

Interface Design Elements & Principles

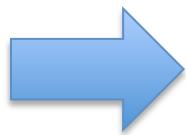
CSE/ISE 392

Tony Scarlatos

GUI Elements and Principles

Elements

- Windows
- Icons
- Menus
- Pointers
- Color
- Text
- Graphics
- Audio
- Animation
- Video



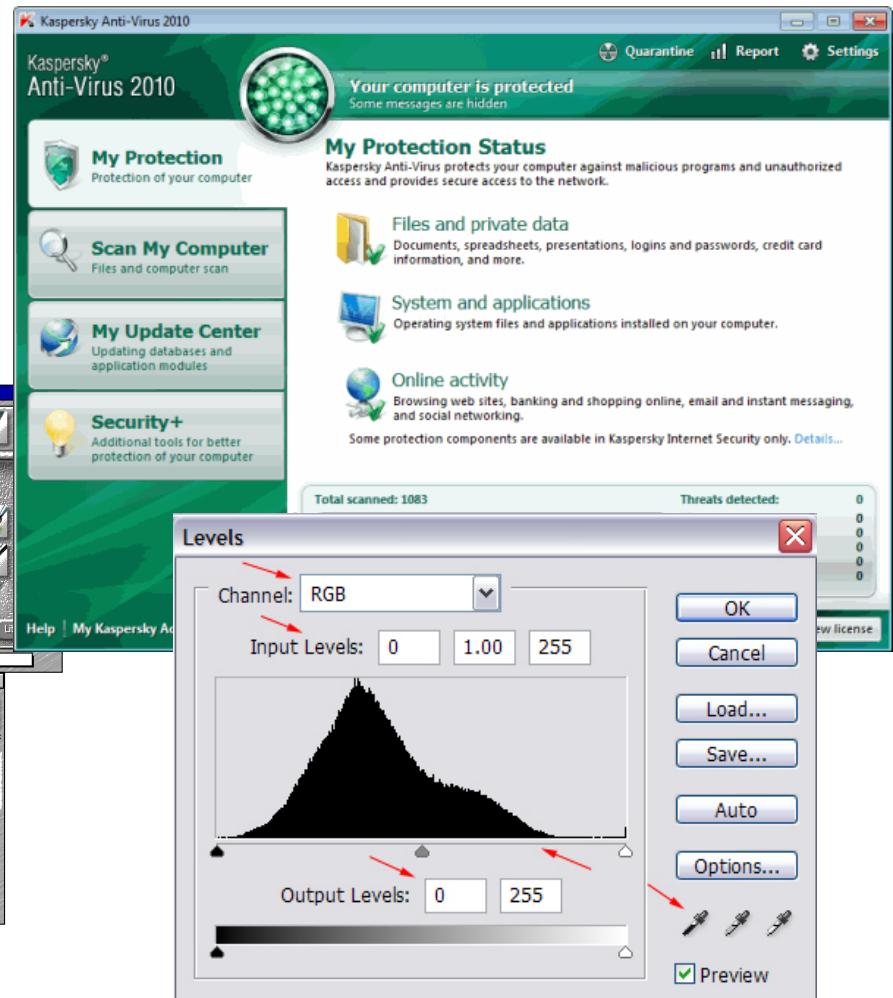
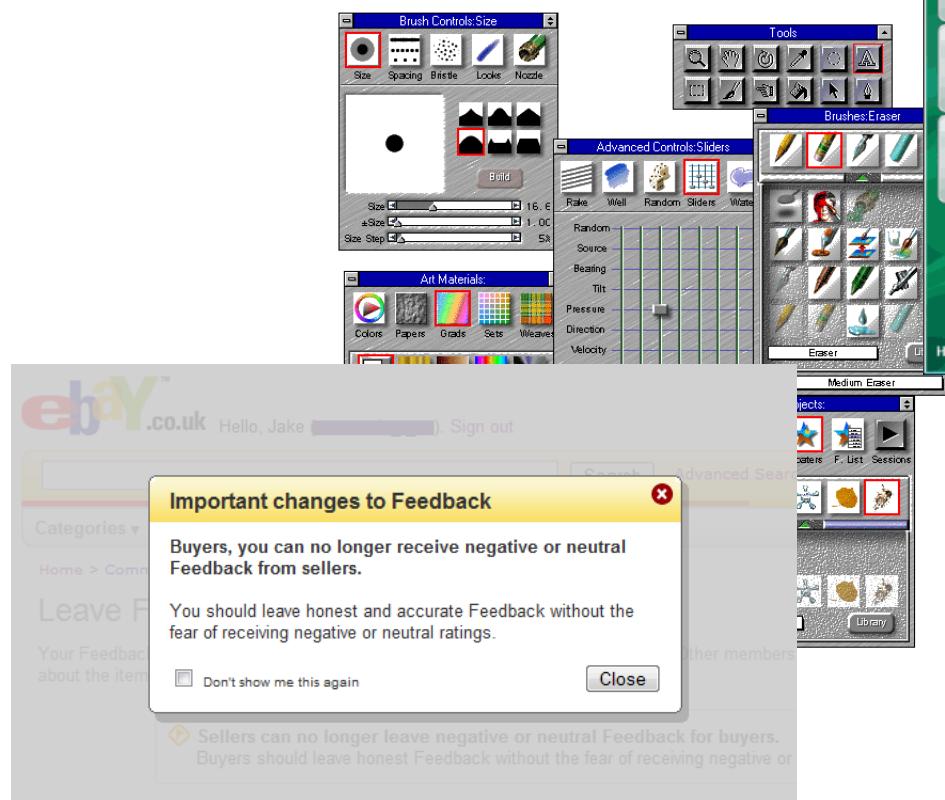
Principles

- *Consistency*
- *Clarity*
- *Predictability*
- *Economy*
- *Transparency*
- *Modality*
- *Sensitivity*
- *Understandability*
- *Conviviality*



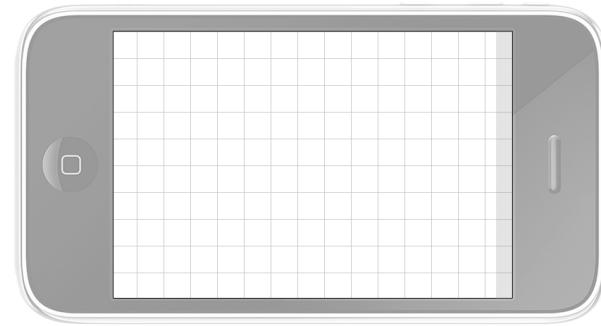
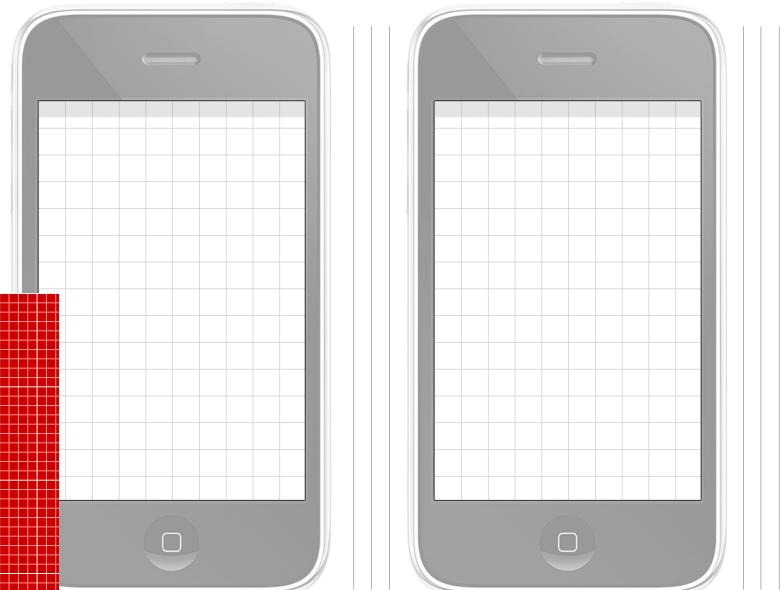
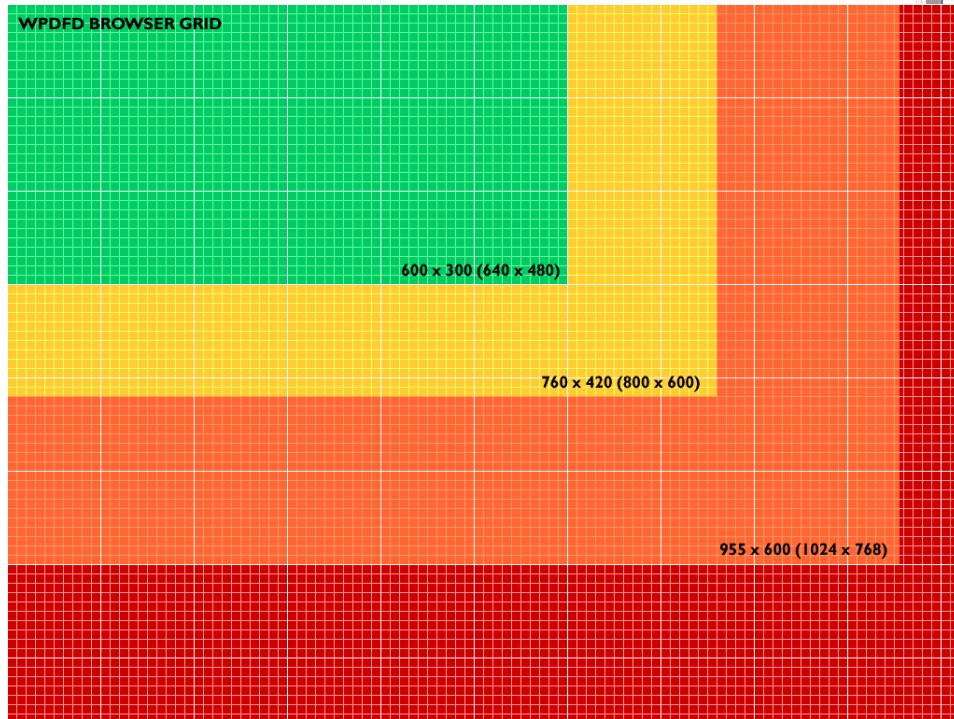
Windows

- Application window
- Dialog boxes
- Tool bars & palettes
- Alerts

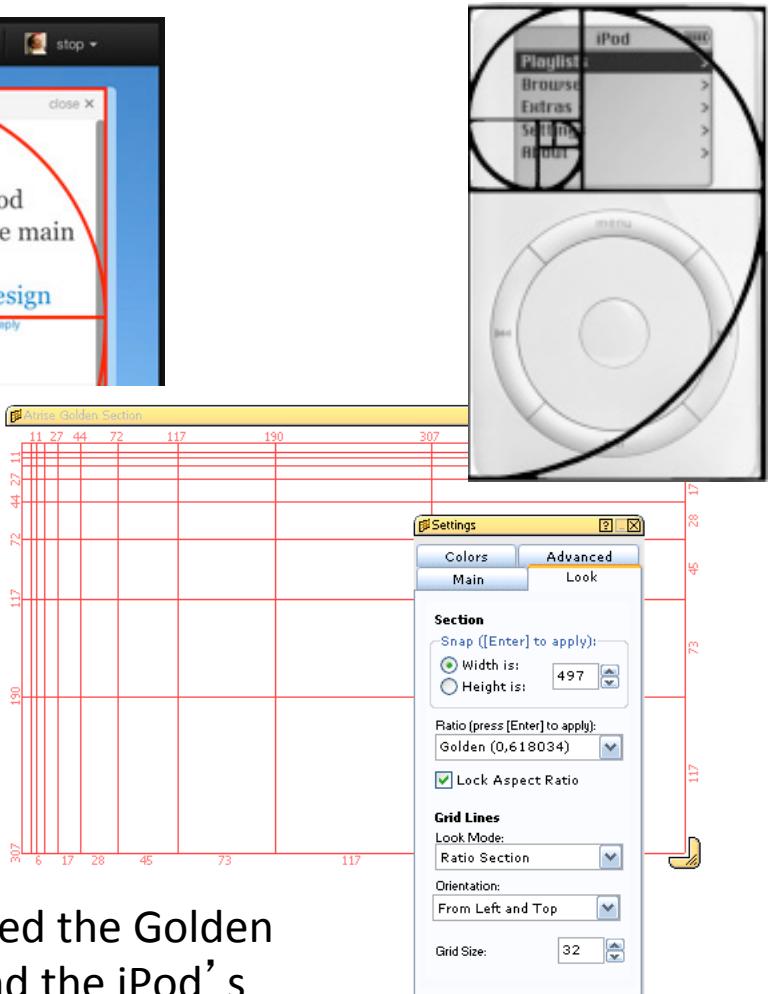
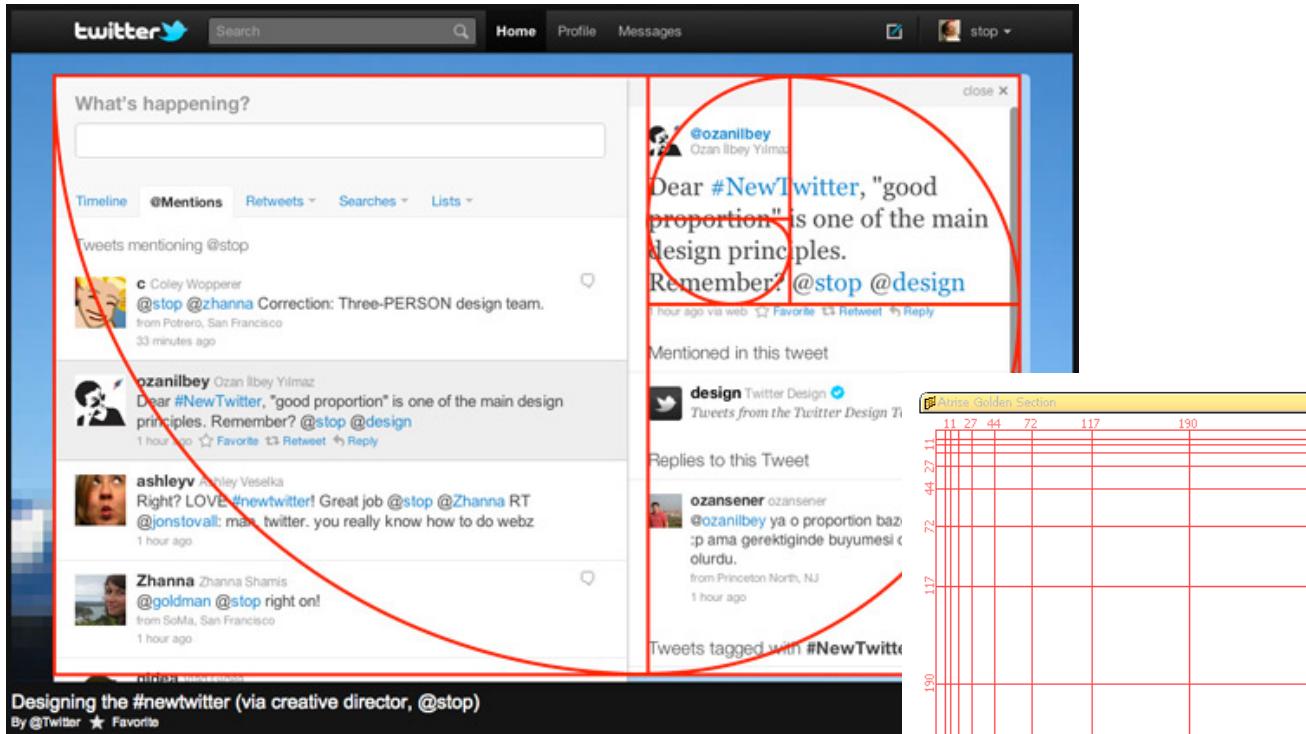


Screen Layout

- Aspect Ratio & Orientation
 - The web and mobile devices make this challenging



The Golden Rectangle (Phi)



The Fibonacci Series yields a ratio of 1:1.61 (Phi) which is found throughout natural forms. The rectangle based on that ratio is called the Golden Rectangle. Above, the Twitter screen layout and the iPod's proportions are based on Phi. Software tools now help designers use the Golden Mean.

The Rule of Thirds

The Rule of Thirds helps designers to find the points of emphasis in their interfaces and to balance their screen layouts.

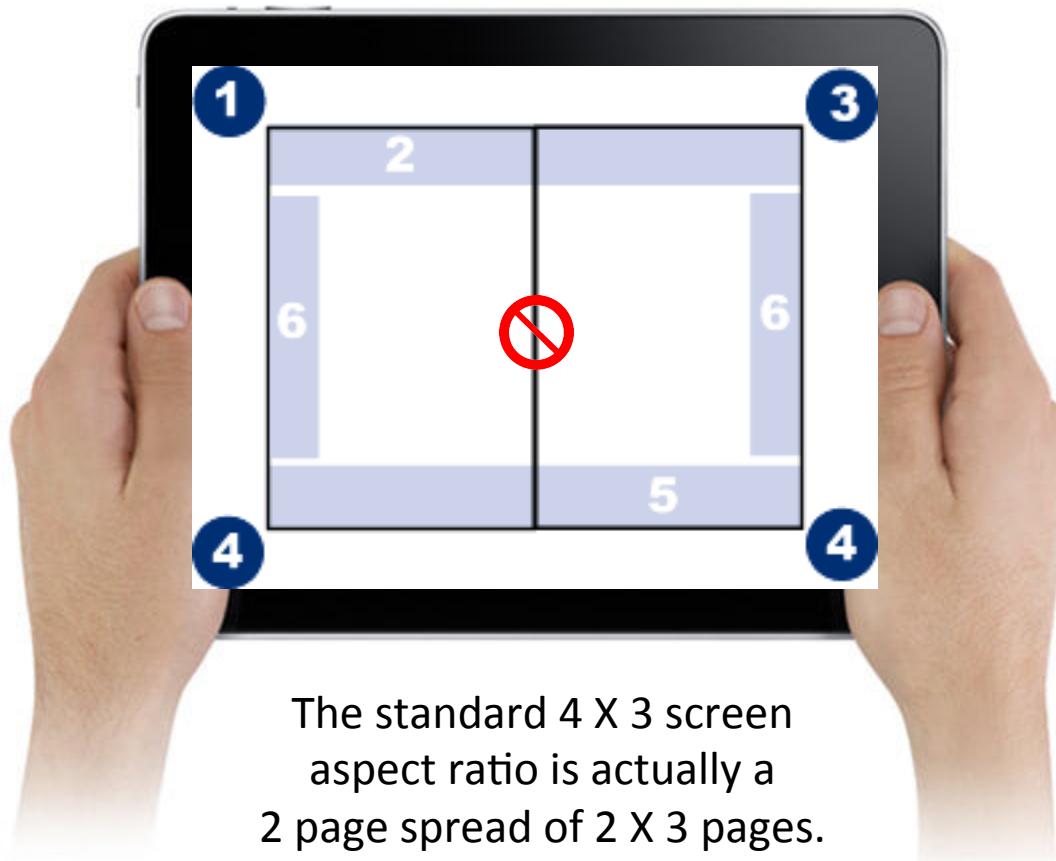
Lightroom Screenshot: A portrait of a young woman is being edited in Lightroom. A 3x3 grid overlay is applied to the image, with red circles highlighting the intersections at the top-right, middle-right, bottom-right, and middle-left positions. The Lightroom interface includes a Navigator panel, Presets panel (showing 'Lightroom Presets' like 'Creative - Aged Photo'), and a Histogram panel.

Wireframe Grid: A simple 3x3 grid with red circles at the intersections, representing the rule of thirds principle.

Demandware eCommerce Freedom Website: A desktop screenshot of the Demandware website. The layout features a header with the 'Demandware' logo and navigation links ('Homepage', 'Demandware eCommerce', 'Clients', 'Services', 'Partners', 'News & Events', 'About Us'). Below the header is a large banner with a person holding a gift box, followed by sections for 'eCommerce freedom On-Demand' and 'Webinar'. The footer includes a 'Featured Client' section with logos for Spirit, House of Fraser, Sally Beauty Supply, Bandolino, Barneys New York, and Playmobil.

Mobile Device Interface: A screenshot of a mobile web browser showing the same Demandware website. The layout is adapted for a smaller screen, demonstrating how the rule of thirds can be applied across different devices.

Screen Prominence



For Western cultures that read left to right, the upper left corner of the screen is the most prominent part of the screen, followed by the upper right, and the two lower corners. The center of the screen actually has the least prominence (it's the gutter of the book).

Case In Point...

Apple Menu:
Restart
Shut Down
Log off



Finder:
Directory
Applications

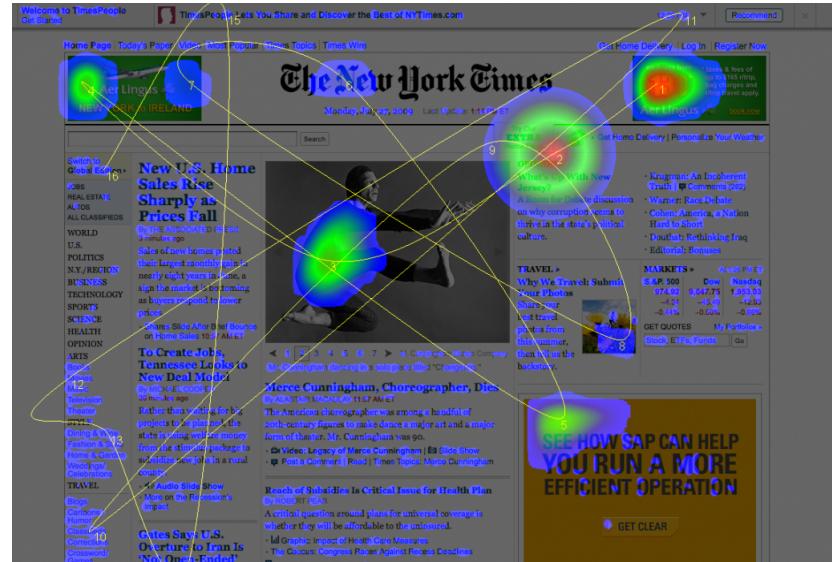
Spotlight:
Find Files

Disks
Mount
Along
Right
Edge

Trash:
Eject
Burn Media

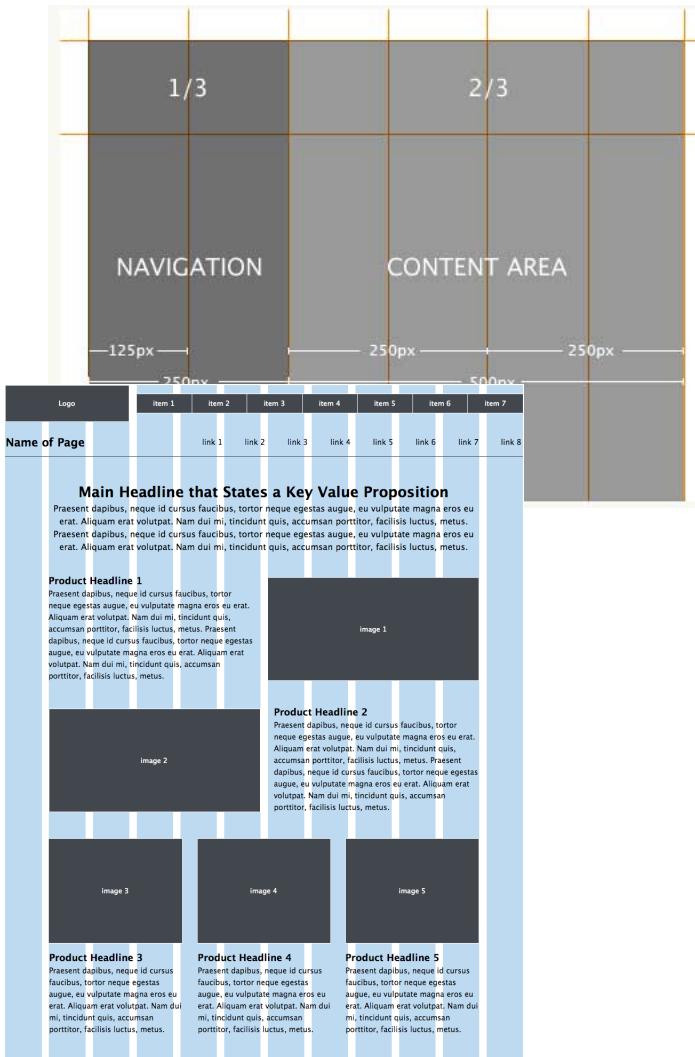
Capturing the User's Attention

- Where the eye is drawn:
 - Moving pictures (video, animation)
 - Pictures (photos, graphics, illustrations)
 - Headlines (large, bold, or differently-colored text)
 - Body copy
- Visual prominence accrues to:
 - Larger regions of positive and negative space
 - Regions with greater contrast
 - Higher saturations of color
 - Warmer colors



An eye-tracking heat map of the NY Times online indicates where a user's gaze has been directed.

Use of the Grid



facebook.
via NutshellMail

Sarah Zeller

Wedding Ceremony
60 new photos

Chris Basey

If you're travelling in the holidays, Google is offering free wifi in 47 airports and all Virgin America flights. And there are prizes to be won!

Nov 3, 7:36 AM Unlike

View all 5 comments

Nick Hodulik Why just PR & Mktg? How does anyone get anything done with tons of meetings?
about an hour ago

Kelly Dove LOL Derek! I was thinking the same thing...
24 minutes ago

comment share like post to wall

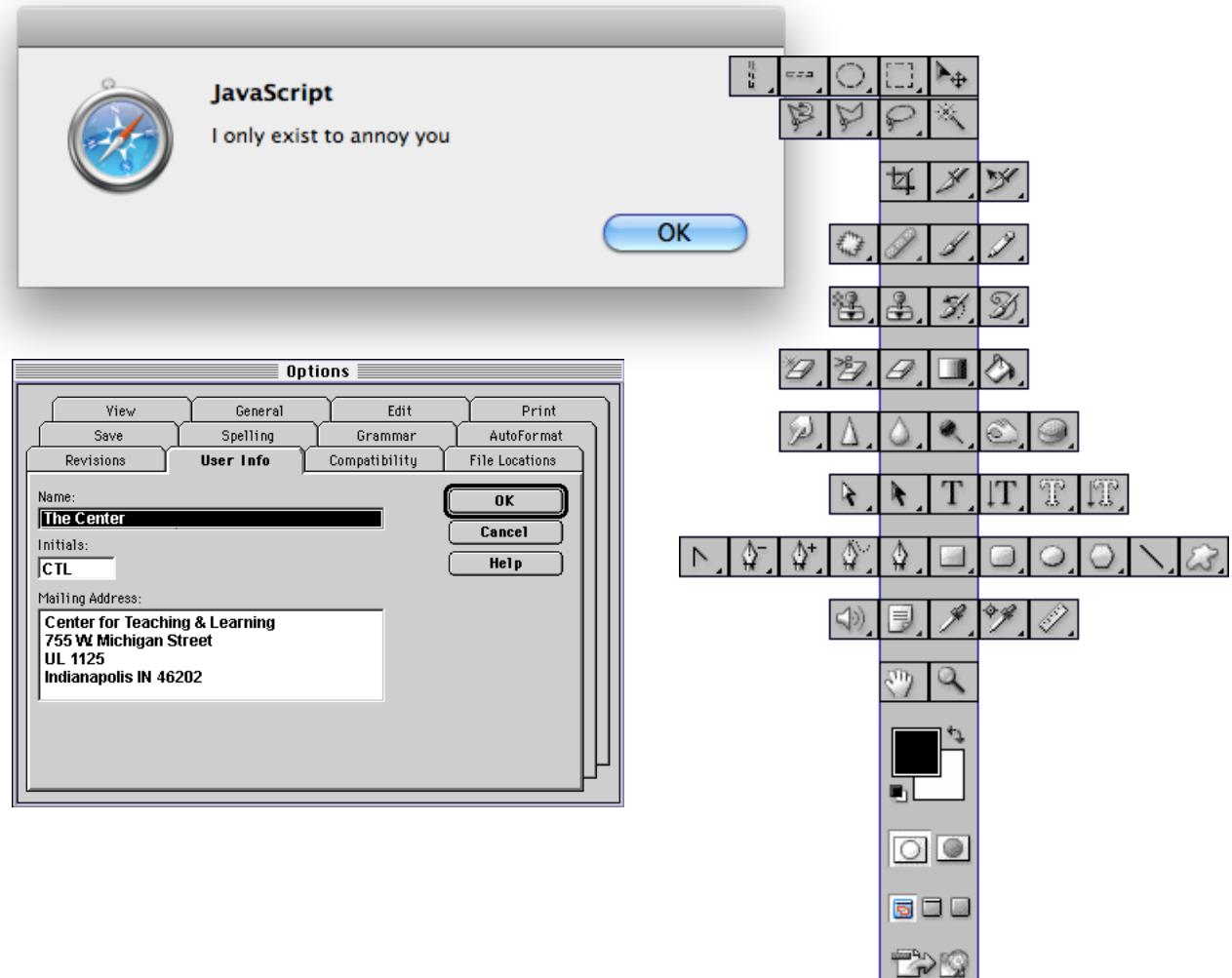
Comment

Grids organize the presentation of a variety of data, especially dynamic data.

Avoid complication and clutter

With dialogs, alerts, and tool bars, avoid complexity and too many choices. Tools should be semantically organized.

Use dialogs and alerts sparingly. Dialogs and alerts can interrupt the flow of interaction and make users lose their place.



Icons

- Graphic icons are quickly recognized and remembered.
- Help overcome language barriers and literacy issues.
- Simple and consistent in style – they should be recognizable at a distance, and should scale well.
- Color palette is limited, and ability to show detail is low.
- A 50/50 balance of positive to negative space is usually the best design for readability.
- Abstract ideas are difficult to represent.
- Text aids, like cursor "tooltips" can be used.
- Icon size is dependent upon the input used (i.e. touch screen), and also the age of the user.
- Consideration of cultural differences in interpreting icons is important.



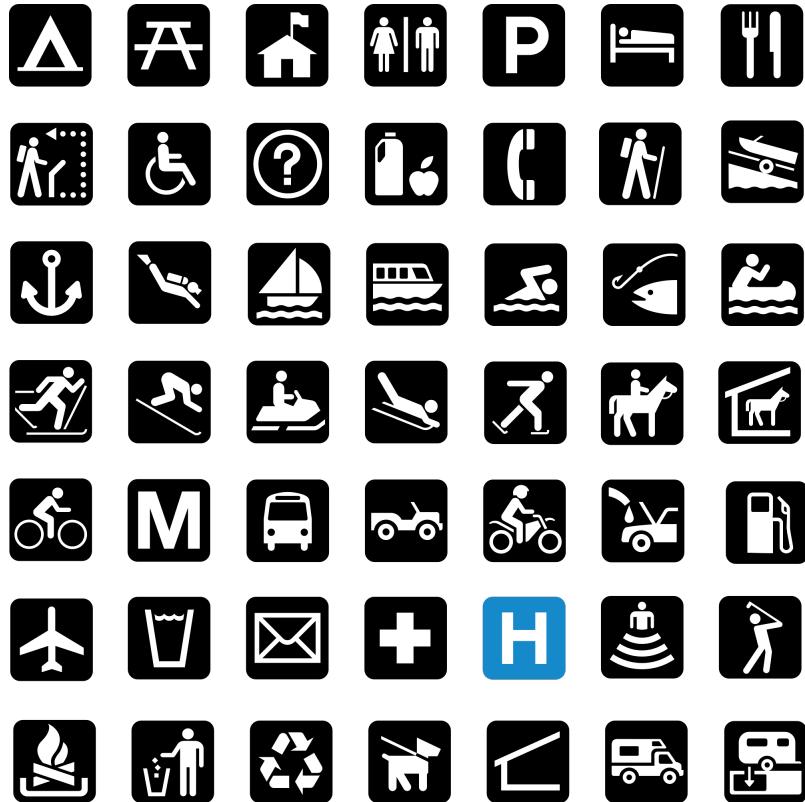
Literal



Abstract



Arbitrary



Menus

Item 1	
Item 2	
Folder 1	▶
Item 3	
Folder 2	▶ Sub Item 2.1
Item 4	Folder 2.1 ▶ Sub Item 2.1.1
	Sub Item 2.1.2
	Sub Item 2.1.3
	Sub Item 2.1.4
Products	
Name	<input type="text" value="Chai"/>
Price Per Unit	<input type="text" value="18.0000"/>
Quantity Per Unit	<input type="text" value="10 boxes x 20 bags"/>
Units In Stock	<input type="text" value="39"/>
Units On Order	<input type="text" value="0"/>
Category	<input type="text" value="Beverages"/> ▼
	<ul style="list-style-type: none">BeveragesCondimentsConfectionsDairy ProductsGrains/CerealsMeat/PoultryProduceSeafood

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2. Make the most of your Lenovo computer! (24)

 Absolute Essentials Services, Software, and acc...	 Special Offers Click here to see limited tim...	 Stay Unplugged Longer Extend your work time.
 Try, Buy, or Activate Microsoft Office Activation Assistant for the ...	 Spare Power One for every room	 Lenovo On-line Registration Register Now!
 Norton Internet Security. Essential protection.	 Warranty Upgrades Choose your level of service	 Concerned about theft? Protect your investment
 Thumb Size Storage Portable, convenient storag...	 Password protection Fingerprint authentication!	 ThinkVantage Productivity Center Ultimate business tools!
 Hassle Free mobility Convenient connectivity sol...	 Keyboards and Mice Best in the business	 Monitors Crystal Clear.
 Project your best Zero to setup in 2.6 seconds	 Power up anywhere AC/DC travel adapters go w...	 Safeguard your investment Stylish carrying cases.
 Diskkeeper Defragmentor Improve system efficiency	 Dispose your old system Lenovo Recycling Services	 VoIP ready? Fulfill your Audio / Video ne...
 Backup your life External storage.	 Performance boost Memory engineered for you...	 Lock it up Provide an extra layer of sec...

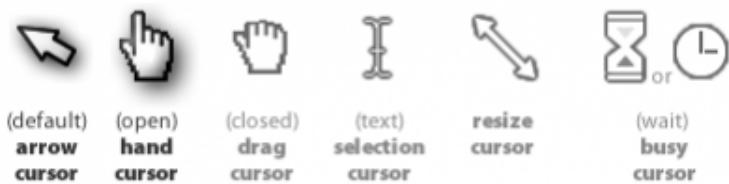
Minimize the number of nested menus to three, and the number of menu items to nine or less. Order the items semantically and in descending priority (i.e. frequency of use). Limit the number of icons used. Avoid cognitive overload.

Pointers

Cursors provide feedback to the user about the mode the application is in – editing, processing, etc. Cursors can have color, and can be animated to show that a process is taking place. But complex pointer icons can also confuse users.

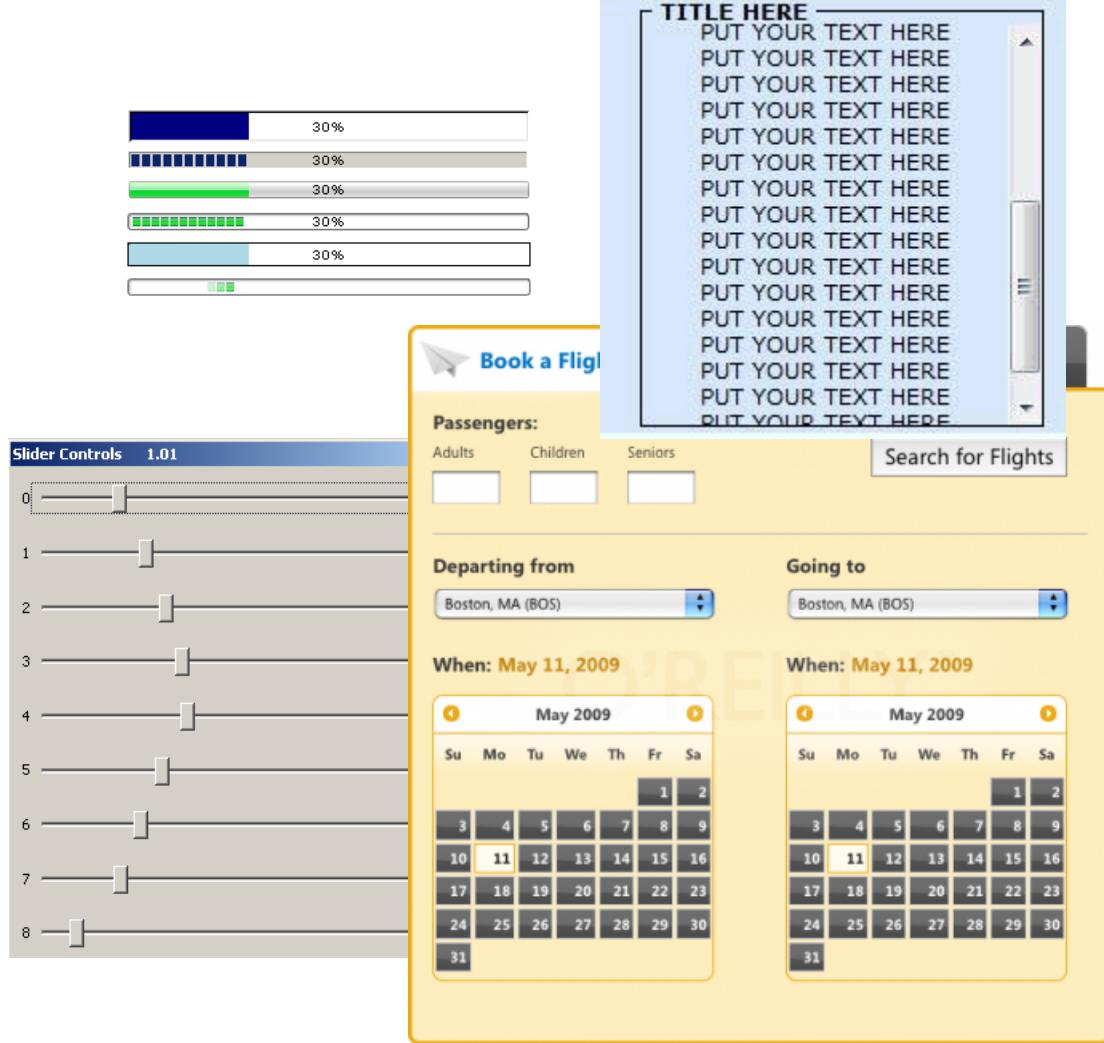
Pointer Shapes			
Normal Select		Vertical Resize	
Help Select		Horizontal Resize	
Working In Background		Diagonal Resize 1	
Busy		Diagonal Resize 2	
Precision Select		Move	
Text Select		Alternate Select	
Handwriting		Drag- make copy	
Unavailable		Drag - make shortcut	

Common Cursor Types



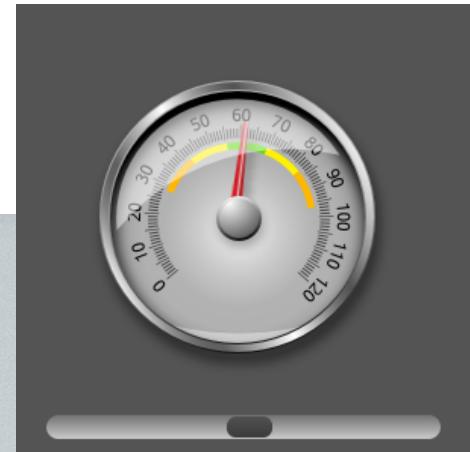
Widgets

Widgets are standardized mini-utilities such as calendars; but also include scroll bars, progress bars, sliders, etc. Scroll boxes in particular are over used, and often reflect a failure of design more than a useful feature.



Controls

Interface controls are modeled after an actual artifact, like a switch or a knob. In practice controls like dials may be harder to use in a computer interface than their actual counterparts, since there is no tactile feedback. Buttons with multiple states can be a distraction in the interface.



Color

- Layers and Separates
 - Distinguishes different types of information
- Sets the context for graphs and tables
- Emphasizes important items
 - Saturated colors are "active", neutral grey is "disabled"
- Labels
 - Groups similar functions by color
- Contributes to the “mood” of the application
- Color is never perceived in isolation. Use strong colors in small quantities, against large areas of quiet colors. More saturated colors draw our attention immediately. Use them sparingly.



Color perception stems from natural phenomena, like atmospheric distortion and the blue shift. Warmer, more saturated colors advance, and cooler, less saturated colors recede.

UI Color Guidelines

- Use a limited palette of complementary colors
- Make sure your background *is* the background
- Don't use light blue for text, but it's great for backgrounds
- Older users need brighter colors to recognize them, and 10% of males have some form of color blindness
- Don't use highly saturated colors from opposite ends of the spectrum in close proximity



Use Complementary Colors

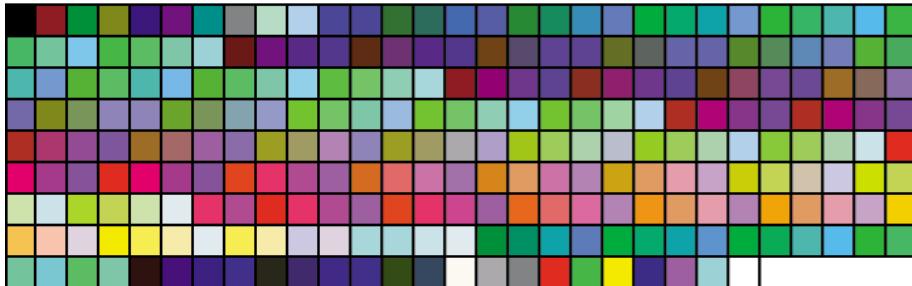
Warm colors move forward

Cool backgrounds recede

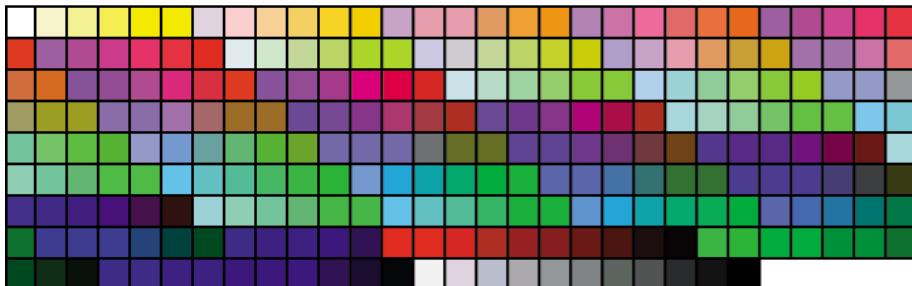
This is very hard to read.

Don't Do This!

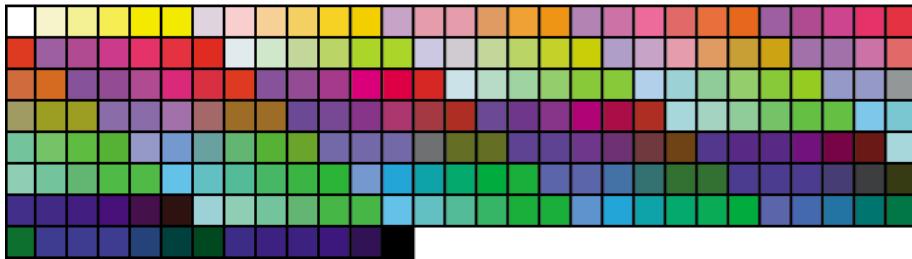
Color Palettes



Windows palette
(256 colors)



Macintosh palette
(256 colors)



Web-safe palette
(216 colors)

Color Psychology: Warmer Colors

- Red
 - Rare in the natural world
 - Associated with fire, blood, danger
 - Commands attention
- Orange and Yellow
 - Color of the sun
 - Motivator, makes people happy and decide rapidly
- Green
 - Pastoral
 - Puts people at ease



Color Psychology: Cooler Colors

- Blue
 - Most common color in the natural world
 - Color of the sky and the ocean
 - Light blue conveys access and assistance
 - Dark blue conveys authority
- Violet
 - Infrequent color in nature
 - It's unusual and exceptional
 - The color of royalty, intrigue and mystery



Color Psychology: Neutral Colors

- Brown
 - Color of the earth
 - Dependable and full of promise
- Black
 - Color of night
 - Formality (and fear)
 - Judicial
 - Funerals in western cultures
- White
 - Color of clouds
 - Purity
 - Weddings in western cultures



Text

12 point 24 point 48 point

96 point

- Legibility and quick comprehension are the primary goals.
- Screen resolution is much lower than print, and reading a lot of text can strain the user's eyes. Keep the use of text to a minimum.
- Users scan more than they read, so use text in readily "consumable" chunks.
- The minimum point size for text should be no less than 12 point. Older users and children require larger font sizes.
- With few exceptions, DO NOT USE all capital letters. Capitals are harder to read (and may imply impatience with the user).

Color Use in Design

While there is little hard evidence for many conventions that have grown around color use in publications, there is one area in which color use does follow hard-and-fast rules: cultural color psychology. The high visibility of red might make it appealing in the West, but in South Africa, where it is associated with mourning, it would not be seen on a cover about as often as black would be in the West. Blue is generally appealing to all of us irrespective of culture because of its calm and infinite, but is a turnoff when used for food. It's all about context. So while it may be something that useless to tell a designer how to use color, here's a helpful guide on how NOT to use it.

Black

Black is complex; it can be sexy, authoritative, powerful, menacing, intriguing, rich, depressing, dull, glossy, textual, timeless... many occasions it will be at least two of these at the same time. Avoid using black on the cover, where it can be too widely associated with death and tragedy, but on the inside pages of a magazine its use can be striking. In color psychology, many people think that it implies submission.

White

White is almost complex as black. Innocence, cleanliness, wealth, and purity are some of the associations we make with white, but it can also be sterile and neutral to the point of blandness.

Red

The extreme vibrancy of red has both good and bad points. It is confrontational and can render other elements on a page almost invisible. But it will definitely attract the eye and has been proved to create a strong emotional response in a viewer, stimulation faster heartbeats and breathing.

Blue

Peaceful and tranquil, blue causes the body to produce calming chemicals. But choose it carefully - it can also be cold and depressing.

There is one area in which color use does follow hard-and-first rules: cultural color psychology... It's all about context.

Green

Green is the easiest color on the eye and is calming and refreshing. As the color of nature, most associations viewers make are positive ones. Additionally, dark green implies wealth and power.

Yellow

Yellow is the most difficult color for the eye to take in, and thus is potentially overpowering - possibly why it's seen as an unpopular color choice for covers.

Purple

Used in the right way, purple has associations of luxury, wealth, romance, and sophistication, but it can also appear overtly feminine or gauche.

Orange

Our associations with orange are good: exciting, vibrant, and joyous. But it can be a difficult color to use - too red can overpower; too yellow is anemic.

Brown

Another nature color with good associations. Light brown implies genuineness, while dark brown suggests wood or leather. The combination of these makes them appealing for men's subjects.

A good balanced text layout in Helvetica, but...

Typography

- Limit the use of styles to at most four: headlines, subheads, body copy, and captions.
- The use of **bold** and *italic* fonts should be consistent and limited.
- Choose fonts that support the theme of the interface.
 - Serif fonts (e.g. **Times**) are classical and formal. They are more legible than sans-serif fonts and are good for body copy.
 - Sans-Serif fonts (e.g. **Arial**) are modern and informal. Usually best for headlines.
- Specialty fonts and typographic designs (e.g. logos) might have to be rasterized for distribution. Some applications, such as Flash, allow developers to embed fonts in their executable files (.swf).

Arial

Arial Black

Comic Sans MS

Courier New

Georgia

Impact

Times New Roman

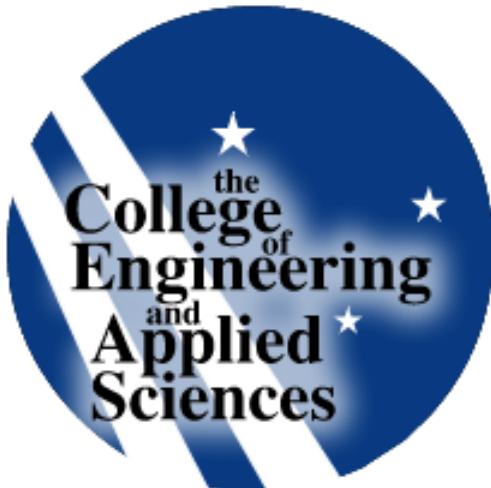
Trebuchet MS

Verdana

Above, the “core nine” cross-platform (web-safe) fonts.

Typography examples

the
College
of
Engineering
and
Applied
Sciences



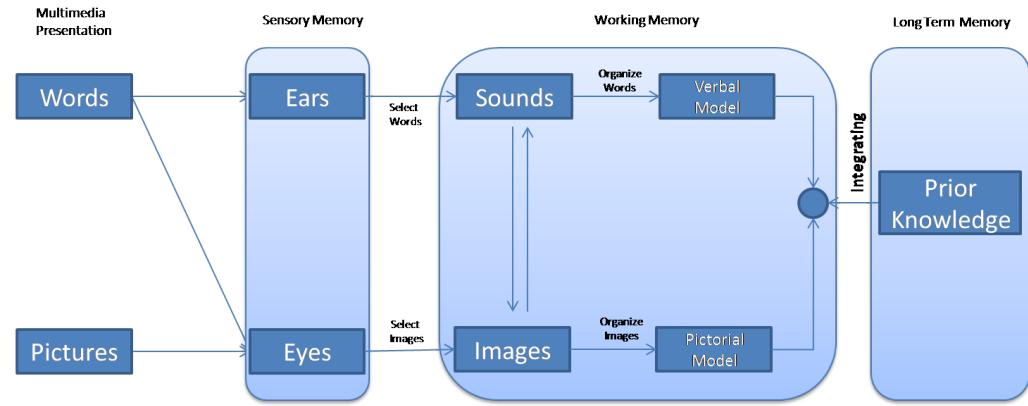
KERMIT95

the First
Presbyterian
Church of
Smithtown

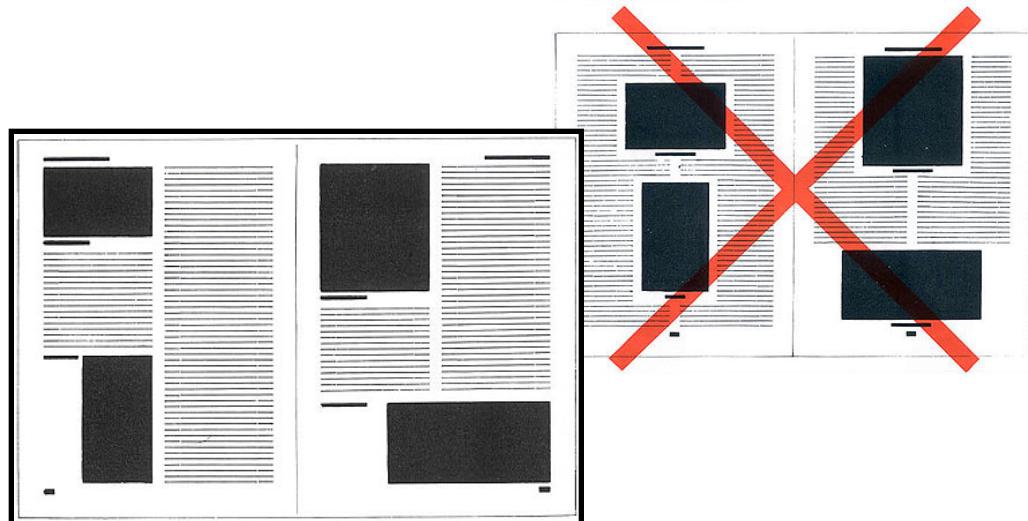
A screenshot of a website header. At the top, there is a dark blue navigation bar with small white icons and text: "Presbytery of Long Island", "PCUSA", "Map/Directions", and "Bread for the World". Below the bar is a photograph of a white church building with a tall steeple and a clock, partially obscured by pink blossoming trees. To the right of the photo, the church's name is written in a large, elegant, black serif font. At the very bottom of the header, there is a thin white navigation bar with small blue icons and text: "HOME", "CONTACT US", "GENERAL INFORMATION", "CALENDAR OF EVENTS", "CHURCH HISTORY", "CHURCH LIFE", and "VIDEO".

Digital Media

- Richard E. Mayer (Prof. of Psychology, UC Santa Barbara): *Multimedia Learning*, Cambridge University Press, 2001
- **People learn better when multimedia messages are designed in ways that are consistent with how the human mind works and with research-based principles**



Cognitive Theory of Multimedia Learning; Nine Ways to Reduce Cognitive Load in Multimedia Learning; Mayer and Moreno, Educational Psychologist, 2003



Principles for managing essential processing

- **Multimedia principle:** People learn better from words and pictures than from words alone.
- **Segmenting principle:** People learn better when a multimedia lesson is presented in learner-paced segments rather than as a continuous unit.
- **Pre-training principle:** People learn better from a multimedia lesson when they know the names and characteristics of the main concepts.
- **Modality principle:** People learn better from animation and narration than from animation and on-screen text.

Principles for reducing extraneous processing

- **Coherence principle:** People learn better when extraneous words, pictures, and sounds are excluded rather than included.
- **Redundancy principle:** People learn better from animation and narration than from animation, narration, and on on-screen text.
- **Signaling principle:** People learn better when the words include cues about the organization of the presentation.
- **Spatial contiguity principle:** People learn better when corresponding words and pictures are presented near rather than far from each other on the page or screen.
- **Temporal contiguity principle:** People learn better when corresponding words and pictures are presented simultaneously rather than successively.

Principles based on social cues

- **Personalization principle:** People learn better when the words are in conversational style rather than formal style.
- **Voice principle:** People learn better when words are spoken in a standard-accented human voice than in a machine voice or foreign-accented human voice.
- **Image principle:** People do not necessarily learn better from a multimedia lesson when the speaker's image is added to the screen

Mayer's final principle

- **Individual differences principle:** Design effects are stronger for low-knowledge learners than for high-knowledge learners. Design effects are stronger for high-spatial learners than for low-spatial learners.