VISUAL DESIGN PRINCIPLES FOR USABLE INTERFACES

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EVERYTHING IS DESIGNED: WHY WE SHOULD THINK BEFORE DOING

Take a moment and visualize... Las Vegas at night. What kind of image does this conjure up for you? Flashing lights coming from all directions, one hotel’s lighting display designed to outdo the one next door, as well as the casino signage down the street. At first glance, everything is exciting, colorful, and beautiful.

Now add a fireworks display to your picture. More color, more excitement. Where do you look first? There is so much going on; it is hard to take it all in, but you don’t want to miss a thing. Your head turns in all directions. You look there; then, out of the corner of your eye, you see something else. Look over there!

Now the fireworks are at their peak, and the noise gets even louder. Any conversation with companions is impossible, it has become impossible to focus on any one thing for more than a split second. Overwhelmed, overloaded, everything screaming for your attention. Can you manage it? For how much longer? Do you begin to shake your head in despair and just give up? Do you wish you were somewhere else—NOW?

Making Things Easier to Use and Understand—Thinking About the User’s Experience

The previous description is unfortunately an accurate analogy of many users’ experiences as they attempt to work, play, and relax. New products, new services, and new technology, with new or less-than-familiar ways of interacting with them. These “users” are customers, electricians, grand parents, clerks, pilots, students. They are you and me. And, for a great majority, it’s a jungle out there!

Las Vegas at night with fireworks. Or, monitors that are winking, blinking, distracting, disturbing, overwhelming and, after a short period of time, visually deafening. Now add the voices coming from boxes...! Although this may seem like an exaggeration, for many this is exactly their experience.

It is our job as creators of these products, of our user’s experience to be simple and useful; where technology and process are transparent as possible. To do our job well, we must play the role of user advocate, ensuring that the interfaces we design are not just merely exercising the technology, but assisting the user do a job, easily moving from task to task, getting work done, making life easier.

When we succeed, our products become effortless, even pleasurable to use. Good design is not noticed, it just works. That is the role of good design.

Defining Visual Design. Visual design is not merely a series of subjective choices based on favorite colors or trendy typefaces—at best a cosmetic afterthought considered if there is enough time and money. Good visual design is the tangible representation of product goals. It is concerned with the “look,” the method, and the style in which the information is presented. It should be the result of a thoughtful, well-considered process, not merely a decorative afterthought.

Applying the appropriate visual/experience design principles and tools while incorporating the user perspective (information design) enhances the value, perception, and usefulness of products. It is the best combination of project goals, the user perspective, and informed decision making.

The Role of the Designer. Visual design choices must be based on project goals, user perspective, and informed decision making. Although many aspects of design are quantifiable, there are visual principles that are less quantifiable, but equally important. Even though many individuals can learn the necessary skills, become visually literate, and able to make competent design decisions, it is a unique combination of creativity and talent that differentiates one design solution as more attractive and desirable than another.

One must not only have the talent, but also the understanding and skills to apply the principles required to present information in its most accessible, useful, and pleasing form. This is the role of the designer in the development of interfaces for interactive products. Understanding product goals and ensuring that interface is approachable, useful, and desirable. In an environment where the interface is the only tangible representation of a product, and user perception determines product success, appropriate information presentation and visual design is the key. Designers understand visual principles within their usage context, and how to apply them appropriately to create attractive solutions that also solve problems.
The Process of Good Design—How Do We Get There from Here?

As interface designers, we are responsible for defining what the experience will be like when someone uses our product. We are defining, designing, then creating this experience to be one that is useful and meaningful, even pleasant and empowering. The designer must maintain an attitude of unbiased discovery and empathy for the user. In addition, one needs to create clearly defined goals, a good design, and evaluation process—that support and enhance these goals, and the flexibility to make changes as the process continues and products evolve.

An Information Design Process Is an Informed Design Process

An Information Design Process is a method of visually structuring and organizing information to develop effective communication. Information design is not superficial or decorative, rather a merging of functional, performance-based requirements with the most appropriate form for presentation of these requirements.

A thoughtful, well-designed solution will:

- Motivate users: It psychologically entices the audience, convincing them that they can successfully cope with the information and tasks at hand.
- Increase ease of use and accessibility: Decreases the effort needed to comprehend the information and provides a clear path through material that aids in skimming, quick reference and easy access.
- Increase the accuracy and retention of information: Users learn and retain information better when it is visually mapped and structured in obvious and intuitive ways.
- Focus on needs of its users: Different audiences have different requirements and styles of learning. This approach ensures solutions that provide ways for different types of users to access information.

An Information Design approach is part of a process that incorporates research, design, testing, and training to produce useful, cost-effective and desirable solutions.

Phase 1: The Audit. The goal of the Audit is to create a blueprint for the project, much like one would create an architectural blueprint before building before construction.

To do an Audit, one must begin the process by asking and answering a number of questions, acknowledging ongoing change and an ever-increasing palette of products and services. Asking questions occurs throughout the entire product life cycle, because the answers/design solutions reflect the user/use environment and affect the ongoing usefulness and value of the product.

To create a good design, ask and answer, on an ongoing basis, the following questions:

Audit Questions A
- Who are your users?
- How will they use this product?
- When will they use this product?
- Why will they use this product?
- Where will they use this product?
- How will your process evolve to support this product, as it evolves.

When the first set of questions are asked and answered, the next set of questions must be asked and answered as well:

Audit Questions B
- What is the most efficient, effective way for your user to accomplish their tasks and move on to the next of tasks?
- How can you most efficiently and effectively present information required for ease-of-use of this product?
- How can the design of this product be done to support ease-of-use and transition from task to task as a seamless, transparent, and even pleasurable experience?
- What are your technical and organizational parameters?

The Audit focuses on discovery. Many disciplines and organizational resources must be considered. Change is a given, because we begin with assumptions, and don’t know what we don’t know. The answers and their analysis in the context of organizational objectives provide the basis for the Audit Report, which will serve as the guide for Phase 2: Design and Development.

The Audit Report can be as simple as a two-page list or as complex as a comprehensive one-hundred page report. Since the goal is discovery, it include every aspect of the organization concerned with product the development cycle: project management, usability engineering, technical development, user support/documentation, visual communication and design, and content management. With these goals in mind, the result will be unbiased, accurate, comprehensive information to serve as a basis for design in the following Design Development phase.

FIGURE 13.2. An Information Design Process is phased to ensure user and organizational needs are met. It is ongoing and iterative, throughout the life cycle of a product. Any change can trigger a recycling of this process to ensure solutions remain appropriate and useful.
Phase 2: Design Development. Using the Audit Report as a guideline, the process of Design Development begins. This is an ongoing, iterative process, with each iteration incorporating test results (from users) to make the product appropriate to the particular set of needs. In reality, the length of this process is often defined and limited by real-world deadlines, such as product release dates.

The Design Development phase includes design and testing. The designer/design team create a number of solutions based on results and objectives of the Audit Report, as well as other project specifics. The first, design ideas should be very broad, incorporating many ideas and options no matter how unrealistic or unusual. As ideas are tested and evaluated, other parameters defined and user feedback is incorporated, the solutions naturally become more refined. The surviving design ideas will then be based on solid information from user feedback, serving as a good basis for final design decisions.

In the beginning of this phase, the focus is on high-level concepts and navigation; how will the product work? What will it feel like to use? As these initial concepts are refined, design details become more specific. When the conceptual model and organizational framework are approved, the design of the look, or product package, begins. By the end of this phase, the design has been tested, approved, and specified, to be carried out in the Implementation and Monitoring phase.

Phase 3: Implementation and Monitoring. The Implementation phase focuses on delivering what has been defined, designed, and documented in the preceding phases. It is the final part of a holistic process by defining all of what is required to make a product succeed on an ongoing basis. This includes not only implementation of the design within the technology, but also product support, such as training creation of additional materials, and other support that enhances use and productivity. On-going monitoring of solutions is key to continued product success, and must reflect the evolving technology and user needs.

This last phase is more consultative, and ongoing throughout the product lifecycle. This ensures that any changes, such as new technology and product developments, are reflected in the product itself. These may in fact trigger another Audit/Design/Testing cycle, although usually less extensive than the initial process.

Though the Implementation Phase is called the last phase, it reveals the evolutionary process of design and development. The goal of ongoing monitoring of solutions is to be aware of changes in user needs, technology and competition that impact user acceptance and satisfaction. Changes here often may result in the need to re-evaluate and re-design to incorporate this new knowledge gained.

VISUAL DESIGN PRINCIPLES

Many visual design principles can be easily explained and learned. Others, although easily defined, are more complex to explain and understand. They are often intuitive for those naturally skilled in aesthetics and have been formally trained in visual design/usability disciplines. Good visual interaction and experience design bridge many worlds: that of visual design, information presentation, and usability with that of aesthetics. The resulting solutions are not only usable, but also attractive, interesting, and pleasurable to use.

Universal Principles of Visual Communication and Organization

Every visual person, whether artist or graphic designer, understands the universal principles of visual organization. They are at work in everything we see and do. Though more conceptual in nature, they are the basis for every visual decision. To begin to understand these principles and how they work is to become visually literate.

There are three visual communication principles that are fundamental to all successful design solutions, related yet distinct in their meaning and application.

Harmony is the thoughtful combination of many and different parts into a pleasing, orderly whole. In interface design, this is achieved when all elements of a design appear to fit and work well together. Transitions place to place are effortless, and the techniques used to achieve harmony are transparent to the user.

Visual harmony has the same goal as musical harmony; complementing yet enhancing the basic piece. In the visual world, the golden rectangle of Greek architecture is one of the most widely known examples of this.

Balance is the pleasing harmony of various visual elements to achieve a sense of stability and comfort in design. Much like a clown balancing on a ball while juggling objects of different weights who must make adjustments for actions that are occurring, visual balance requires the same concerns and adjustments in the interaction world.

In design, all elements have visual weight, or heaviness. Depending on whether the design is symmetrical or asymmetrical, visual balance and a feeling of unity must be achieved for a solution to feel comfortable to the user.

There are a number of ways to achieve this. The simplest way is through symmetry, such as a page with centered type and illustrations. Though it is more likely to be successful, it is not as interesting and has the potential to be boring and static. Asymmetrical design is use of variation of elements, such as size, contrast, color, and placement to create visual tension and drama. Both are valid approaches and require skill and understanding of complex visual interaction to achieve a balanced and attractive design solution.

Simplicity in visual design is the embodiment of clarity, elegance, and economy. Although there are many ways to achieve the same result, a solution that is simple works, effortlessly devoid of unnecessary decoration. Simplicity in design appears easy, accessible, and approachable, even though it often requires more skill to achieve.
Achieving simple visual design solutions is no easy task, but two guidelines for creating simple design solutions are: “Less is more” (Mondrian) and “When in doubt, leave it out!” (Anonymous). The simplest, most refined design is direct and includes only the essential elements—as if by removing any of the remaining elements the composition would be rendered unintelligible or radically different.

Visual Design Tools and Techniques

New technologies are rapidly being created that go beyond simple automation of tasks and communication; they are revolutionizing processes and the resulting products. Before the revolution brought about by electronic publishing technology, many disciplines (e.g., writing, editing, design, publishing, programming) were discreet and clearly defined.

Today, new publishing and communication environments have brought to life the possibility of the *renaisance* publisher—one person who can create, design, publish, and distribute. Yet the process to arrive at successful solutions is very complex. One must remain focused on what factors determine success and with constant evaluation and adjustment of these factors in light of new developments.

The Five Criteria for Good Design

Before any work begins, participants in the process should have a clear understanding of the criteria for good design. These five questions are guidelines for evaluation of design solutions before, during, and after the process to ensure that all solutions remain valid as products, technology and user needs evolve.

- **Is it Appropriate?**
  Is the solution appropriate for the particular audience, environment, technology, culture?

- **Is it Durable?**
  Will the solution be useful over time? Can it be refined, transitioned, as the product evolves and is redefined?

- **Is it Verifiable?**
  Has the design been tested in the use environment by typical users? Has feedback been properly evaluated and used to improve the product?

- **Does it have Impact?**
  Does the design solution not only solve the problem, but also impact a look and feel, so that the user finds the product experience comfortable, useful, and desirable?

- **Is it Cost-Effective?**
  Can the solution be implemented and maintained? The cost of any design begins with the Audit and the Design phases, but continues after Implementation to ensure that it remains useful and cost-effective. The hard costs and soft costs of delivering the solution plus ongoing maintenance add up to the real cost of the design. Are there individuals with necessary skills and understanding to create, refine and maintain the design as time goes on?

VISUAL DESIGN PRINCIPLES AT WORK

The following sections outline the various visual design disciplines and principles that are used when creating quality design solutions. Each topic can be a subject of extended study in its own right, because there is much to understand when presenting information most appropriately for every specific situation.

It is important to recognize that, as the design process evolves, new insights and information will be discovered that will have impact on the design solution. It is optimistic to base solutions on the early initial process, because the very nature of process means discovering what is unknown, yet critical. For that reason, all those involved in the design process must remain open and ready to incorporate new information that may impact or change the design, cause delays, but will more accurately reflect the users/customers.

For example, if a new feature was developed that would change a product’s target audience from professional users to focus on executives, one would have to reconsider most critical interactions and content delivery. Executive users have less time and need different information. The design result might be a simpler interface, different content, perhaps larger typefaces, different visual “tone of voice,” etc.

The most important principle to remember when thinking about design is: There are no rules, only guidelines. Everything
is depends on context of usage. And always be thinking about your users, users, users.

Typography

Typography is at the very heart of visual design; it is the art of defining and arranging the general appearance of type. In visual design, typography is the first and most important design skill to master and understand. Good typography is the basis of good visual design infrastructure, because it is the smallest definable part of a design—much like a pixel is to a screen display. If one can understand and apply the principles of good typography, then one can extend those same principles to more complex issues that follow, such as page design and product design.

Typography choice affects legibility; the ability to easily read and understand what is on the page, in all media. It is often said that good typography, like good design, is invisible—it just works. Choosing the appropriate typeface for the purpose and context, however, takes considerable experience and understanding.

With hundreds of typefaces to choose from and numerous ways to manipulate them—finding the one most suited for the intended audience is no easy task. Choosing the appropriate typeface is the difference between being able to read and understand something, or not. Given the current publishing environment with its lack of control, multiple media, and varied viewing contexts, and user needs it is an even more complex task.

The choice of typeface immediately impacts whether a communication is read and how it is perceived. A typeface can be used to set a mood. An old-fashioned typeface can make a newsletter look dated; a typeface with extreme thick and thin strokes in the letterform can look great in a brochure, but render a web page unreadable. A typeface specifically designed for online use can increase legibility as well as providing perceptual cues about approachability and quality of an interface. Thus, typographic choice ultimately impacts product acceptance.

A good choice makes the task of reading more enjoyable and effortless rather than frustrating and fatiguing. Though typographic choice might seem to be an insignificant issue, it is often the major factor affecting overall usability. The designer must have a clear understanding of the various concepts and principles that affect legibility when making choices about typography.

How the Eye Sees, Then Reads. The human eye does not read one letter at a time, or even one word at a time. It moves along a line of text, grouping the text to form comprehensible phrases of information. This motion of the eye during reading is known as saccadic movement. Typeface choice directly affects this process, making it easier or more difficult for the eye to group, read and understand information.

The following characteristics of type further illustrate principles that affect legibility of type and overall quality of the communication.

x-Height. This refers to the height of the main element of a lowercase letter and is equivalent to the height of a lowercase x. The x-height, not the point size, conveys the actual physical and psychological impression of the size of a letter.

Choosing a Typeface. The typefaces in Fig. 13.4 are the same point size, but appear different because of variations in x-heights of each typeface. Because of these variations, as well as other design elements of the letterforms themselves, some will be more or less readable and legible than others. This depends on resolution of the output/viewing devices, viewing environment, color, context, and a variety of other design issues. When choosing a typeface, it is critical to understand not only the characteristics of a typeface, but also the usage context and application environment as well.

Ascenders and Descenders. The ascender is the part of the lowercase letter that rises above the body (x-height) of the letter. The descender refers to the part of the lowercase letter that falls below the body (x-height) of the letter.

Serif and Sans Serif. Serif is the stroke that projects from the top or bottom of the main stroke of the letter. Some printed letters have no serifs at all; these letterforms are called sans serif (without serif).

FIGURE 13.4. The x-height of a typeface (actual height of a lower-case x) is a key characteristic when deciding the visual size of a typeface, particularly where readability is the critical requirement. The above typefaces are the same point size. Some will seem larger (e.g., Helvetica) and easier to read than others (e.g., Serifa) though they are the same point size.
Readability Versus Legibility. Readability is ability to find what you need on the page; legibility is being able to read it when you get there. Effective page design makes a page readable; good use of typography makes it legible.

Legibility is determined by:

- typeface
- output/viewing device, resolution
- line length/column width
- letter spacing, word spacing, line spacing
- justified versus ragged columns
- movement
- color
- viewing environment

Contrast. Contrast can affect size, shape, color, and background color.

Variations. There are five ways to vary a typeface:

- lightface
- boldface
- condensed
- expanded
- italics

Note: In some typefaces, there may be additional increments of medium and extra bold, as well as combinations such as bold extended or bold italic.

Font. A font is made up of all of the characters of one size of one particular typeface. In addition to the alphabet and punctuation marks, certain fonts include symbols and special characters, such as the &.

Size. Type size is referred to in terms of point size. Because of differences in x-heights, 14-point Helvetica looks much larger than 14-point Times Roman.

This is 14-point Helvetica.
This is 14-point Times.

Kerning. Kerning is the adjustment of the spacing between letters to give the visual impression that they are all equidistant.

Families of Type. There are five families, or organizational groupings of type, based on their historical development. Although created over hundreds of years ago, all of these typefaces are in use today. But more important than knowing the date of creation is understanding how typefaces have evolved over time, and the resulting differences and similarities among them. The style of typeface is very much a reflection of trends, fashion, current events, and technical developments at the time the typeface was designed. See Fig. 13.5.

FIGURE 13.5. These five A’s show typographic style from the 1600s through modern times, reflecting similar changes in tools, fashion, and current events. Ultimately, choice of output media should determine typeface choice, given details such as the thick and thin parts of the letterforms, negative space, viewing environment, output resolution, etc.

Variations in Letterforms

Variations in Stress. Early designers of type attempted to match the handwritten letterforms of the scribes as much as possible. The results were typefaces with a distribution of weight through the thinnest part of the letterform, creating a diagonal stress. A good example of this is Garamond. Over time, the stress became more vertical as in Baskerville, and later, completely vertical with Bodoni. With Century Expanded, there is a return to a slight diagonal stress. In Helvetica, you will find no noticeable stress at all.

Variations in Thicks and Thins. Typefaces also vary in the degree of contrast between the thick and thin strokes of the letters. Garamond illustrates the prominent characteristics of Old Style faces, little contrast between thick and thin strokes. The contrast is even greater in Transitional faces, and Modern faces such as Bodoni, which have the most extreme contrasts between thick and thin strokes. With Egyptian faces, such as Century Expanded, there is a return to less contrast. In Contemporary faces, such as Helvetica, there are no perceptible thick and thin strokes.

Variations in Serifs. Serifs also vary from one face to the next in their weight and in the way they are bracketed—the way in which the serif meets the vertical stroke of the letter. You can see this evolution in type from the Old Style heavy serif of Garamond through the Transitional serif of Baskerville to the refined Modern serif of Bodoni. This was followed by a return to the heavy serif in Century Expanded, an Egyptian face, and the elimination of the serif in Helvetica, a Contemporary face.
FIGURE 13.6. The serif typeface Century below versus the sans serif typeface Univers, above. Understanding the differences within the typeface as well as what the differences between a serif and a sans serif is important. Try setting a paragraph of each with exactly the same line length, size and spacing to compare the differences.

Typographic Guidelines

Serif Versus Sans Serif. Serif typefaces have a stronger baseline due to the “feet” created by serifs. This helps move the reader’s eye horizontally across the line of type. Sans serif and serif typefaces can be effectively combined if one limits the number of typographic changes to prevent what could become visual chaos. The key is to ensure, that no matter what choices are made, they reinforce information hierarchy and overall design goals. See Figs. 13.6 and 13.7.

- Sans serif is often easier to read as online, though depending on the type size and monitor resolution, sans serif can be equally as legible if the appropriate size, style and color choice is made
- sans serif or serif can be effective for contrast, particularly when combined with size and weight changes.
- resolution and color impact choices

Combining Typefaces. When combining typefaces, it is important to decide whether the goal is harmony or contrast. As a general rule, it is wise not to use more than two different typefaces on one page. Excellent typography does not get in the way of the reader. Too many typefaces can jar and confuse the reader, create visual intrusions, and slow or the curtail reading.

Contrast in Weight (Boldness). Combining classic faces with a good differential factor can add useful contrast, such as extra bold Helvetica with regular-weight Times. Be wary of combining two faces that are both intricate, such as Gill Sans Bold and Souvenir. This can add too much contrast and visual complexity.

Output Device and Viewing Environment. The quality of publishing technologies and viewing environment vary greatly—laser printer versus video versus electronic media, etc. In choosing a typeface style, size, spacing, and leading, it is critical to consider the final output medium and its effect on legibility. Low-quality monitors and poor lighting have a major impact: serifs sometimes disappear, letters in small bold type fill in, and colored type may disappear altogether.

Letter Spacing. When letter spacing is too tight, the letters are hard to distinguish from each other, making them less legible. When letter spacing is too wide, the gaps between the letters do not allow the eye to recognize letter groups as easily. Optimal letter spacing is unnoticeable, the eye can skim across a line and quickly and easily understand.

Word Spacing. Too-tight word spacing makes words difficult to distinguish one from the next. When word spacing is too wide, gaps between words don’t allow the eye to forms word groups as easily. When there is greater space between words than there is between lines, the reader’s eye naturally falls to the closest word—which may be the word below instead across the line. This often occurs with low-resolution or poorly developed products.

Line Spacing/Leading. The space between lines of text, or leading, should increase in relation to type size. However, this adjustment must be done visually, not mathematically. You can also improve legibility by increasing the leading in relation to column width.

Line Length/Column Width. The correct line length is just long enough for the eye to easily move across the line without losing its place and easily drop down to continue reading the following lines.

Justified Versus Ragged Right (Flush Left). A justified column can leave uneven word spacing, creating rivers, or vertical white spaces, within in the paragraph. These rivers cause the eye to move vertically down the page, to naturally connect visually what is closest in proximity, instead of easily across the line of type. It is very difficult to prevent rivers in justified columns, unless much time and effort are applied. It is for this reason that, unless the type is manually set or adjusted, it is better to use a ragged right column. See Fig. 13.8.

Highlighting with Type. There are three basic ways to highlight type:
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FIGURE 13.8. With current technology, the difference between a justified column and ragged right column can make a huge difference. In a poorly justified column, spaces within a justified line connect vertically down the page, distracting the eye from easily reading across a line of text.

- **Bold or Extra bold**

- **italics**—Italics are appropriate for short phrases versus long passages, because the slant of the italic appears lighter on is more difficult to read.

- **UPPERCASE** Because Uppercase letterforms are more angular, the eye attempts to connect lines and shapes that are in closest proximity and drawn in the same direction. In addition, uppercase letterforms take the full space from baseline to the top of the font space. The eye has limited shape and size cues to help differentiate between letters, words and sentences to create meaning.

It is only necessary to use one highlighting technique for emphasis.

**Decorative Typefaces.** These are of limited use for body text, because their irregular design make them less legible. They should be used for headlines with caution. Because they are essentially typographic fashion statements, decorative typefaces can either reinforce or distract from the overall message, or brand of a particular product or organization.

**Black on White Versus White on Black and Dark on Light Background Versus Light on a Dark Background**

**Positive and Negative Type.** White on black (or light on a dark background) is generally regarded as less legible and much more difficult to read over large areas. To the human eye, white letters on a black background appear smaller than their reversed equivalent. The amount of contrast between the color of type and the background is an especially important factor for online communication. Color adds exponential levels of complexity to these considerations since displays are inconsistent from one situation to another.

**DESIGN PRINCIPLES: PAGE DESIGN**

While typography deals with legibility, page design focuses on readability—the ability to read and comprehend information. Can the reader find what is needed on the page? The two important functions of page design are motivation and accessibility.

A well-designed page is inviting, drawing the eye into the information. Users are motivated to accept the invitation. A good page will ensure that the reader will continue by increasing the ease of understanding and accessibility of the information. (For purposes of simplicity, the term *page design* is used interchangeably to mean page, screen, and document design.)

Motivation and accessibility can be accomplished by providing the reader with ways to understand the information hierarchy quickly. At a glance, the page design should reveal easy navigation and clear, intuitive paths to discovering additional details and information. This is called visual mapping.

A page, site or product that is visually mapped and designed for easy navigation has:

- a clear underlying visual structure
- organizational landmarks
- graphic cues and other reader aids
- clearly differentiated information types, clearly structured examples, procedures, and reference tools
- well-captioned and annotated diagrams, matrices, charts, graphics, etc.

This kind of visual structuring will aid readers and

- provide a clear path through the information
- aid in skimming
- give a conceptual framework
- prevent a feeling of overload from too information

One could think of a table of contents as a simple visual map, because it quickly provides a simple overview, the order, and some details about the structure and content. What it does not reveal however, are priorities. Site maps or other diagrams will provide some of this information as well.
Building the Design of a Page

A good example of how visually mapping works effectively is visible in the following example of the evolution of a page from simple text. As more design elements are added, and the page becomes a combination of text, type, visual cues, and graphic elements. Information design techniques, drawn from cognitive science, can be used to improve communication effectiveness and performance.

***Gray Page or Screen.*** "Raw text" interests few. When information is presented as a uniform undifferentiated block, people find it difficult and irritating to use and very easy to ignore. See Fig. 13.9.

**Chunking.** This involves structuring or simplifying the visual field by breaking like kinds of information into manageable chunks according to their subject matter. One sees things that are close together as related. Adding white space, rules, and other graphic devices can increase a grouping/chunk and separate one chunk from another. See Fig. 13.10.

**Queuing.** This entails ordering chunks of information visually to reflect the content hierarchy. The design suits the user's requirements of subject matter, order, and importance. See Fig. 15.11.

**Filtering.** This step simplifies linguistic and visual order to filter out unnecessary background noise that interferes with the information being transmitted. Filtering builds a sense of layers of information through color, visual cues and symbols, bulleted lists and headers, making one page effective for a range of users and uses. See Fig. 13.12.

**Mixing Modes.** Different people learn by using different cognitive modes or styles. Some prefer text, others prefer illustrations, photos, diagrams, or formulas. To suit these naturally varied learning styles, information must be translated into several different modes, which are then carefully presented to avoid a confusing jumble. See Fig. 13.13.
Abstracting. The individual page or screen is a microcosm of the complete book, site product. The result is a complete codified system of graphic standards, effective for both the reader and the producer. Abstracting creates a system of standards that simplify text organization, create consistent approaches to preprocessing information, and establish a unique customized look for an organization’s products. See Fig. 13.14.

Other Page Design Techniques

White Space. White space (or empty space) is one of the most underutilized tools of design, yet is extremely effective. It can be used to visually open up a page, focus attention, help group like kinds of information, as well as provide a rest for the reader’s eye and create the perception of simplicity and ease of use.

The Grid. A grid is a system for distribution of visual elements in a clearly intelligible order. Grids, as part of a design system, determine the horizontal placement of columns, and the vertical placement of headlines, text, graphics, and images.

This visual organization or grid system is a series of consistent relationships, alignments, and spatial organization. The grid acts as a blueprint of the page that can be used again and again to create additional pages that appear related, but have different information. When the grid system is understood, it forms the basis for consistent application and extension of the design by others who also understand the intention of the system.

Every good design has an underlying structure or grid, as a basis to create a consistent look and feel to a program, web site, book, or sets of any of these. One could think of the grid as the visual analogy of the metal beams as a framework of a high-rise buildings. Each floor has the same underlying elements. Such as windows, elevators, plumbing, but depending on the use of each floor, will be built and look very different.

The grid is also a tool to improve usability. For example, if a user can anticipate a button to always appear in the same place, or help always available in the same way, this greatly improves the usefulness of the product or program and ultimately its success. Placement all visual elements such as buttons and help are specified on the grid.

Field of Vision. Field of vision refers to what a user can see on a page with little or no eye movement; it is the main area where the eye rests to view most of the page. A good design places key elements in the primary field of vision. It should reflect and reinforce the information hierarchy. Size, contrast, grouping, relationships, and movement are tools that create and reinforce field of vision.

The user will see first what is visually strongest, not necessarily what is largest or at the top of a page. This is particularly important for online information, because of limitations of page real estate and dense information environment.

One can easily experience these concepts, as well as the strength of peripheral vision, when looking at a page that has a banner advertisement or moving graphics. It is virtually impossible to ignore or focus attention on the primary field of vision when there is winking and blinking somewhere else on the page. Superfluous use of visual devices in fact reduces the value of the information by distracting and disturbing the user’s desire and ability to focus, read, and understand.

Proximity. This concept applies to the placement of visual elements physically close, so they will be understood as related elements.

For example, if there were 3 images with captions on a page, it would be more useful to place each caption near the image if explains, though it might be more efficient to place the three captions together in one block of type on the page.

The Illusion of Depth. Though the online world exists on a two-dimensional space, various visual techniques can be used to create the illusion of depth, much like the painters of the Italian Renaissance period. Visual cues, such as layering, overlapping, perspective, size, contrast, and color can reinforce visual hierarchy by giving the illusion that one element appears on top of or in front of another.

Charts, Diagrams, Graphics, and Icons

The goal of any visual device is to provide the fastest, most efficient path to understanding ideas, as well as to make it clearer and more compelling. Useful, effective graphics can act much like visual shorthand, particularly important when the real estate of the page is limited. A good graphic can eliminate the need for text and communicate across cultures. However, a bad graphic that is unclear and must be reinforced by long captions can be worse than none at all.

The old cliche, a picture is worth a thousand words, is true only if it is efficient and effective. In stressful situations, people do have the time to read or the ability to focus on lengthy text or complex visuals. Though more difficult to achieve brevity and simplicity in such cases have greater value.

People prefer well-designed charts, diagrams, and illustrations that quickly and clearly communicate complex ideas and information such as comparisons or analysis. Studies show that images are retained long after the reader is finished reading. Done correctly, visual images can be used to make the information more memorable and effective. At a minimum, a good illustration or graphic can often improve performance simply because it increases user motivation.

Visuals are powerful communications tools. They can be used to:

- visualize data
- visualize new or abstract concepts
- visualize physical and technical concepts that are invisible to the eye
- communicate a large amount of information efficiently and effectively

Visuals can be used to explain and reinforce concepts, relationships, and data by making them tangible. They become
FIGURE 13.15. Zen calligraphy is an example of the historically close relationship between word and image. The great Zen master Hakuin of Kyoto, Japan (1768–1865) created this symbol to mean “dead,” with additional notes saying, “Whenever anyone understands this, then he is out of danger.”

thinking tools. Information is clarified, made easier to evaluate, and has greater impact. The use of visuals, whether they are photographs, charts, illustrations, icons, or diagrams, is a very effective way to communicate a message. Choosing the appropriate presentation of the concept is critical to the user’s ability to effectively comprehend the message. In addition, a key to a successful visual is understanding the limitations of the display medium.

**Tables, Charts, and Diagrams.** These three types of graphics are discussed in order of complexity. Tables are the least difficult to create, charts the second most difficult, and diagrams the third. Illustrations, graphics, and other images and visuals are the most complex and require more conceptual and visual sophistication.

When is one more appropriate than the other? Determining which format is the most effective is illustrated in Fig. 13.16.

In addition to this list, it is important to remember that visual cues, such as color, shading, texture, lines and boxes, should be considered redundant cues and only used to provide additional emphasis to support the concept.

**Icons and Graphic Cues.** Icons and other graphic cues are another form of visual shorthand that help users locate and remember information. Choosing a style that is easily understood, and consistent with the overall style, is no easy task. It is important to choose style that is simple and consistently reinforced throughout a product.

More complex and unique symbols and icons can be used if usage takes place over a longer period, allowing familiarity and learning to take place. The Mastercard logo is basically two intersecting circles, but after many years of reinforcement many will recognize it immediately without any text or other explanation. It is a very difficult task to create an icon that, without any explanation, communicates a concept across cultures.

For example, the use of a freestanding rectangular box with an open door flap indicates a mailbox, or in-box. This kind of mailbox is rarely used today, and was never in use in Europe (they have mail slots or upright boxes) or any other part of the world. Even the concept of mail delivery would be considered strange. This is a case where understanding had to be learned. Although simple ideas presented as icons are appropriate, a program with many complex icons using colloquial images would surely make a program agonizing for users from other cultures.

There is an important difference between an icon and an illustration, though often the two concepts are confused. If an icon has to be labeled, in fact it is really an illustration. The value of an icon as visual shorthand is lost, and it is better to use just the word or short phrase rather than both when screen real estate is at a minimum. Alternatively it might be more appropriate and useful as an illustration.

If an icon is memorable with minimal reinforcement, then it is successful. If after several times a user cannot remember the meaning of a particular icon, then it is of no value and should be eliminated. If a set of icons is being designed, there must be consistency of style (business-like vs. playful), light source (upper right or other), perspective and line style among the icons, as well as consistency with the product of which they are a part.

**Illustrations and Photographs.** As technology improves, the use of complex images will only be limited by the designer’s
When to Use What Graphic

<table>
<thead>
<tr>
<th>If you want to show...</th>
<th>use a...</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Groups</strong></td>
<td></td>
</tr>
<tr>
<td>Group of related items, with a specific order</td>
<td>numbered list</td>
</tr>
<tr>
<td><strong>Relationships</strong></td>
<td></td>
</tr>
<tr>
<td>Relationships and steps involved in a process</td>
<td>flow chart table</td>
</tr>
<tr>
<td>Relationships between categories of ideas</td>
<td>project plan table</td>
</tr>
<tr>
<td>Relationships of tasks taking place over time</td>
<td></td>
</tr>
<tr>
<td><strong>Evaluate/Compare</strong></td>
<td></td>
</tr>
<tr>
<td>Evaluate items against several criteria</td>
<td>rating table comparison table matrix diagram</td>
</tr>
<tr>
<td>Evaluate items against one criteria</td>
<td></td>
</tr>
<tr>
<td>Compare more than one item to more than one variable</td>
<td></td>
</tr>
<tr>
<td>Compare several things in relation to one variable</td>
<td>bar chart pie chart</td>
</tr>
<tr>
<td>Compare the relative parts that make up a whole</td>
<td></td>
</tr>
<tr>
<td><strong>Hierarchy</strong></td>
<td></td>
</tr>
<tr>
<td>Hierarchical structure of an organization</td>
<td>organizational chart</td>
</tr>
<tr>
<td><strong>Concepts</strong></td>
<td></td>
</tr>
<tr>
<td>concept</td>
<td>illustration and/or text icons, other graphics complex images interactive components</td>
</tr>
<tr>
<td>Abstract concept</td>
<td></td>
</tr>
</tbody>
</table>

FIGURE 13.16. When to use what graphic.

choice. Appropriateness is the most important component; one should not use cartoons for a company brochure, or use a low-resolution photograph of a control panel when a line illustration would be clearer.

Understanding meaning and implications of illustrations and photographs is no easy task, but there are some basic guidelines for making those choices.

Photographs represent existing objects easily, but issues of resolution and cross-media publishing can often make them unintelligible. If the photographs can be reproduced with proper resolution, cropping, and contrast, and the focus user on the required detail, then this is a good choice. They can also include cues for orientation and context that is more difficult to achieve in an illustration.

Often the reproduction quality of a photograph is unpredictable, no matter how it is simplified or cropped to focus attention. In this case, an illustration or line drawing is more effective. The obvious advantage of illustration is for visualization of concepts or objects that do not yet, or may never exist. Another advantage is the ability to focus by the design. For example, attention can be focused on a specific machine part by highlighting various lines and greying-out less important parts of the illustration. To do a similar thing in a photograph at best would add time, complicate the image, and possibly never simplify the explanation.

No matter what method one uses for visual explanations, it must clarify and reinforce. If the goal of the image is to explain where to locate a piece of equipment, then an overview of the equipment in the environment is appropriate. If the goal is to show a particular aspect, such as a button, then the illustration should focus attention on that. One can crop an image to focus attention on specifically what is being explained; it all depends on the goal of the photograph or illustration.

There are cases when the combination of photography and illustration are more effective than either alone. For example, a photograph of an object in its usage environment conveys information beyond the image of the object itself. If the goal was to show the location of a particular part of that object, then a detail, closely associated with the overall photograph or inset, would be even more useful than just a photo or illustration alone.

Guidelines

*Visuals Should Reinforce the Message*. Don't assume that the audience will understand how the visual reinforces the
FIGURE 13.17. Thirty centuries of development separate the Chinese ancient characters on the left from the modern writing on the right. The meaning of the characters is (from top to bottom): sun, mountain, tree, middle, field, frontier, and door.

argument. A clear focused illustration with a concise caption will shorten comprehension and learning and cause the user to say "Aah, that is how it all fits together!"

Visuals should:

- Help clarify complex ideas
- Reinforce concepts
- Help the user understand relationships

Create a Consistent Visual Language. In creating graphics, it is important to establish a consistent visual language that works within the entire communication system. Graphics attract attention. When the user sees the screen, the eye automatically jumps to a visual, regardless of the fact that it may interrupt the flow of reading. A graphic should not create disharmony. This will only slow down the progress of comprehension and make it more difficult for the user to continue. It will also increase the effort needed to understand the relationship between the text and the visual.

Consider Both Function and Style. It is important to consider function versus decoration. Although it would be wonderful to see an artistic illustration tax forms or comic styled illustrations in annual reports, it would not be appropriate or reinforce a message or image of the communication and organization. A good graphic is appropriate to the context of the communication and reinforces and validates the message.

Focus on Quality Not Quantity. Graphics are only effective if they are carefully planned, well-executed, and used sparingly; like visual shorthand. One good diagram with a concise caption is more effective than several poorly thought out diagrams that require long explanations.

Work with a Professional. Most of can write a letter that clearly communicates the message, but when it comes to writing the year-end sales report or the company brochure, we often turn to a professional writer to help us find the most effective, relevant, and interesting way to communicate our message. This holds true for the development of user interfaces, graphics, and other visuals that impact the look and feel and ultimately the overall success of a program.

Build Graphics Library to Create Visual Consistency, Organizational Identity, and a Streamlined Process. Because graphics often do require a professional, they can become time consuming and expensive to create. Once a visual language and style are established, start building a graphics library. If the same concepts are being illustrated repeatedly, this is an
opportunity to streamline the development process by collecting them in one place and making them available for reuse. An organizational style can be created for these visual explanations. As time goes on, users will come to associate a particular style and method of explanation with the organization, which aids understanding as well as reinforcing an organization's product brand and identity.

**Reinforce Shared Meaning (Common Visual Language).** A serious issue to consider when creating graphics, particularly conceptual diagrams, is shared meaning, whether it be across an organization or across the globe. The same diagram can be interpreted in entirely different ways by different people having different backgrounds and experience.

Truly effective graphics require extra time and effort, but the payoff can be tremendous. They are invaluable tools for promoting additional learning and action because they

- reinforce the message
- increase information retention
- shorter comprehension time

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**COLOR**

Though color is reinforcing, or redundant visual cue, it is by far the most powerful element in visual communication. Color evokes immediate and forceful responses, both emotional and informational. Because color is a shared human experience, it is symbolic as well. And, like fashion, the perception and value of color changes over time.

Color can be used to trigger certain reactions or define a style. For example, in Western business culture, dark colors (such as navy blue) are generally considered to be conservative, whereas paler colors (such as pink) are regarded as feminine and not businesslike. However, in other cultures these color choices would have entirely different meaning.

The appropriate use of color can make it easier for users to absorb large amounts of information and differentiate information types and hierarchies. Research on the effects of color in advertising show that ads using one spot of color are noticed 200% more often than black and white ads, whereas full-color ads produce a 500% increase in interest.

Color is often used to add information to:

- show qualitative differences
- act as a guide through information
- attract attention/highlight key data
- indicate quantitative changes
- depict physical objects accurately

Because of its ready availability, it very tempting to apply it in superficial ways. For color to be effective, it should be used as an integral part of the design program, to reinforce meaning, not simply as decoration. The choice of color—while ultimately based on individual choice—should follow and reinforce content, as well as function.

**Basic Principles of Color**

**Additive Primaries.** The entire spectrum of light is made up of red, green, and blue light, each representing a third of the spectrum. These three colors are known as additive primaries, and all colors are made up of varying amounts of them. When all three are combined, they produce white light.

**Subtractive Primaries.** By adding and subtracting the three primaries, cyan, yellow, and magenta are produced. These are called subtractive primaries.

Green + Blue = Cyan
Red + Blue = Magenta
Red + Green = Blue = Yellow

Color on a computer display is created by using different combinations of red, green, and blue light. In print, colors are created with pigments rather than light. All pigments are made up of varying amounts of the subtractive primaries.

The three attributes of color are:

- **Hue**—the actual color
- **Saturation**—the intensity of the color
- **Value**—includes lightness and brightness:
  - Lightness—how light or dark a color appears
  - Brightness—this is often used interchangeably with lightness;
    - the differences are as follows: lightness depends on the color of the object itself, and brightness depends on the amount of light illuminating the object.

**How to Use Color**

**Less Is More ... Useful and Understandable.** Just as you can overload a page or screen with too many typefaces, you can have too many colors or make bad choices. Given the unpredictability of color displays, users, and viewing situations, the choice can get complicated. Color is often best used to highlight key information. As a general rule, use no more than three colors for primary information. An example is the use of black, red, and gray—black and red for contrasting information, gray for secondary. When thinking about color online, one must remember that each display will output color in a different way. Red and green should be used sparingly, since they spring forward. Blue is often used for backgrounds, since it recedes. Add to that the lighting situation and a variety of users. All these factors affect color choice.

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**Create a Color Logic, Use Color Coding.** Use a color scheme that reinforces the hierarchy of information. Don’t mislead the audience by using different colors for the same concept. Whenever possible, try to use colors that work with the product branding and identity or an established visual language. Create a color code that is easily understood by the user and reinforces meaning.

**Create a Palette of Compatible Colors.** Harmonious color can be created by using a monochromatic color scheme or differing intensities of the same hue. But make them different enough to be easily recognized and simple enough to be easily reproduced, no matter the medium.

**Use Complementary Colors with Extreme Caution.** These are colors that lie opposite each other on the color wheel. Let one dominate and use the other for accents. Never put them next to each other because the edges where they meet will vibrate. Though this was the goal of pop art in the 1960s, it makes pages impossible to read. One must check each particular display, because the calibration of monitors can unexpectedly cause this to happen.

**Decisions Regarding Color in Typography Are Critical.** Colored type appears smaller to the human eye than the same type in black. This is important to consider when designing user interfaces. One must also consider the smear effect on typography in displays, based on the color chosen, the strength of the projected light and interaction with colors surrounding it. Additionally, quality and calibration of displays impact characteristics of color online.

**Consider the Viewing Medium.** The same color looks different when produced by:

- a computer display
- an LCD projector
- color laser printer versus dot matrix output
- glossy versus dull paper

**Context Is Everything.** Though printed color is very familiar and more controllable, projected color is inconsistent and varies, depending on lighting, size of the color area, size and quantity of colored elements, lighting, output device. One must check all viewing possibilities to ensure that color choices are readable as well as legible, across all media used. What might look good on a laptop may not be readable when projected in a room of 500 people printed in the corporate brochure.

The amount of color will affect how it is viewed, as well as the best background choice. A blue headline is very readable on a white background, but if that background becomes a color, then readability can be reduced dramatically, depending on how it gets presented on each particular display.

**Contrast Is Critical When Making Color Choices.** Contrast is the range of tones between the darkest and the lightest elements. The desired contrast between what is being read (this includes graphics, photographs, etc.) must be clearly and easily differentiated from the background. If there is not enough contrast (of color, size, resolution, etc.), then differentiation and reading will be difficult or impossible. This is particularly a problem with online displays, because the designer has no control of display quality.

**Quantity Affects Perception.** Color used in a small area will be perceived differently by the eye than the same color used in a larger area. In the smaller area, the color will appear darker, in the larger area, lighter and brighter.

**Use Color as a Redundant Cue When Possible.** At least 9% of the population, mostly male, is color-deficient to some degree, so it is generally not a good idea to call out warning points only through color. With a combination of color and a different typeface, etc., you won’t leave anyone in the dark.

**We Live in a Global World, So When in Rome.** Remember that different colors have different connotations in different cultures, religions, professions, etc.

- in the U.S., on February 14th, red means love
- in Korea, red means death
- in China, red is used in weddings and signals good luck and fortune
- in many countries, red means revolution
- to a competitor, red means first place
- to an accountant, red means a negative balance
- to a motorist, red means stop
- in emergencies, a red cross means medical help

Creating a System: Graphic Standards and Branding

With the explosion of new publishing media in a global marketplace, the need for guidelines for developing and producing consistent, quality communication has taken on a new urgency.

The new technology makes it easy to generate images, and offers a wealth of options. The danger lies in creating the visual chaos, with every element demanding attention beyond the point of sensory overload. With the new tools, it can happen faster, at a lower cost, and with greater distribution.

Graphic standards system provide guidelines and tools for structuring and organizing communications, and reinforce a brand across a corporation on the globe. Graphic standards are documented guidelines that explain the methodology behind the design. In addition, the guidelines and examples support those who wish to expand the system by explaining how to maintain a consistent brand and organizational look and feel as new products, features, and technology are introduced.

A graphic standards system will ensure:
FIGURE 13.19. Trying examples in your context. Because color is not available in this particular edition, try your own experiment. Take a look at this illustration, and recreate a paragraph of text, with the background graded from 100% to 0%, choosing one color for the background. Then set lines of type in a variety of typefaces and sized, to see where it becomes legible or totally impossible to read. Remember to test your choices with each context and parameters. Such things as lighting, projection distance, and users' physiological constraints can make the difference whether something can be read or not.
Audit. The Audit is a critical step in determining the scope and parameters of an organization's corporate graphic standards. Specific questions for the Audit phase include:

- What is the purpose?
- Who are the audiences?
- What are the differences; the similarities?
- Who will be doing the work?
- What tools will be used?
- What is the desired company or product image?

Development. Goals for the Development Phase include:

- Design of standards that are easy to read, use, and project a consistent quality image.
- Design of products that fit within the production parameters of the company.

Implementation. The Implementation phase must ensure that the system is accepted and used properly. This requires training and support, easy procedures for distributing and updating materials, and a manual explaining how to use the system.

The development of standards is in itself an educational process. It requires all participants to be aware of communication objectives and what is required to meet them. As alternatives are developed and tested, management has the opportunity to evaluate their organization's purpose, nature, and direction, as well as its working methods and communication procedures.

The process requires the commitment and involvement across many departments and levels. The result is an empowering of the organization—planting the seeds for growth and increased effectiveness.

What Does a System Cover? Corporate graphic standards historically had been applied to an organization's logo, stationery, business cards, and other printed materials. As the online portion of an organization's brand dominates, providing for cross-media guidelines is even more critical.

Corporate graphic standards are generally communicated to the organization in print and electronic form. Documentation often includes:

- Corporate Identity Manuals
  Style guides in both print and online illustrate the application of the standards across the company's publications and provide specifications for production and expansion.
- Templates and Guidelines
  These come in both print and electronic form.
- Editorial Style Guides
  Determine the use of product/service names, punctuation, and spelling, writing styles.

Developing the System. When developing an organizational graphics standards system, one must consider the global publishing needs, the resources available for producing products, and the skill level of those directing production.

To responsibly determine the overall corporate needs, a team effort is required. Personnel from areas such as information systems, graphic design, usability, and marketing, along with engineers, writers, and users should be involved in the process. This team approach helps to build support for, and commitment to, the organizational standards.

The development of a comprehensive system follows the Information Design Process of Audit, Development, and Implementation.

Audit. The Audit is a critical step in determining the scope and parameters of an organization's corporate graphic standards. Specific questions for the Audit phase include:
The next key guideline is to keep it simple. Although many tools are available, there is only one goal: to clearly communicate ideas. The designer must always ask: What is the most efficient and effective way to communicate this idea? A good illustration might work better (and take less bandwidth) than an animated sequence. A simple bold headline might allow the user to read the page than a banner moving across the page, constantly drawing the eye to the top. Animated icons are entertaining, but would they be appropriate or necessary to understand serious financial information?

There is a great temptation to use many new tools. The best tip is to use a tool only if it can explain an idea better than any other method or enhance an explanation or illustrate a point that otherwise could not be done as effectively or efficiently. The best design is not noticed, it just works. Products are used to get something done, not to notice the design. The best test of success is ease of understanding and completing the tasks, and moving on to the next.

Like all expensive real estate, online real estate has the same characteristic: location, location, location! With such a premium of space, and so much to accomplish in such a short time, being considerate and efficient with the screen real estate is the design goal. The appropriate use of all the design principles, graphics, icons, and illustrations make that goal possible if it is applied with understanding and consideration of each particular context of usage.

In the following sections are some of the issues and considerations when presenting interactive information. As one considers how the many elements impact the design of interfaces, the following principles must be considered very seriously.

Effective and Appropriate Use of the Medium

Transitioning a print document to an online environment requires a rethinking of how it must be presented. Viewing and navigating through online information require radically different design considerations and methods. Users do not necessarily view the information in a linear way, in a particular order, or time frame.

Interactive media viewed on computer screens have quite different characteristics and potential, particularly as information crosses platforms, resolutions, and environments.

Historically, we have come from the rich medium of print, where we can hold the entire product in our hand, view it, and choose what/when/how we wish to read. The mere physicality of a book provides many sensory cues that are not present on a two-dimensional monitor. As designers, we must find other ways to provide the same cues that allow people to use products comfortably and with confidence.

The Element of Time

This is the critical difference between static and interactive media. The sense of interaction with a product impacts the user's perception of usefulness and quality. In addition, animated cues (blinking cursors, etc.) and other implied structural elements (e.g., handles around selected areas) become powerful navigational tools if intuitively understood and predictably applied.

In addition, one must keep in mind how the product will be used. Will the user calmly sit down and use the product, will the tasks be interrupted over a period of hours, days, months, or years? Will the user be physically impaired, in a state of panic fumbling with a keypad. The element of time contributes to the design criteria and choices.

Consistent and Appropriate Visual Language

A major issue is the unpredictability and vastness of the products. Providing way-finding devices that are easy to recognize, understand, and remember, include:

- clear and obvious metaphors
- interface elements consistent with the visual style of other program parts, including consistent style for illustrations, icons, graphic elements, dingbats, shading, etc.
- guidelines for navigational aids, such as use of color, typography, page/screen structure, etc., consistent with other parts of product support.

Navigation Aids

When reading a book, there are many ways we can see our progress through it. We can use a bookmark, turn down the corner of a page, or use a pen to highlight information we want to remember. We can refer to the table of contents or index, and then flip directly to the desired page. We can use a finger as a placeholder and walk down the hall to show a colleague.

At no time can we ever see or touch the entire digital document (or program). If we cannot hold the entire document, how do we know where we are in relation to the whole? How do we get back to where we were? Or some where we haven't been?

Navigation aids provide readers with highways, maps, road signs, and landmarks as they move through the online landscape. They enhance discovering and communicating the underlying structure; providing a sense of place so that the user knows where they are, where they have been, how to move elsewhere, or return to the beginning.

Using familiar visual elements (e.g., from other products, releases, etc.) leverages existing knowledge. Graphic standards support this as well. When using a familiar page layout/grid structure, it is much easier to remember the zones in which like kinds of information appear. This ensures that whatever visual cues are applied can take advantage of the user's experience and save time for the designer.

Graphics/Icons

Graphic representations are very effective devices to orient users within a program. A visual map can offer an overall picture
of the program's sections and interrelations. Graphics and icons can help support the function of the table of contents, index, and page numbers. In addition to the many new tools to highlight their functionality, they can be even more effective as guides through and around a product. The key here is to ensure that the intent and action have been clearly defined and designed.

Metaphor

We learn easiest when we have previous structure, or mental model with which to associate and expand information. If we have a basic understanding of the concepts we can easily add more information. The desktop metaphor for a software interface is easy to grasp as a way to organize data in a program, because the basic logic is similar to what we are familiar with in the real world. Using familiar visual analogies helps users understand and organize new information more easily.

Color

Once the monitor is paid for, color is free and a very seductive design tool. One must be sure to use it consistently. On the monitor, there is limited space to work with. When colors are assigned meanings, and those meanings are carried throughout the product, the colors can replace written explanations (e.g., the bars at the top of the screen are blue, so this must be the testing section or the yellow background always means an overview section).

Legibility

As discussed in typography, legibility is the ability to read the information on the page. The page can be a screen, and as such, has special considerations. Color, size, background, movement, viewing environment, lighting, resolution, all play a critical part in legibility.

Readability

Readable screens demand use of clear visual representations and concise, unambiguous text. A design can imply meaning by the placement of elements in particular areas, or zones allotted for certain types of information. This makes the screen easier to comprehend and more accessible. It also makes optimal use of a limited space.

Guidelines

Use the Analogy of a Poster As a Guide to Design. One analogy is to think of a home page as if it were a poster. A poster must grab one's attention quickly, in unpredictable and uncontrollable locations. Because of limited space, the viewer gets only hints of related information but no great amount of detail. Imagine if someone walking by could click on the speaker's name and get additional biographical information, or click on the location and get directions. This is kind of organization is hierarchical and a radical difference from the way information is presented in a brochure where order is fixed. There is a specific linear sequence: the chronology is implied by its binding or folding, though one may choose to read page 5 before page 1.

In online environments, the designer can rarely control how and in what order the user will access the product. This requires fundamental differences in presentation of information. We can make suggestions and best guesses but still must design with an awareness these major unknowns.

This idea goes hand-in-hand with using the laptop format as another design consideration. The home page, like a well-designed poster, should hint at all topics contained in the site, provide high level information about these topics, and suggest easy paths to access this a information. If information goes beyond the laptop format, the design must visually communicate to the user how they can know it is there by providing strong visual hints, so that they will investigate beyond what is immediately visible. One can imagine the changes required for smaller, hand-held, voice-activated devices.

Design for the Most Difficult Common Denominator. One must design the interface in anticipation of the worst-case scenario. If a majority of users will be using your product in a quiet room, with fast connections, perfect lighting, and large monitors, the requirements are different from a contractor accessing critical information on a laptop in the field. Often, the user profile is unknown, because new technology often defines new categories. But if, for example, the users will be on a variety of platforms and locations with constant interruption, then one has to design from this situation. It is critical to consider what the breadth of possibilities will be; and user testing, viewing, questioning can make the difference of product acceptance or not.

Avoid Overuse of Saturated Colors. Saturated colors, such as red, tend to jump out at the viewer, which is distracting and irritating. Thus, red is usually not a good choice for large areas of color on the screen. High impact is dependent on the contrast between background and foreground colors. For instance, when designing screens for a display with a black background, both yellow and white have a higher impact than red. What must also be considered is the variations in every viewing situation and how that affects contrast among the various elements on the page, as well as overall legibility and readability.

Consider Different Users' Levels of Skill. All navigation tools should be simple enough for the novice user, but must not slow down the expert. Detailed visual maps and other visual graphics/elements should be available for those users who need them, without getting in the way of the expert user who
Be Aware of the Fatigue Factor. Although there is no definitive answer on fatigue caused by looking at a computer screen for long periods of time, it is a central factor to consider. According to H. John Durrett's book, *Color and the Computer*, looking at a well-designed computer screen should not cause any more fatigue than reading a book or writing a report. Though many would disagree with this statement, many people spend more time with their computer than a book and no doubt would have additional input on this subject.

As interactive media becomes a commodity, the focus will not be on what a product does, but how it does it; that will be the difference between product acceptance or product failure. Success or failure will be judged by the ease of use and understanding of its interface—the face of the product/program to the users.

Other Differences to Consider. There are many differences that impact how and why we design our interfaces, and many of them have been discussed in other chapters in more detail. A designer should never forget differences such as vision and physical impairment (sight, motor skills, etc.) mental impairment and how that impacts ability to read, comprehend, and use the interfaces we design.

Use the Squint Test to Check the Design. A very simple self-test to check visual hierarchy is the squint test. Simply squint your eyes at the page you are evaluating, putting the details out of focus. As you look at the page, what is the first, most dominant element on the page? Is this what should be seen first? What should have primary, secondary, importance on the page? In cognitive psychology terms, this is called visual queuing. The visual ordering of what the user sees on the page is the goal of good interaction design.

There Are No Universal Rules, Only Guidelines

If there were rules, everything would look the same and work perfectly according to those rules. Each situation is different with its own context and parameters.

Remember the Audience: Be a User Advocate

Throughout the process of development, audience needs are primary. Who are they? What requirements do they have? How and where are they using your product? Answers to these and other questions are the criteria to evaluate alternatives throughout the development process. As designers, we must understand and advocate from the point of view of the user.

Structure the Messages

Content must be analyzed to create a clear visual hierarchy (reflecting the information hierarchy) of major and minor elements. This visual layering of information helps the user focus on context and priorities.

Test the Reading Sequence. Apply the squint test. How does the eye travel across the page, screen, or publishing medium? What is seen first, second, third? Does this sequence support the objectives and priorities as defined in the Audit?

Form Follows Function

Be clear about the user and use environment first. The interface design should be its tangible representation and reinforce these goals.

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There Are No Universal Rules, Only Guidelines

There are many ways to say the same thing. What is important is to create an appropriate visual style and design all visual elements in the same way. The goal is to create a consistent visual language throughout the entire product.
Keep Things Simple. The objective is to efficiently and effectively communicate a message, so that users can perform a task. Fewer words, type styles, and graphic elements generally mean less visual noise and greater comprehension. An obvious metaphor enhances intuitive understanding and use. The goal is to communicate ideas and information, not show off features or graphics.

People Don’t Have Time to Read

In addition to writing clearly and concisely, it is important to design information in the most economical, accessible, intuitive format, enhanced by a combination of graphics and typography. Graphics are very powerful and can often be used to efficiently and effectively provide explanations while saving space on a page. Designer beware, as they can visually dominate a page, unless considered beforehand and designed as an integral part of the page.

Be Consistent

Consistent use of type, page structure, graphic, and navigational elements creates a visual language that reduces the effort needed read and understand the interface. The goal is to create a user experience that appears effortless and enjoyable throughout.

Start the Design Process Early

Don’t wait until the last minute. Put together the development team of designers, usability professionals, engineers, researchers, writers, and user advocates at the beginning of the process. In particular, with interactive media, the traditional review and production process will change. The process is less of a hand-off and more of a team effort; it’s more like making a film than writing a book.

No matter how varied an organization’s products are, successfully applying the principles of good design will enable an organization to communicate more effectively with all its audiences and customers. This will have a direct impact on improving the value of the products and services, in addition to adding value to an organization’s brand and identity.

Good Design Is Not About Good Luck

Good design is based on the principles of visual and interaction design applied appropriately and thoughtfully. Creating the most useful, successful design for an interactive product is difficult. By its nature, the design process is iterative, ongoing and experiential. There are usually several possible ways to solve a problem, with the final design decision dictated by the best choices based on requirements at a particular time.

Always and forever, remember the users, user, users. They are why we are here and have this work to do. They are everywhere, in places we have not yet imagined. As the world grows smaller and we are more connected, the opportunity lies in where and what we have not discovered.

I have been studying and practicing in this field of visual/interaction design in all its various flavors for over 20 years. Though contexts and technology change, the basic principles of visual design still apply. What does not change, however, is my focus on the user, user perspective, and use environment, with an ongoing goal to make things easier to use and understand.

This is only the very beginning.

References


