicators need not be graphic artists in

order to improve the visual display of their content. Rather, they need to be willing to devote the time it takes to excel in three key activities:

- grouping content rhetorically,
- organizing content visually, and
- signaling structural relationships.

The research presented in this chapter provides very strong evidence that each of these activities can help improve readers' engagement with content. These activities are especially powerful when they are employed iteratively and when they are combined with usability testing. Content that has been shaped by these activities and followed up with usability testing is likely to be easier to understand, more used, better liked, and better remembered. Moreover, each component of the information-design heuristic is supported by empirical evidence.

As the case study of Miguel's design process shows, using the heuristic helped him consider different visual structures for his content. His pencil sketches were a valuable catalyst to his design thinking. Seeing the options, even in very rough form, allowed him to imagine the resulting documents more fully and eliminate those designs that would likely be ineffective. And the feedback from his information-design colleague helped him recognize that he needed to worry about the consistency of visual cues just as much as consistency in writing and editing.

Taken as a whole, the research tells us that information design is neither decoration nor artifice. Rather, good information design supports readers' cognitive and emotional interactions with content. In this way, information design is about enabling communication. My research on expertise in information design suggests that as technical communicators become more sensitive to the graphic, spatial, and typographic possibilities for their content, they become more flexible and more skilled in designing messages (Schriver 2012).

The expansion of technical communicators' concern from focusing mainly on verbal aspects of messages to both visual and verbal aspects is important because many messages are never read. At first glance, people judge them to be too complicated, boring, or ugly. As technical communicators develop their expertise in information design, they will be better able meet their readers' cognitive and emotional needs for content. They will also find that information design is not about the details, such as choosing between serif and sans serif typefaces (although the details are important), but rather about the big picture—that is, building bridges to make sure people engage with the message. That means understanding

the content people need, structuring it in ways that invite engagement, and envisioning novel ways to shape the message. The hardest part of the work lies in building those rhetorical bridges.

DISCUSSION QUESTIONS

1. Take another look at figure 16.2, the heuristic for structuring content visually. In your opinion, which of the three phases will be the most difficult for students whose educational background has focused mainly on writing? What aspects of visual design do you think will be most challenging for you? What aspects interest you most?
2. People may respond emotionally as well as cognitively to the communications they read. Think about the last time you reacted emotionally to a document or a website. How did you respond? Excited? Enthusiastic? Annoyed? Frustrated? What was it that made you react as you did? What were the characteristics of the message or its presentation that triggered your response? What role did good or bad information design play in how you felt?
3. Look at the seven grouping techniques presented in figure 16.3. Think of a topic in technical communication that could be organized in various ways. Choose two of the grouping techniques and describe how the topic could be organized using each technique. In your opinion, which one provides the best structure for the content? Why?
4. Find a short example of poor information design (two pages or two screen captures). Make an electronic version of the example so you can display it for the class. Prepare a short presentation in which you first analyze the stakeholders for the example and their likely purposes for using the communication. Then draw on information-design research and the heuristic in figure 16.2 as a framework for evaluating why the information design is inadequate. As you discuss the example, identify the specific visual or verbal features that make the design poor.
5. Collect a set of four articles written on a single scientific or technical topic (e.g., nanotechnology, sleep disorders, cloud technology, electric cars). Two of the articles should be written for a lay audience (e.g., from *Science News*) and the other two for professionals in the field (e.g., *Science*). Analyze the articles for the ways they organize the content. Are similar structures employed for expert and novice audiences? What are the key differences among the visuals included? Are they effective? What can we learn from these practices?
6. Choose a local nonprofit agency and collect a sample of their paper and electronic documents. Create screen captures of their website and

print out representative pages that typify the agency's design moves. Analyze the documents for their writing and visual display of the content. What tone and persona do the designs project? Do paper and online versions give similar impressions?

7. Gather the paper documents and the printouts of the website you collected from the nonprofit agency. Lay out the document set on a large table, side by side: paper and online documents. Assess the impression the document set creates "as a family." Is it easy to tell that all of the documents are designed by the same agency? Are there elements that make the organizational voice inconsistent? Create a class presentation in which you detail your analysis, pointing out recommendations that you would make to the agency for improving the coherence and consistency of their communications.
8. Collect an example of the front page of your favorite electronic newspaper or service. Capture the image electronically and then import it to a design program, such as Adobe Illustrator. "Select the entire page" and use the software to "gray out the transparency of the page" so you can still see the shapes of the textual and graphic elements, but not read them. Then, use the software's tools to trace the grid of the page and make a grid overlay. Pay attention to the underlying structure of the body copy and graphics. Save the original page in full color and the page with your grid overlay. Bring the files to class and be prepared to describe how the content is displayed. How many columns and rows are employed in the design? What are they used for? Why is the information grouped as it is?
9. Choose a commercial organization with an online presence that has online competitors (e.g., banks, software manufacturers, airlines, rental car agencies, hotel chains, consumer product makers). Identify three websites that represent the competition (e.g., three different airlines). Collect screen captures from their websites. Then select two key features that are relatively similar across the websites that can be compared. For example, for airlines you could assess the booking information or trip-planning tools. Compare and contrast the three sites by making a series of tables that highlight the similarities and differences in their design strategy. Prepare a short report that discusses your findings.
10. Look for a document that presents an information design you admire. "Reverse engineer" the document—that is, try to identify the visual and verbal strategies that make it tick. Drawing on the research in information design, discuss why you think the document is effective.

NOTE

1. For a discussion of Gestalt principles applied to information design, see Schriver 1997, 303–326.

WORKS CITED

Anderson, John R. 2009. *Cognitive psychology and its implications*. 7th ed. New York: Worth Publishers.

Bernard, Michael L., C. H. Liao, and M. Mills. 2001. The effects of font type and size on the legibility and reading time of online text by older adults. In *Proceedings of the Special Interest Group on Computer-Human Interaction Extended Abstracts '01*, 175–176. New York: Association of Computing Machinery. http://psychology.wichita.edu/hci/projects/elderly.pdf.

Bernard, Michael L., and M. Mills. 2000. So, what size and type of font should I use on my website? *Usability News* 2 (2). http://www.wsupsy.psy.twsu.edu/surl/usabilitynews/2S/font.htm.

Bernard, Michael L., M. Mills, M. Peterson, and K. Storrer. 2001. A comparison of popular online fonts: Which is best and when? *Usability News* 3 (2). http://psychology.wichita.edu/surl/usabilitynews/3s/font.htm.

Breland, K., and M. K. Breland. 1944. Legibility of newspaper headlines printed in capitals and in lower case. *Journal of Applied Psychology* 28:117–120.

Brumberger, Eva, and Kathryn Northcut. 2012. *Designing texts: Teaching visual communication*. Amityville, NY: Baywood.

Coles, P., and J. J. Foster. 1975. Typographic cuing as an aid to learning from typewritten text. *Programmed Learning and Educational Technology* 12:102–108.

Dyson, Mary C. 2004. How physical text layout affects reading from screen. *Behaviour and Information Technology* 23 (6): 377–393.

Farkas, David K. 2005. Explicit structure in print and on-screen documents. *Technical Communication Quarterly* 14 (1): 9–30.

Flower, Linda, John R. Hayes, and H. Swarts. 1983. Revising functional documents: The scenario principle. In *New essays in technical and scientific communication*, edited by P. V. Anderson, R. J. Brockmann, and C. R. Miller, 41–58. New York: Baywood Press.

Frascara, Jorge. 2010. Data, information, design and traffic injuries. *VideoLectures.net*, March. http://videolectures.net/aml2010_frascara_diti/.

Ivory, Melody Y., Rashmi R. Sinha, and Marti A. Hearst. 2001. Empirically validated web page design metrics. In *Proceedings of the 2001 Human Factors in Computing Systems Conference*, edited by Michel Beaudouin-Lafon and Robert J. K. Jacob, 53–60. New York: ACM.

Jenkins, S. E., and B. L. Cole. 1982. The effect of the density of background elements on the conspicuity of objects. *Vision Research* 22:1241–1252.

Kahn, M., K. C. Tan, and R. J. Beaton. 1990. Reduction of cognitive workload through information chunking. In *Proceedings of the Human Factors and Ergonomics Society 34th Annual Meeting*, edited by D. Woods and E. Roth, 1509–1513. Santa Monica, CA: Human Factors and Ergonomics Society.

Keyes, E. 1993. Typography, color, and information structure. *Technical Communication* 40 (4): 638–654.

Köhler, W. 1947. *Gestalt psychology*. New York: Liveright.

Lidwell, William, Kritina Holden, and Jill Butler. 2003. *Universal principles of design*. Beverly, MA: Rockport Publishers.
Lindgaard, Gitte, Gary Fernandes, Cathy Dudek, and J. Brown. 2006. Attention web designers: You have 50 milliseconds to make a good first impression! *Behaviour and Information Technology* 25 (2): 115–126.
Malamed, Connie. 2009. *Visual language for designers: Principles for creating graphics that people understand*. Beverly, MA: Rockport Publishers.
Miller, G. A. 1956. The magic number seven, plus or minus two: Some limits on our capacity for processing information. *Psychological Review* 63:81–97.
Müller-Brockmann, J. 1985. *Grid systems in graphic design*. Revised ed. New York: Hastings House.
Mullet, Kevin, and Darrell Sano. 1995. *Designing visual interfaces: Communication oriented techniques*. Mountain View, CA: SunSoft Press.
Muter, P., and P. Marrutto. 1991. Reading and skimming from computer screens and books: The paperless office revisited? *Behaviour and Information Technology* 10:257–266.
Nielson, Jakob. 2006. Progressive disclosure. *Alertbox: useit.com*, December 4. http://www.useit.com/alertbox/progressive-disclosure.html.
Niemela, M., and J. Saarinen. 2000. Visual search for grouped versus ungrouped icons in a computer interface. *Human Factors* 42 (4): 630–635.
O'Brien, Beth A., Stephen J. Masfield, and Gordon E. Legge. 2005. The effect of print size on reading speed in dyslexia. *Journal of Research in Reading* 28 (3): 332–349.
Outing, Steve, and Laura Ruel. 2004. Eyetrack III: Online news consumer behavior in the age of multimedia. http://poynterextra.org/eyetrack2004/index.htm.
Ozok, A. A., and G. Salvendy. 2000. Measuring consistency of web page design and its effects on performance and satisfaction. *Ergonomics* 43 (4): 443–460.
Paivio, A. 1969. Mental imagery in associative learning and memory. *Psychological Review* 76:241–263.
———. 1990. *Mental representations: A dual coding approach*. New York: Oxford University Press.
Parush, A., R. Nadir, and A. Schtub. 1998. Evaluating the layout of graphical user interface screens: Validation of a numerical computerized model. *International Journal of Human-Computer Interaction* 10 (4): 343–360.
Paterson, D. G., and M. A. Tinker. 1946. Readability of newspaper headlines printed in capitals and lower case. *Journal of Applied Psychology* 30 (April): 161–168.
Pirolli, Peter, and Stuart K. Card. 1999. Information foraging. *Psychological Review* 106 (4): 643–675.
Reece, Gloria Ann. 2002. Text legibility for web documents and low vision. PhD dissertation, University of Memphis.
Rickards, E. C., and G. J. August. 1975. Generative underlining strategies in prose recall. *Journal of Educational Psychology* 67:860–865.
Sadoski, Mark, and Allan Paivio. 2001. *Imagery and text: A dual coding theory of reading and writing*. Mahwah, NJ: Erlbaum.
Samara, Timothy. 2002. *Making and breaking the grid*. Beverly, MA: Rockport Publishers.
Scharff, Lauren, Alyson Hill, and Albert Ahumada. 2000. Discriminability measures for predicting readability of text on textured backgrounds. *Optics Express* 6 (4): 81–91.
Schriver, K. A. 1989. Evaluating text quality: The continuum from text-focused to reader-focused methods. *IEEE Transactions on Professional Communication* 32 (4): 238–255.
———. 1991. Plain language through protocol-aided revision. In *Plain language: Principles*

and practice, edited by E. R. Steinberg, 148–172. Detroit, MI: Wayne State University Press.

———. 1992. Teaching writers to anticipate readers' needs: A classroom-evaluated pedagogy. *Written Communication* 9 (2): 179–208.

———. 1997. *Dynamics in document design: Creating texts for readers*. New York: John Wiley and Sons.

———. 2009. Using design to get people to read and keep reading. *Health Literacy Out Loud Podcast (HLOL)*, December 12. http://www.healthliteracyoutloud.com/?s=schriver.

———. 2010. Reading on the web: Implications for online information design. Ljubljana Museum of Architecture and Design Lecture Series on Visual Communications Theory: On Information Design. http://videolectures.net/aml2010_schriver_rotw/.

———. 2011. La retórica del rediseño en contextos burocráticos (The rhetoric of redesign in bureaucratic settings). In *Information design*, edited by Jorge Frascara, 156–165. Buenos Aires: Ediciones Infinito.

———. 2012. What we know about expertise in professional communication. In *Past, present, and future contributions of cognitive writing research to cognitive psychology*, edited by Virginia W. Berninger, 275–312. New York: Psychology Press.

Spencer, H., L. Reynolds, and B. Coe. 1974. Typographic coding in lists and bibliographies. *Applied Ergonomics* 5:136–141.

Spyridakis, J. H. 1989a. Signalling effects: Part I. *Journal of Technical Writing and Communication* 19 (1): 227–239.

———. 1989b. Signalling effects: Part II. *Journal of Technical Writing and Communication* 19 (4): 395–415.

Stark Adam, Pegie, Sara Quinn, and Rick Edmonds. 2007. *Eyetracking the news: A study of print and online reading*. St. Petersburg, FL: Poynter Institute for Media Studies.

Theofanos, Mary Frances, and Janice Redish. 2005. Helping low-vision and other users with web sites that meet their needs: Is one site for all feasible? *Technical Communication* 52 (1): 9–20.

Tufte, E. R. 1983. *The visual display of quantitative information*. Cheshire, CT: Graphics Press.

Tullis, T. S. 1997. Screen design. In *Handbook of human-computer interaction*, edited by M. Helander, T. K. Landauer, and P. Prabhu, 503–531. New York: Elsevier Science.

Vartabedian, A. G. 1971. The effects of letter size, case, and generation method on CRT display search time. *Human Factors* 13 (4): 363–368.

Weinschenk, Susan. 2009. It's a myth that all capital letters are inherently harder to read. *What Makes Them Click: Applied Psychology to Understand How People Think, Work, and Relate*, December 23. http://www.whatmakesthemclick.net/2009/12/23/100-things-you-should-know-about-people-19-its-a-myth-that-all-capital-letters-are-inherently-harder-to-read/.

Wertheimer, M. 1922. Untersuchungen zur Lehre von der Gestalt: 1. Prinzipielle Bemerkungen. *Psychologische Forschung* 1:47–58.

Wilkins, Arnold, Roanna Cleave, Nicola Grayson, and Louise Wilson. 2009. Typography for children may be inappropriately designed. *Journal of Research in Reading* 32 (4): 402–412.