PROGETTAZIONE E PRODUZIONE MULTIMEDIALE

I5 – INTERFACE DESIGN

Prof. Andrea Ferracani

- Part I – Usability
- Part II – General Design Principles
- Part III – Web Design Principles
- Part IV – Accessibility
- Part V – Natural Interfaces

Part I – Usability

Usabilità: Anni ‘80

- Equivalenza con “user friendly”
  - attributo vago e non misurabile
  - Identificabile con figure non affidabili
- Enfasi sul motore interno del sistema
  - “Unix is user friendly. It is just selective about who its friends are”

Usabilità: Anni ‘90

- Enfasi su utente e differenziazione degli elementi caratteristici

- Assume maggior peso l’interfaccia rispetto al motore
- Collocazione dell’usabilità nel ciclo di vita del software
  - riduzione della vaghezza
  - introduzione di metodi ripetibili

Le componenti dell'usabilità

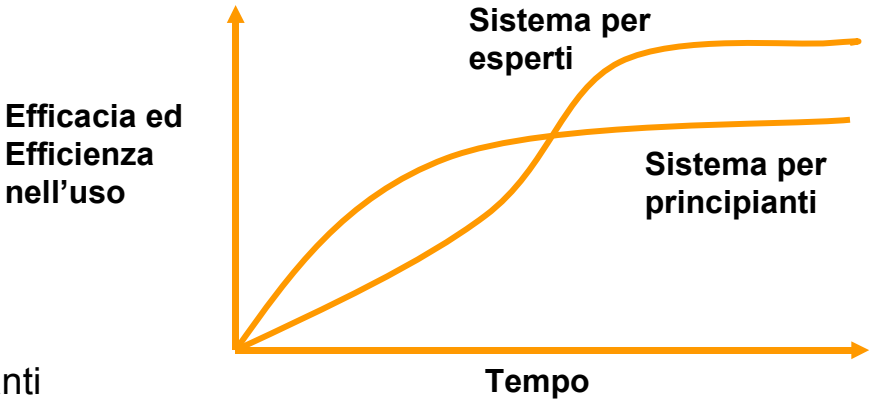
- L'usabilità può essere scomposta in elementi caratteristici diversi
  - effectiveness (efficacia)
  - efficiency (efficienza)
  - learnability (apprendibilità) – anche memorability
  - subjective satisfaction (soddisfazione soggettiva)

- La scomposizione riduce la vaghezza con un minimo sovrapposizione
- Ciascuna figura definita operativamente attraverso procedure di misura e metriche

- Usabilità: Effectiveness
  - Capacità di produrre risultati di qualità appropriata
    - accuratezza, completezza, assenza errori, confidenza nella qualità
  - Classificazione pragmatica
    - errori minori / catastrofici
    - errori corretti / percepiti / non percepiti dall'utente
  - Rilevante per tasks critici

- Usabilità: Efficiency
  - Capacità di completare un numero di tasks entro un certo tempo
    - tempo per completare un task
    - numero di transazioni in un tempo assegnato
  - Misura la produttività
    - rapporto tra prodotto e risorse richieste (lo sforzo dell'utente è considerato alla stregua di una risorsa)
  - L' analisi deve essere effettuata in punti diversi della learning curve
    - tipicamente è effettuata "al termine" dell'apprendimento (steady state performance)
    - difficoltà nell'ottenere utenti esperti
  - Rilevante per tasks frequenti e ripetitivi
    - tipicamente in sistemi dedicati

- Usabilità: Learnability
  - Facilità nel raggiungere una assegnata produttività
    - produttività qualificata dalla capacità di completare dei task
    - grado di facilità quantificata dal tempo, l'aiuto richiesto, i task compiuti



  - Learning curve diverse
    - utenti esperti, occasionali, principianti
    - diversi livelli di apprendimento: try-now e steady state
    - diversi tipi di ambienti: use-only-once, upgrade systems…

- Esempio di learnability di un insieme di icone
  - intuitiveness delle singole icone
  - understandability degli insiemi di icone

- task:
  identificare il concetto rappresentato da un'icona
  - tempo per rispondere
  - numero di risposte
  - numero di errori nelle risposte

Select

zoom in

text

picture

hotspot

layout

table

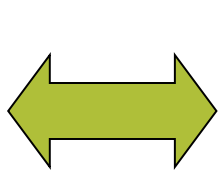
form

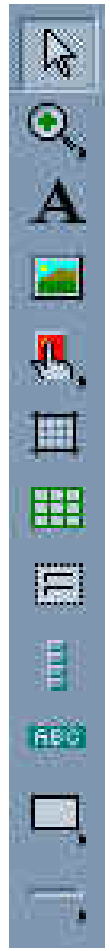
navigation

banner

rectangle

line





- Usabilità: Memorability

  - Recuperare i risultati di un precedente apprendimento
    - potrebbe contrastare con intuitiveness e understandability
    - In relazione con expectation violation

  - Misura utile quando:
    - si deve ripetere un task dopo un certo periodo di tempo
    - utilities usate in circostanze eccezionali ma ripetute
    - applicazioni ausiliarie alle attività principali
    - attività lavorative svolte in maniera non continuativa

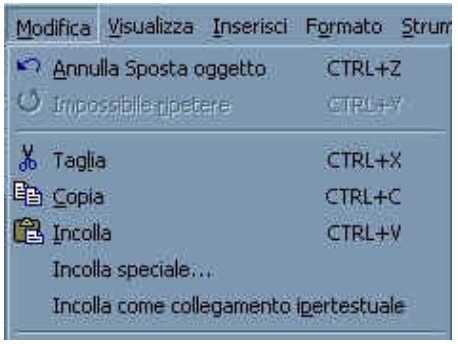
  - Rilevante per utenti occasionali

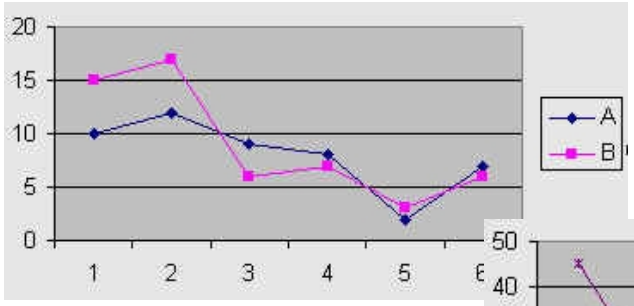
- Usabilità: Subjective satisfaction
  - Gradevolezza percepita nell'uso
    - legato allo sforzo, soprattutto ai valori di picco
    - legato alla capacità di evitare compiti tediosi o apparentemente evitabili
    - legato anche a fattori estetici
    - non necessariamente legato alla effettiva produttività
  - Rilevante per sistemi usati su base discrezionale
    - non-work environment
    - entertainment
  - Condiziona la preferenza e quindi il mercato

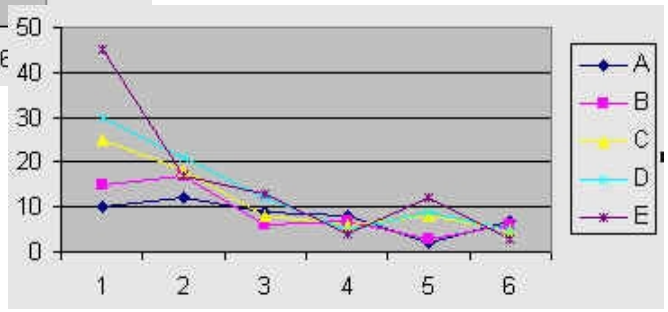
- Misure di satisfaction:
  - *Questionari e interviste*
  - *Likert scale*: valuta su una scala 1-5 quanto concordi (5) o non concordi (1) con una serie di affermazioni:
    - Il sistema può facilitare la mia attività lavorativa
    - Il sistema è facile da apprendere
    - l'uso del sistema è frustrante……..
  - *Semantic differential scale*: marca la posizione che meglio riflette l'impressione del sistema
    - piacevole -------irritante
    - semplice ------- complicato…
  - *Commenti liberi*
    - suggerimenti

Usabilità: Trade-offs

- learnability e efficiency
  - shortcuts
- satisfaction e effectiveness
  - interazione
- effectiveness e efficiency



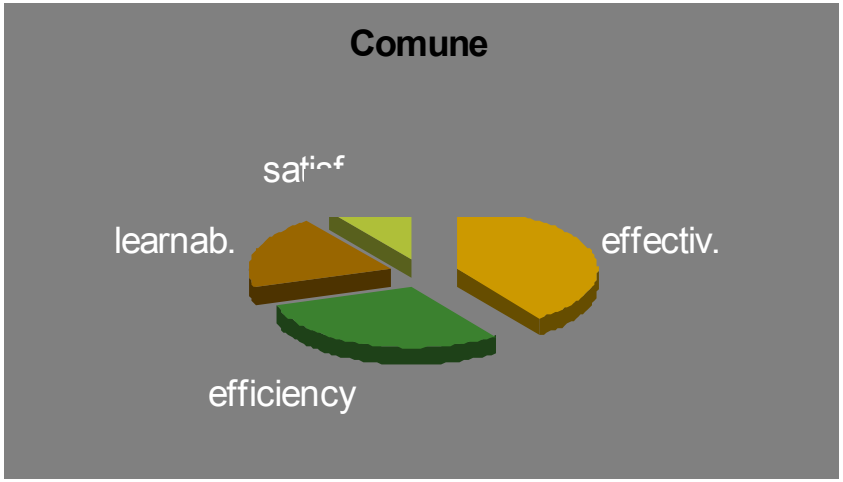




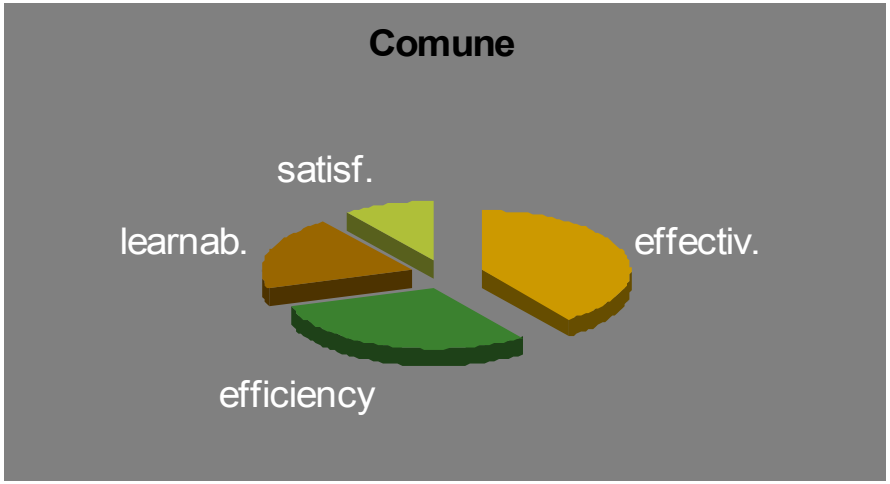
ESEMPIO

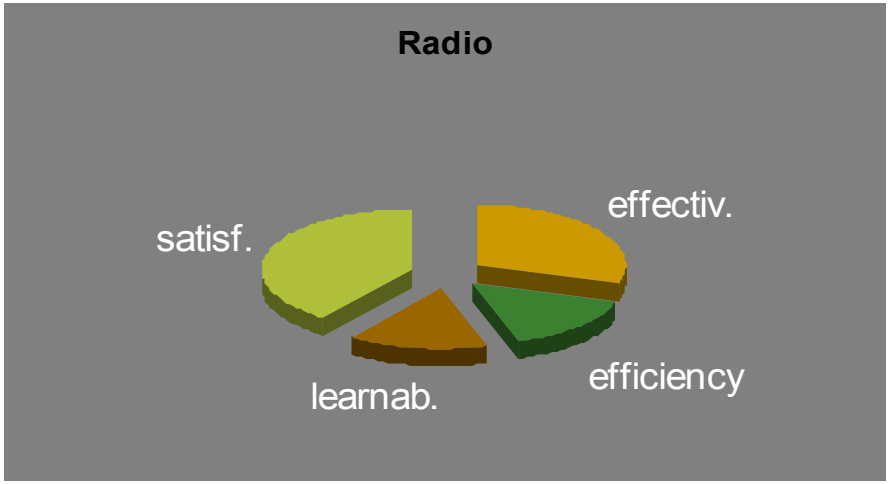
Figure di usabilità del sito di una rete civica

- effectiveness
  - qualità dell'informazione: funzionalità, completezza, correttezza,aggiornamento
- efficiency
  - rapidità nel reperimento e nell'accesso all'informazione
- learnability
  - facilità nel comprendere quale informazione è disponibile e nel localizzarla
- satisfaction
  - gradevolezza, senso di identificazione, limitazione dello sforzo, assenza di attività tediose o frustranti, valorizzazione della propria competenza



- Sito di una radio vs sito comune
  - diverso tipo di informazione
  - diverso rilievo delle diverse componenti di usabilità





Obiettivi di usabilità: es. rete civica

- Il significato e la rilevanza delle caratteristiche di usabilità varia con i diversi utenti e anche con i diversi compiti. Per esempio, nel caso di un sito di rete civica:
  - effectiveness
    - rilevante per l'operatore economico e per il dipendente dell'amministrazione (per questi soggetti è primaria la garanzia di correttezza e completezza poiché utilizzano i servizi del sito ripetutamente), meno per il cittadino individuale
  - efficiency
    - rilevante per l'operatore economico, meno per il cittadino individuale
  - learnability
    - rilevante per il cittadino individuale, meno per l'operatore economico
  - satisfaction
    - per il cittadino comune è rilevante la gradevolezza e il senso di appartenenza.
    - per l'operatore economico e il dipendente dell'amministrazione sono importanti il riconoscimento e l'assenza di passaggi tediosi

Obiettivi di usabilità: es. rete civica - cittadino residente

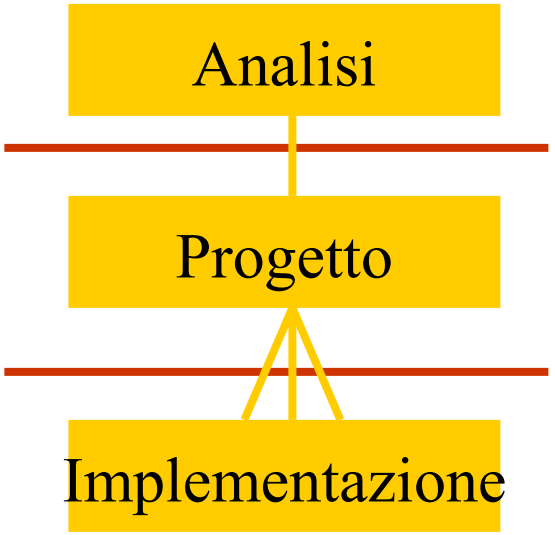
- Learnability: rilevante in modo vitale
  - L'accesso è occasionale, spesso one_shot, individuale
  - Deve comprendere rapidamente quello che è possibile fare o non fare sul sito
  - E' meno importante la facilità con cui viene reperita l'informazione
  - La memorability ha anche a che vedere con la stabilità dell'informazione
- Efficiency: non rilevante
  - Diventa importante per particolari compiti che possono essere frequenti (e.g. meteo o mobilità)
- Effectiveness: rilevante
  - Diventa vitale in particolari compiti (e.g. mobilità)
- Satisfaction: non rilevante
  - Prevale la valutazione pratica ma potrebbe avere valore politico

Obiettivi di usabilità: es. rete civica - operatore economico

- Learnability: non rilevante
  - L'accesso è sistematico, parte dell'attività lavorativa
- Efficiency: rilevante
- Effectiveness: rilevante in modo vitale
  - l'operatore deve integrare il sito nella sua pratica lavorativa
  - deve riconoscervi il modo di aumentare la sua professionalità e la qualità dei risultati che produce
- Satisfaction: non rilevante

Usabilità e ciclo di vita del software

- L'usabilità si inserisce nel ciclo di vita del software e impatta sulle diverse fasi.
  - Analisi: cosa
    - quale informazione è disponibile
    - quali operazioni possono essere eseguite
  - Progetto: come
    - come è strutturato il sito
    - con quale layout di pagina
    - quali elementi grafici e testuali
  - Implementazione
    - dreamweaver, flash, netobject fusion
    - strumenti di content management
    - Java



Analisi

* analisi di utenti e compiti

obiettivi di usabilità

Analisi utenti e compiti

- Raccogliere informazione sull'utente e il *context of use*
  - Caratteristiche dell'utente
    - esperienza nel lavoro, nell'uso dell'applicazione, nell'uso del computer
    - età, livello di istruzione, fattori culturali
  - Caratteristiche dei tasks degli utenti
    - funzioni, obiettivi, periodicità, durata
  - Caratteristiche organizzative
    - ambiente fisico, lavoro cooperativo, tempi di lavoro, contesto sociale
  - Visita del luogo
    - difficoltà nell'accesso agli utenti
    - natura contrattuale del progetto
    - nel caso del web spesso non esiste "il" luogo

- Raccogliere informazioni sui compiti dell'utente
  - Task analysis
    - analisi dei task degli utenti, non del sistema
    - user needs
  - Obiettivi del lavoro
  - Approccio corrente al compito
    - informazione usata per svolgerlo
    - modello del compito percepito dall'utente
    - pregi e limiti dell'approccio corrente
  - Prevedere l'evoluzione dell'utente
    - nuovi tasks
    - nuove competenze

- Effettuare l'analisi funzionale e analisi dei dati
  - Analisi dei flussi informativi
    - enfasi su informazione e attività di trattamento dell'informazione
    - descrizione concreta delle attività e dei risultati prodotti
  - Identificazione dei compiti attribuiti al sistema
  - Analisi dell'informazione
- Il web favorisce l'approccio orientato ai dati. Le transazioni recuperano le funzioni. I link permettono il contatto tra i due schemi

Progetto

* participatory design

* progetto e analisi euristica

Participatory design

- Si devono mantenere gli utenti coinvolti nel design (participatory design). Tipicamente gli utenti non sanno fare proposte in astratto ma reagiscono a oggetti concreti. Non sanno cosa vogliono, ma sanno bene cosa non vogliono. Devono essere selezionati e arruolati degli utenti statisticamente rappresentativi della popolazione target (almeno 5 !) e non assuefatti alle assunzioni del progetto

Progetto e analisi euristica

- Il progetto deve essere iterativo, e soggetto a valutatazione da parte di esperti, separati dai progettisti (almeno in linea di principio). Diverse modalità di effettuare la valutazione (*valutazione euristica*; *cognitive walkthrough*).

- *Valutazione euristica*: consiste nel valutare se ciascun elemento del dialogo e dell'apparenza proposti dall'interfaccia è conforme a principi di usabilità stabiliti
  - principi generali, di categoria e di prodotto

- E' eseguita nel momento in cui è disponibile un progetto. E' condotta da un pool di esperti in usabilità
  - 3-5 esperti è il numero ambizioso
  - non richiede un'implementazione né il coinvolgimento dell'utente
  - almeno due passate del sistema
  - sessioni di valutazione di 1-2 ore

- *Valutazione basata su cognitive walkthrough*: procedura dettagliata per simulare il modo in cui l'utente formula e risolve i problemi nell'uso di un'interfaccia. Focalizza sulla valutazione della facilità di apprendimento

- E' condotta da un insieme di analisti. l'ispezione avviene attraverso un contraddittorio alla pari tra un insieme di analisti che percorrono la sequenza di passi attesi per completare ciascun task
  - può coinvolgere anche utenti e sviluppatori

Implementation

prototyping

* user testing

* iterative design

User Testing

- Lo user testing è orientato a identificare problemi di usabilità
  - Exploratory test
  - Assessment test
  - Validation test
  - Comparison test

- Sono differenti
  - negli obiettivi
  - nella quantità di interazione tra utenti e valutatori
  - nella enfasi su valori qualitativi e quantitativi
  - nel posizionamento lungo il ciclo di sviluppo

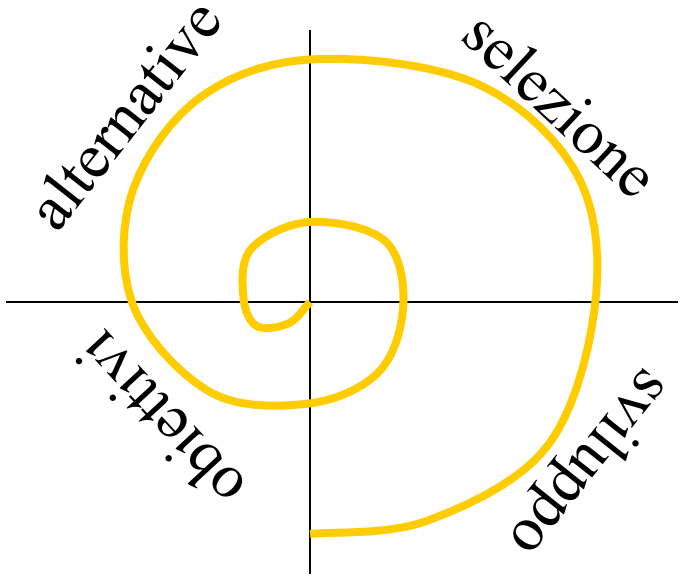
- *Exploratory test*: è eseguito nella prima fase di progetto e nelle fasi iniziali dello sviluppo; è guidato da task rappresentativi oppure orientato a un generico browsing ed è finalizzato a valutare la convenienza di possibili soluzioni di progetto
  - basato su prototipi e mock-ups
  - è un processo informale, collaborativo con molta interazione
  - think aloud: utente e valutatore sono seduti accanto

- *Assessment test*: è eseguito nella fase di progetto di dettaglio ed è utilizzato per verificare la correttezza di soluzioni di design assunte e sviluppate. Focalizza sui dettagli piuttosto che su aspetti di principio.
  - l'utente esegue dei tasks
  - l'interazione con il valutatore è ridotta
  - si prendono misure quantitative

- *Validation test*: è eseguito su soluzioni che si avvicinano alla versione finale; è effettuato in forma di benchmark ed ha l'obiettivo di valutare la prestazione rispetto a una soluzione in competizione
  - gli utenti svolgono tasks specifici
    - senza interazione con il valutatore
  - l'interazione è valutata con metriche quantitative
    - in termini di prestazione (velocità, accuratezza …)
    - in termini di preferenza

Iterative design

- Revisione del design basata sulla valutazione integrata con il testing (processo a spirale)
  - ripetizione del testing
  - controllo di avanzamento
  - fino a 3 iterazioni



Riferimenti

- In rete
  - http://usableweb.com/
  - http://webreview.com/
  - http://www-personal.umich.edu/~bing/oversite/webuse.html
  - http:// ("usability","usability on the web", "Nielsen", "alertbox",
  - "usability for ecommerce", "user-centred design")
  - ...
- Testi

  - [1] J.Nielsen, "Designing Web Usability: The Practice of Simplicity", New Riders Publishing, Indianapolis, 2000.
  - [2] J.Nielsen, “Usability Engineering”, San Francisco, California: Morgan Kaufmann Publishers, Inc. 1993.
  - [3] B.Schneiderman, "designing the user interface”.
  - [4] J.Nielsen, R.L.Mack, “Usability Inspection Methods,” John wiley & Sons, Inc. 1994.
  - [5] P.J.Lynch, S.Horton, “Web Style Guide, Basic Design Principles for Creating Web Sites,” Yale University Press, 2000.

Part II – General design Principles

Interface design principles

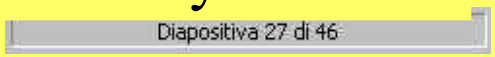
General interface guidelines: “10 Nielsen’s design principles”

Simple and natural language

speak the user language

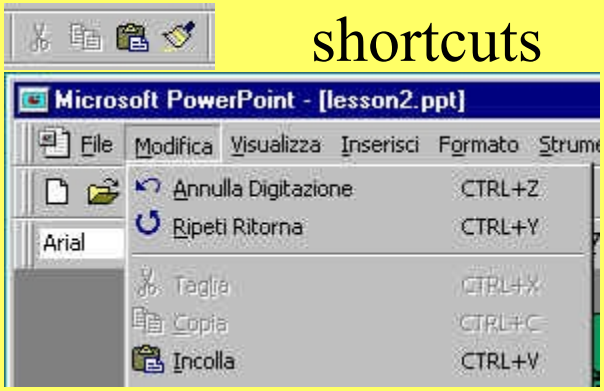
consistency

minimize users’ memory load

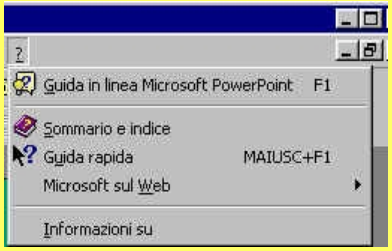


feedback

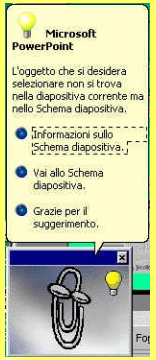
shortcuts



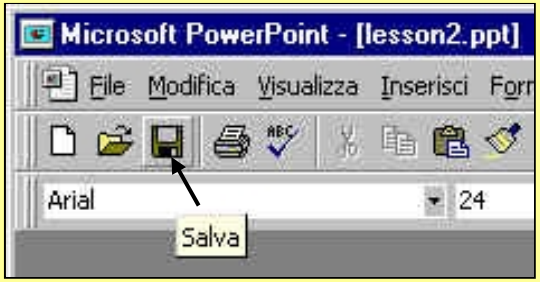
help and documentation



good error messages



Clearly marked exits



Prevent errors

Design Principles

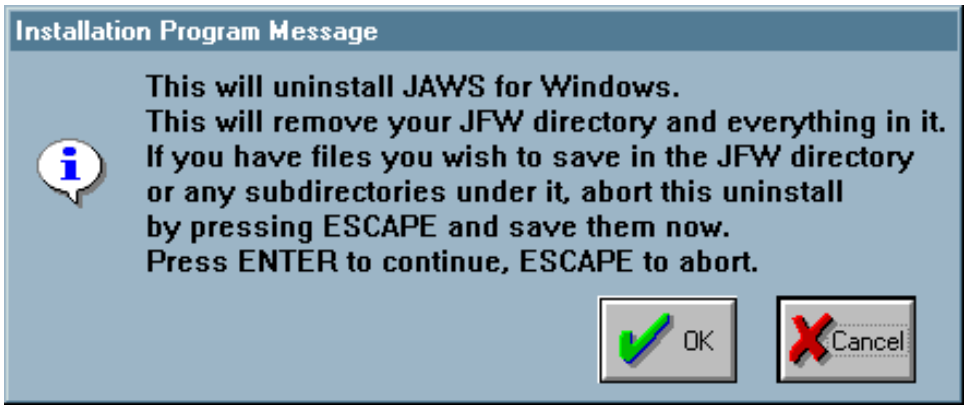
Simple and natural language

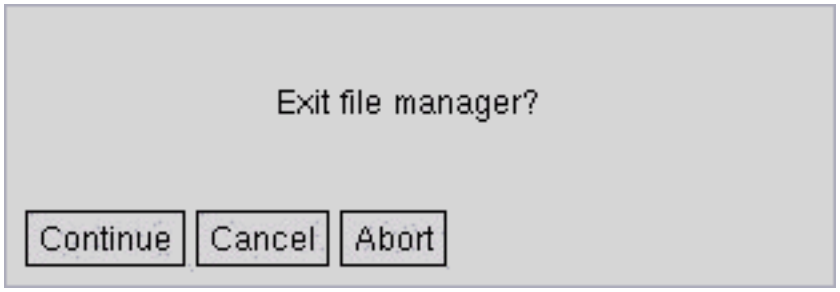
- Match user's task in a natural way
- Avoid jargon, techno-speak

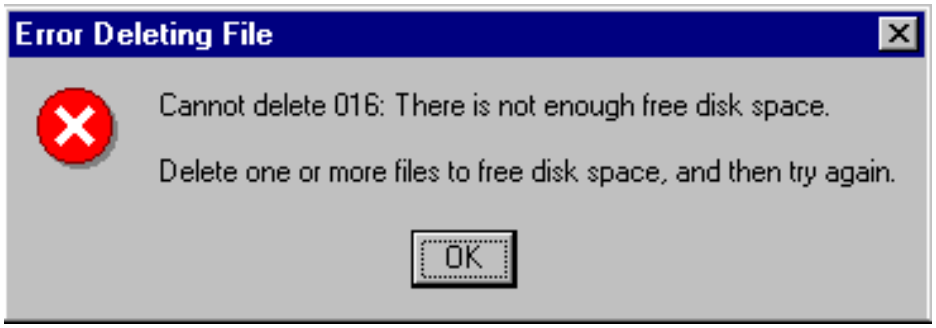
Insufficient funds to withdraw Euro 200 Y

X.25 connection refused due to network congestion. Local limits now in effect N

- Present exactly info that user needs





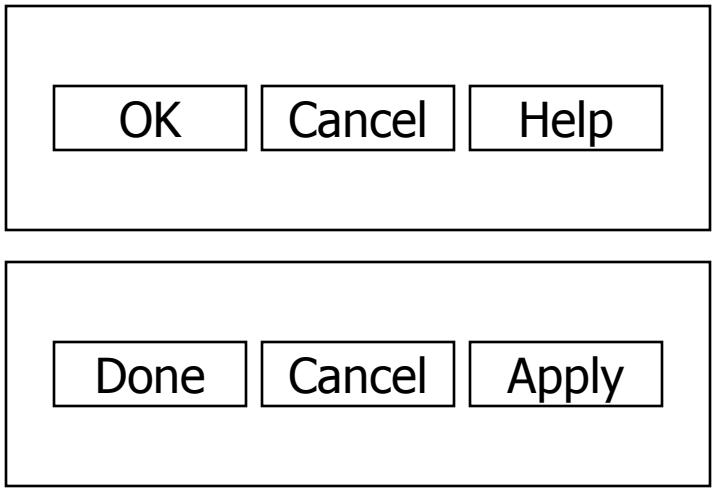


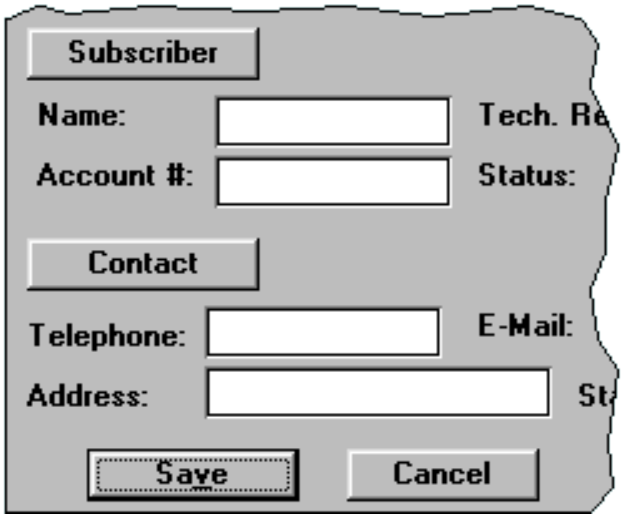
speak the user language

- Put user in charge, not computer. Can be major source of anxiety. E.g.:
  Enter next command vs. Ready for next command

consistency

- Commands, symbols, layout, terminology..... Makes actions predictable





feedback

- Inform the user about what is occurring. Most important on frequent and important actions

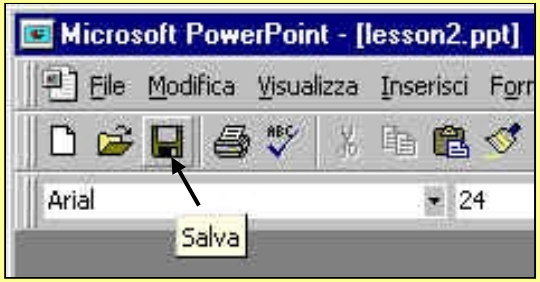
minimize users' memory load

- Recognition is better than recall
- Describe required input format through example and default
- Use reduced number of commands

Undo

- Permit easy reversal of actions. Reduces anxiety, encourages experimentation
  - Undo!

Clearly marked exits



- The user should not feel trapped. Examples:
  - Cancel button
  - Quit (can exit anytime).....

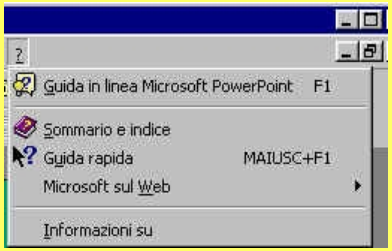
- Enable to perform often-used operations quickly
  - abbreviations
  - menu shortcuts
  - function keys

- Reuse
  - Provide history system

Prevent errors

- Handle errors smoothly and positively

help and documentation



- Provide useful help messages and documentation

Graphic design principles

- Graphics is the “look & feel” portion of an interface, what someone initially encounters. Conveys an impression, mood

- Main elements of interface graphics design are:
  - Metaphor
  - Clarity
  - Consistency
  - Alignment
  - Proximity
  - Contrast

Metaphor

- Tying presentation and visual elements to some familiar relevant items
  - e.g., Desktop metaphor
  - If you're building an interface for a grocery application, maybe mimic a person walking through a store with a cart

Overdone?

Clarity

- Every element in an interface should have a reason for being there
  - Make that reason clear too!

- Less is more
- White space
  - Leads the eye
  - Provides symmetry and balance through its use
  - Strengthens impact of message
  - Allows eye to rest between elements of activity
  - Used to promote simplicity, elegance, class, refinement

Clarity example

Consistency

- In layout, color, images, icons, typography, text, …
- Within screen, across screens
- Stay within metaphor everywhere

- Platform may have a style guide

- Consistency example:

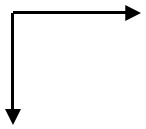
Home page

Content page 1

Content page 2

Alignment

- Western world
  - Start from top left



Allows eye to parse display more easily

- Left, center, or right

Here is
some
new text

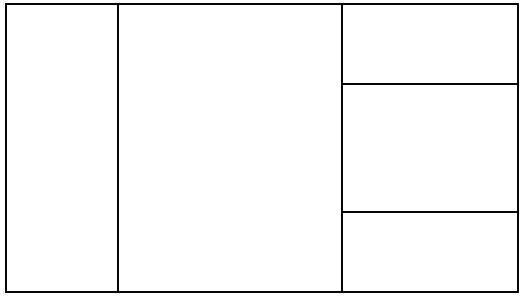
Here is
some
new text

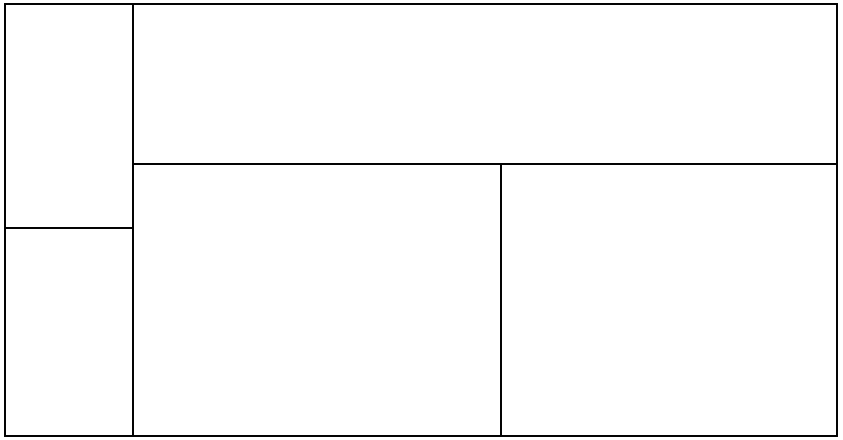
Here is
some
new text

Choose one, use it everywhere

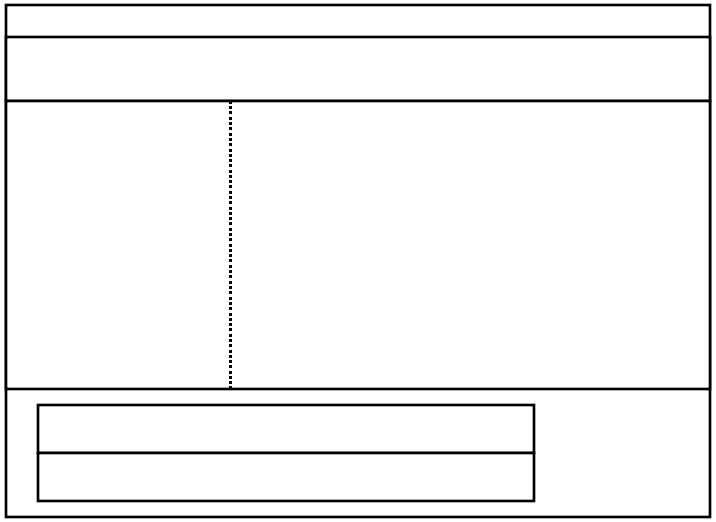
- Novices often center things
  - No definition, calm, very formal

- Grids
  - (Hidden) horizontal and vertical lines to help locate window components
  - Align related things
  - Group items logically
  - Minimize number of controls, reduce clutter (use them)





- Grid example:



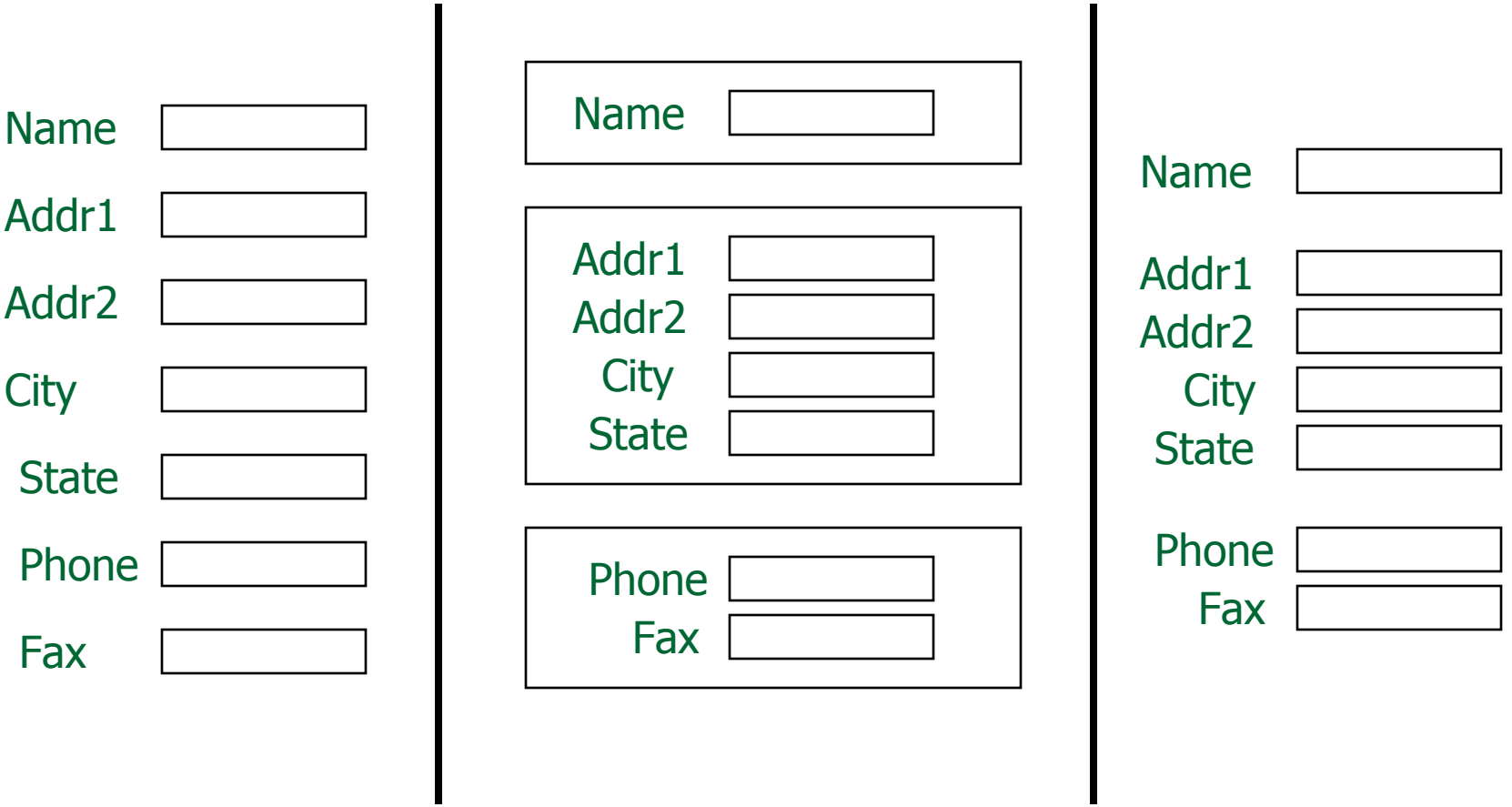
Proximity

- Items close together appear to have a relationship. Distance implies no relationship

Time

Time:

- Proximity example:



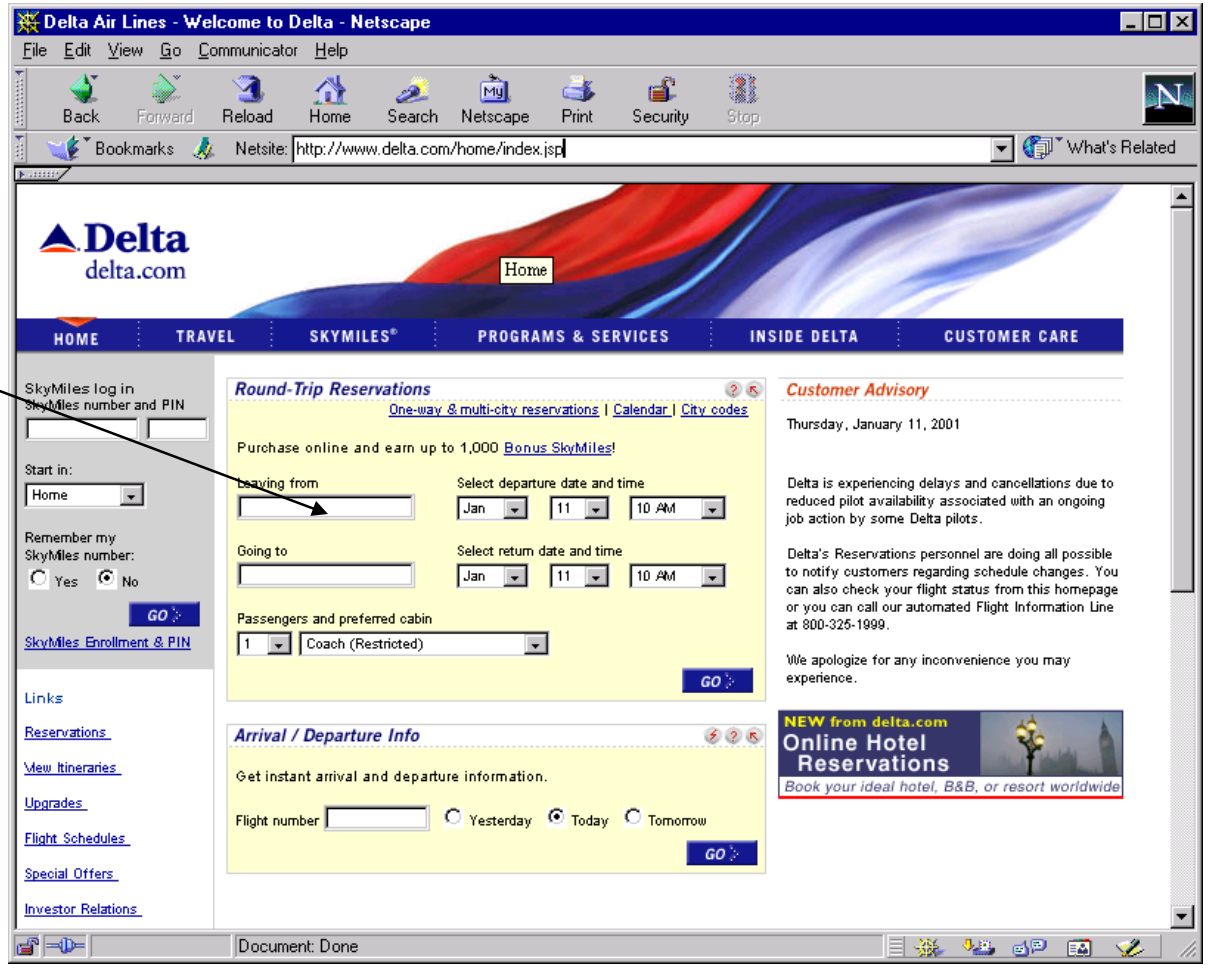
Contrast

- Pulls you in
- Guides your eyes around the interface
- Supports skimming

- Take advantage of contrast to add focus or to energize an interface
  - Can be used to distinguish active control
  - Can be used to set off most important item
  - Use geometry to help sequencing

- Contrast example:

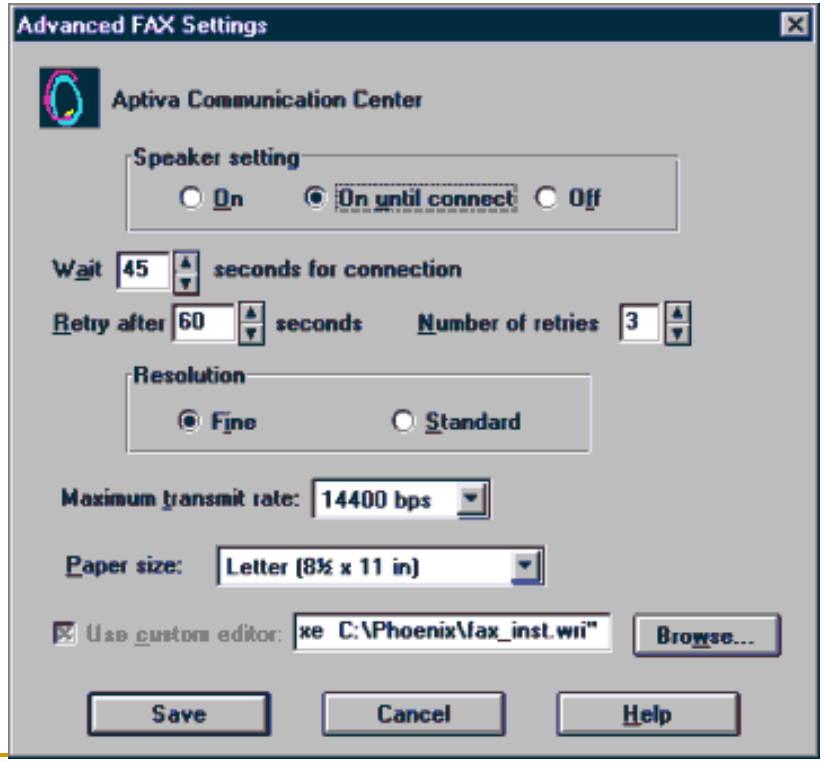
Important element



Exercise

- Look at interface and see where your eye is initially drawn (what dominates?). Is that the most important thing in the interface? Sometimes this can (mistakenly) even be white space!

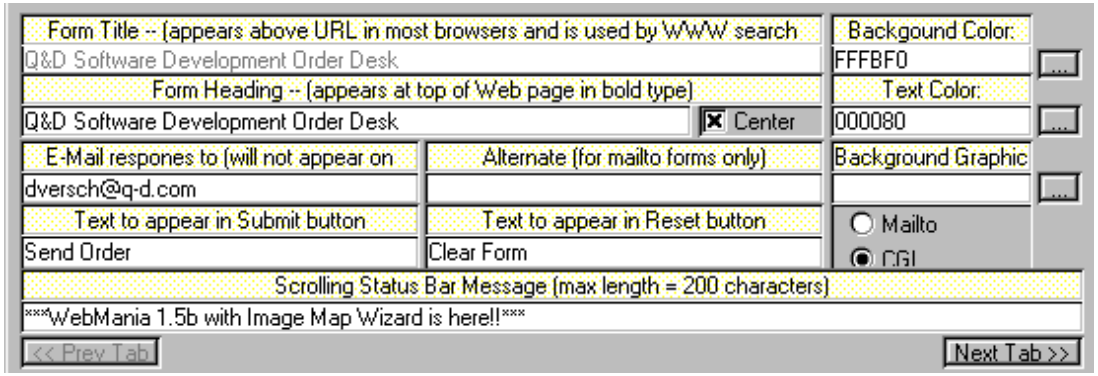
Disorganized



Visual Elements

- General design rule: *less is more*
  - Minimize borders and heavy outlining, section boundaries (use whitespace), 3D effects
  - Minimize the number of controls
    - Blinking : good for grabbing attention, but use very sparingly
    - Bold: good for making something stand out, but use sparingly

Overuse of
3D effects



Visual noise

- Visual elements to take into consideration:
  - Typography
  - Color
  - Icons

Typography

- Characters and symbols should be easily noticeable and distinguishable
  - Avoid heavy use of all upper case
  - Studies have found that mixed case promotes faster reading

HOW MUCH FUN IS IT
TO READ ALL THIS TEXT
WHEN IT'S ALL IN
CAPITALS AND YOU
NEVER GET A REST

How much fun is it
to read all this text
when it's all in
capitals and you
never get a rest

- Two main figures for text:
  - Readability: how easy is it to read *a lot* of text
  - Legibility: how easy is it to recognize *a short burst* of text

- Options:
  - Variable spaced (size 20)
    - Serif font – improves readability
    - Sans serif font – improves legibility
  - Fixed space (size 20)
    - `Monospace font`

- Serif: Times, Bookman
- Sans serif: Tahoma, Arial
- Decorative: Comic Sans
- Script: Script
- Monospaced: Courier, Lucida

- Text guidelines:
  - Use serif for long, extended text; sans serif for “headlines”
  - Use 1-2 fonts (3 max)
  - Use of normal, italics, bold is OK but with care
  - Never use bold, italics, capitals for large sections of text
  - Use 1-3 point sizes max
  - Be careful of text to background color issues

Examples

Much more easy to read

CRAFTS AND GAMES
ARTS FESTIVAL
OF ATLANTA AND DECATUR

SEPTEMBER 19-24

COME AND ENJOY

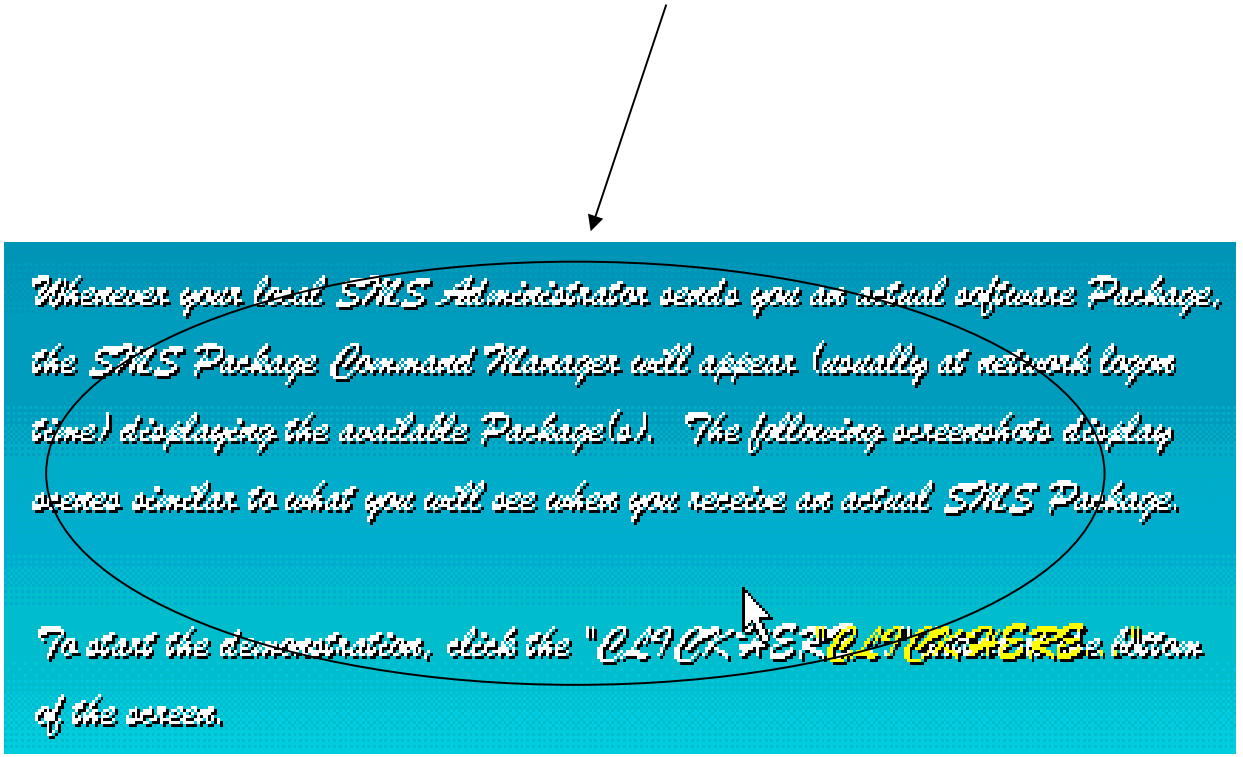
Crafts and Games

Arts Festival
Of Atlanta and Decatur

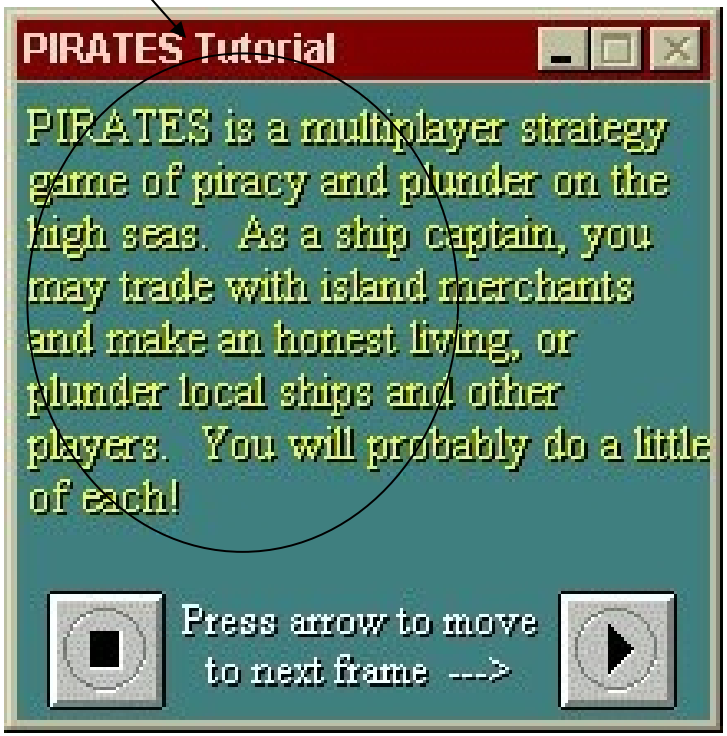
September 19-24

Come and Enjoy!

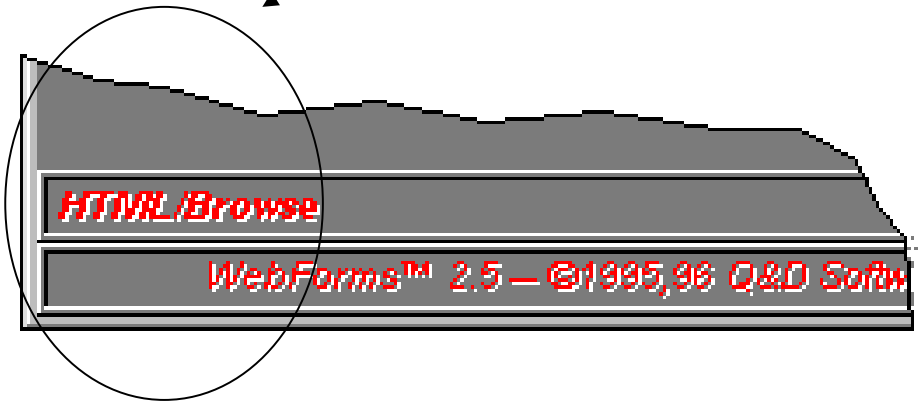
Wrong use of font for large text portion



Wrong use of bold

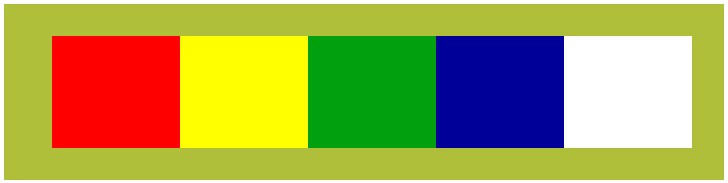


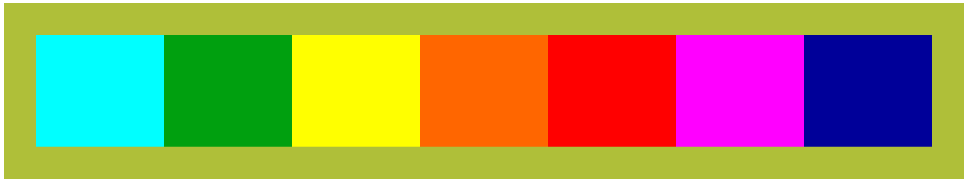
Wrong color choice



Color

- Color for information coding
  - Not effective for small objects
  - From 10 to 12 hues distinguishable by normal humans
  - Not more than two intensity levels per hue
  - Saturation enforces visual pleasure
  - Saturation can be used for (de)emphasize

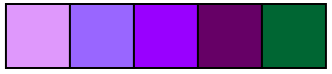




- Color is good for supporting search
- Do not use color without some other redundant cue
  - Color-blindness
  - Monochrome monitors

- Be consistent with color associations from jobs and cultures (particularly important in web design).

Professional



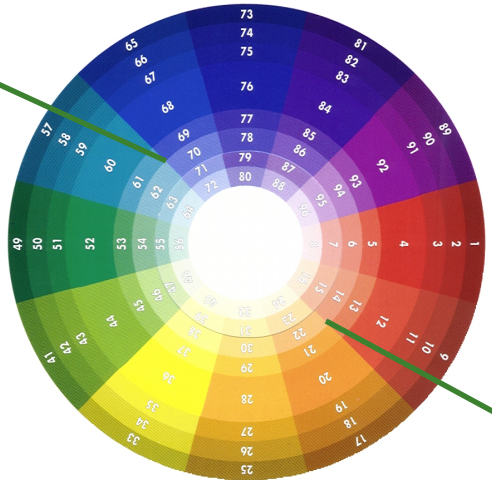
Monochromatic

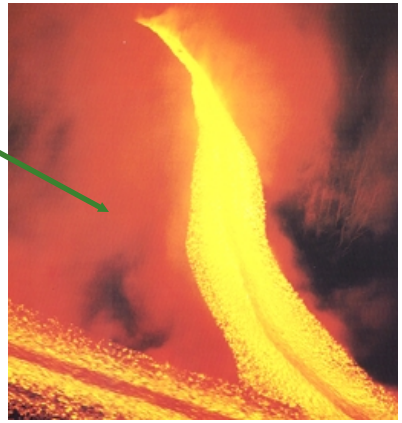
Southwestern

- Colors have meanings and provoke sensations.

The colour circle: warm and cool colours

Cool colours

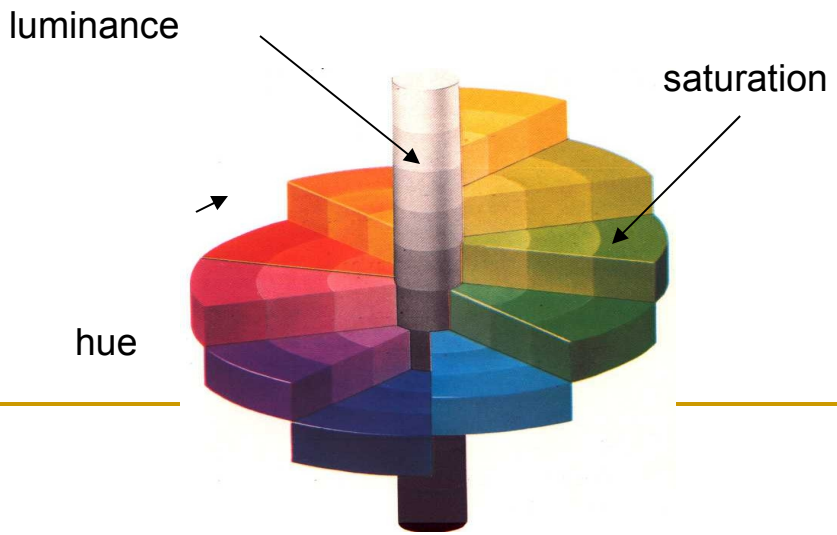




Warm colours

Itten color model

- The Itten Color model: uses 180 fundamental colors arranged in a sphere (the Itten-Runge sphere).
  - 12 pure hues, located along the equatorial circle.
  - 3 saturations along the radius ;
  - 7 luminance levels including black and white, along the meridians.
- Can be interpreted as a simplified view of the opponent color model, and can be derived from it, by bucketing the color space.



- The principle of accordance: three colors forming a equilateral triangle in one of the circular sections of the sphere

Complementary accordance (sphere top)

Harmonic accordance (sphere central)

- Itten's layout allows objective identification of color peculiarities and provides means for characterizing color coupling in terms of contrast and accordance

- Contrast
  - Saturated colors – determines a sense of tense
  - Dark-light colors – determines a sense of plasticity
  - Warm-cold (at any hue) – warm colors (reddish) are perceived as closer; cold colors (greenish) as farther
- Accordance
  - Complementary colors (their sum is white) – determine a sense of calmness. The absence of one color determines anxiety
  - Harmonic colors (their sum is grey) – sense of equilibrium

Colour harmony examples

cold

feminine

exciting

tranquil

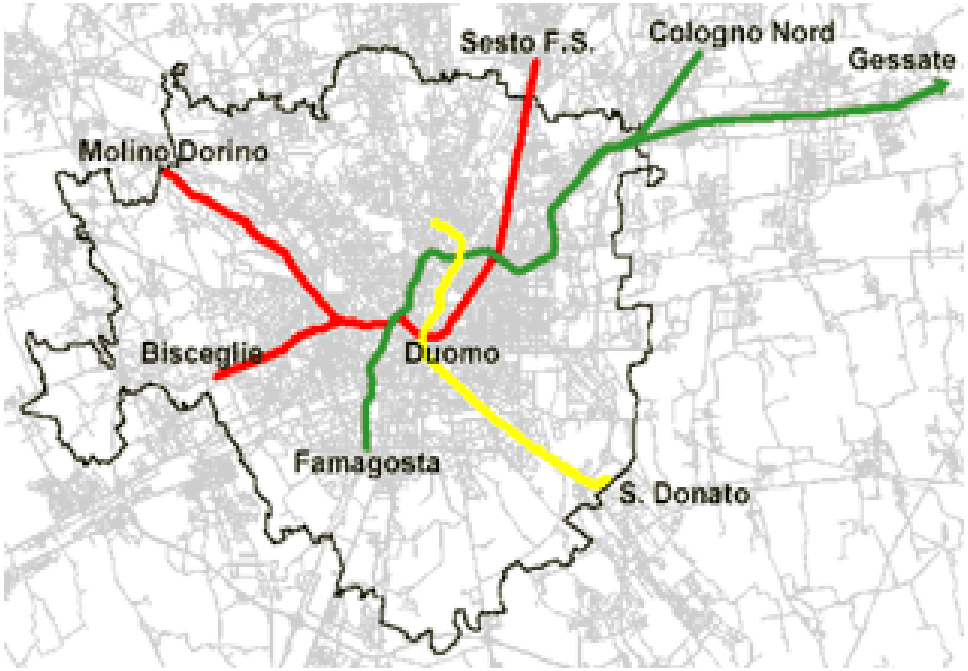
warm

young

Color disabilities

- 1 in 12 people have some sort of color deficiency (about 8% of men and 0.4% of women in the US).
  - 5% of men and 0.38% of women are deuteranomalous (i.e. Green deficiency) (around 95% of all color deficient women).
  - 0.005% of the population are totally colour blind.
  - 0.003% of the population have tritanopia .

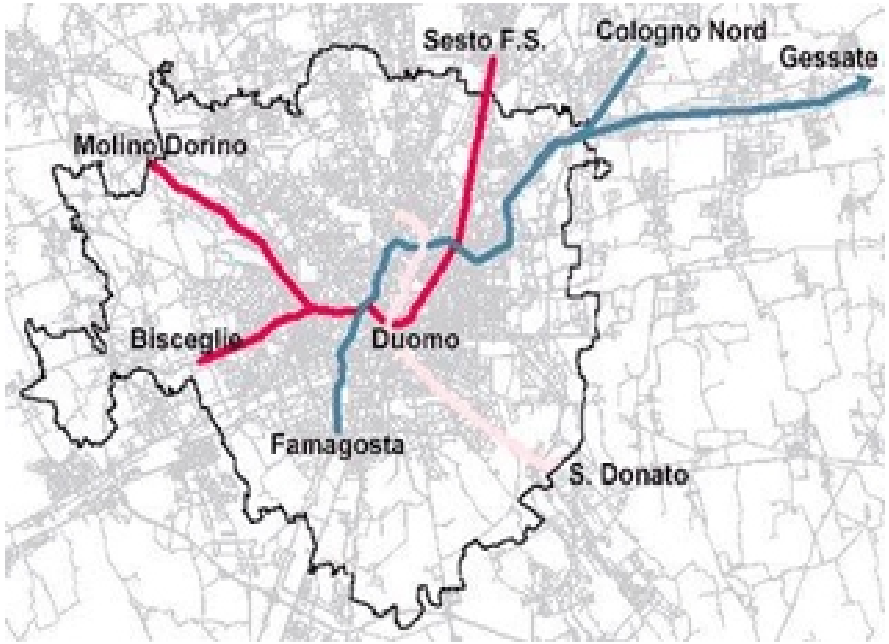
Example



The three metro lines are identified by distinct colors

As seen by human subjects affected by deuteranomaly (confusion between red and **green,** i.e. green deficiency) 5% men

As seen by human subjects affected by protanomaly (confusion between **red** and green, i.e. red deficiency) 1.5% men



As seen by human subjects affected by tritanopy (confusion between blu and **green,** i.e. green deficiency) rare

- Color guidelines:
  - Display color images on black background
  - Choose bright foreground color (white, bold green,…)
  - Avoid brown and green as background colors
  - Be sure fg colors contrast in both brightness and hue with bg colors

  - Use color sparingly--Design in b/w then add color where appropriate
  - Use color to draw attention, communicate organization, to indicate status, to establish relationships
  - Avoid using color in non-task related ways

  - Limit coding to 8 distinct colors (4 better)
  - Avoid using saturated blues for text or small, thin lines
  - Use color on b/w or gray, or b/w on color
  - To express difference, use high contrast colors (and vice versa)

- Web sites and tools for checking colors to support color deficiencies

Color blind: http://colorfilter.wickline.org/

Colorblind Web Page Filter

I'd like to express my appreciation to pair.com for donating a dedicated server to host this utility.

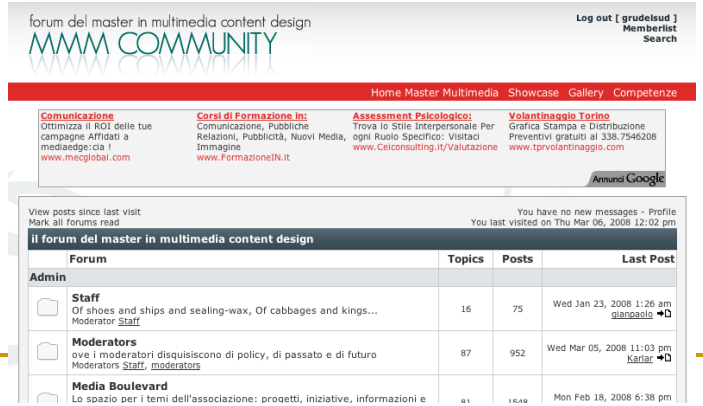
Use the colorblind colorlab to select safe colors earlier in the design process.

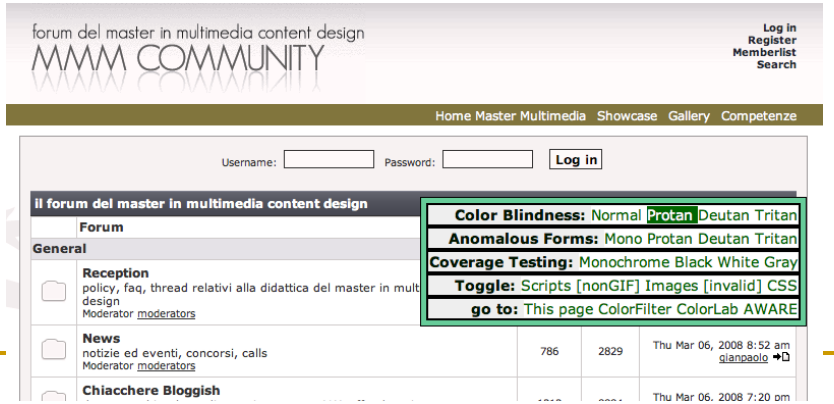
Learn more about colorblindness in this Wikipedia entry.

This tool is still in development, but feedback is welcome while I work on it. If you only use one filter, use the grayscale filter which will not only point out potential problem areas, but will also let you see more clearly which areas the filter is unable to process.

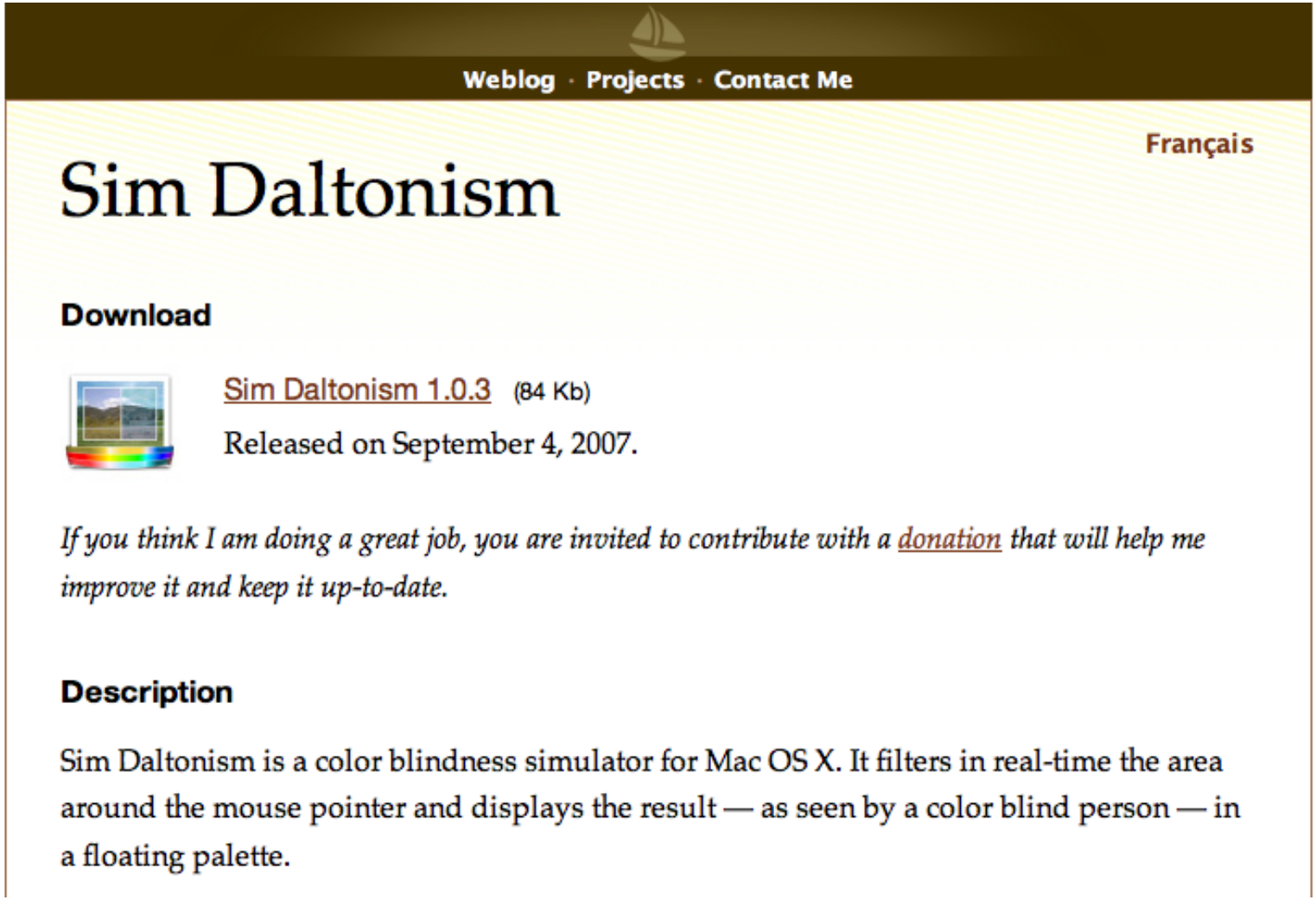
Please indicate a resource to be viewed, and a color filter to be applied to that resource:

Type a URL: http://morpheus.micc.unifi.it/forum
and then
pick a color filter: protanopia (red/green color blindness; no red cones) (What are coverage filters?)
Fetch and Filter! ...may take a minute... Disable image filtering below for a dramatic speed increase.

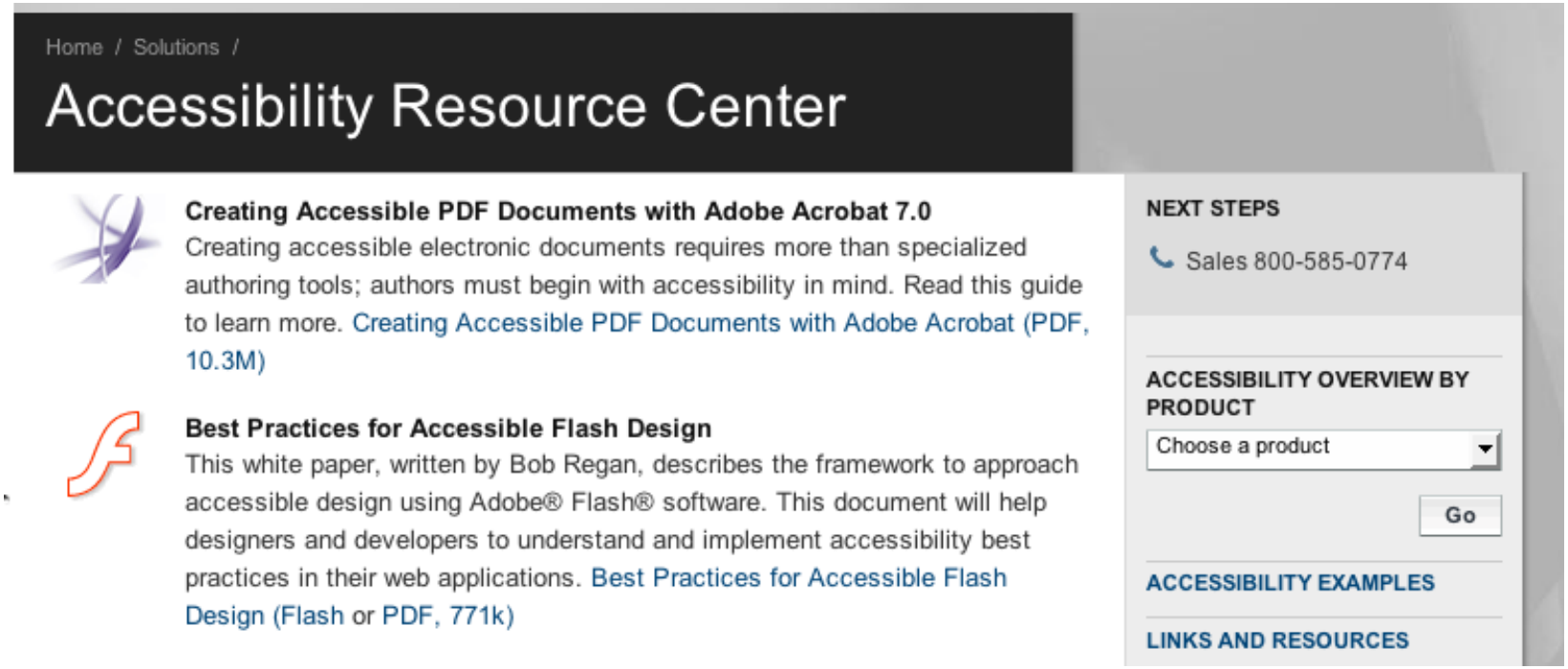




Sim daltonism: http://michelf.com/projects/sim-daltonism/
Tool, MacOS X only



Adobe accessibility (Flash design): http://www.adobe.com/accessibility/



Michele Diodati – accessibilità

http://www.diodati.org/

http://accessibile.diodati.org/agc/index.html

Diodati.org

Accessibilità e traduzioni dal W3C

Testi tecnici del W3C tradotti in italiano. In più: articoli, guide e scritti vari, con particolare attenzione ai problemi dell'accessibilità

nuovo seminario accessibilità 31/03/2008 | presentazione | guide | traduzioni dal w3c | forum | mappa | cronologia | autore | risorse esterne | tasti rapidi | accessibilità guida completa | il pesa-nervi

In primo piano

16/02/2008 - **Secondo seminario su 'Accessibilità: metodi e problemi'**

Diodati.org, in collaborazione con L'ink - Scrittura professionale, organizza a Roma, per la giornata di **lunedì 31 marzo 2008**, la seconda edizione del seminario "*Accessibilità: metodi e problemi*".

Il seminario sarà incentrato sull'analisi dei principali temi di sviluppo accessibile, esposti nel libro di Michele Diodati *Accessibilità Guida completa*, pubblicato di recente dall'editore Apogeo. Lo scopo del seminario è fornire una panoramica dei principali problemi con cui devono confrontarsi gli sviluppatori interessati all'accessibilità, indicando le soluzioni attualmente più utilizzate e gli approcci metodologici più promettenti. La partecipazione è consigliata a chi abbia almeno conoscenze di base di HTML, XHTML, CSS e JavaScript.

Il docente sarà **Michele Diodati**. Tutte le informazioni tecniche e logistiche sul seminario, compreso il **modulo per la preiscrizione**, sono già disponibili online. Buona partecipazione a tutti gli interessati!

Michele Diodati

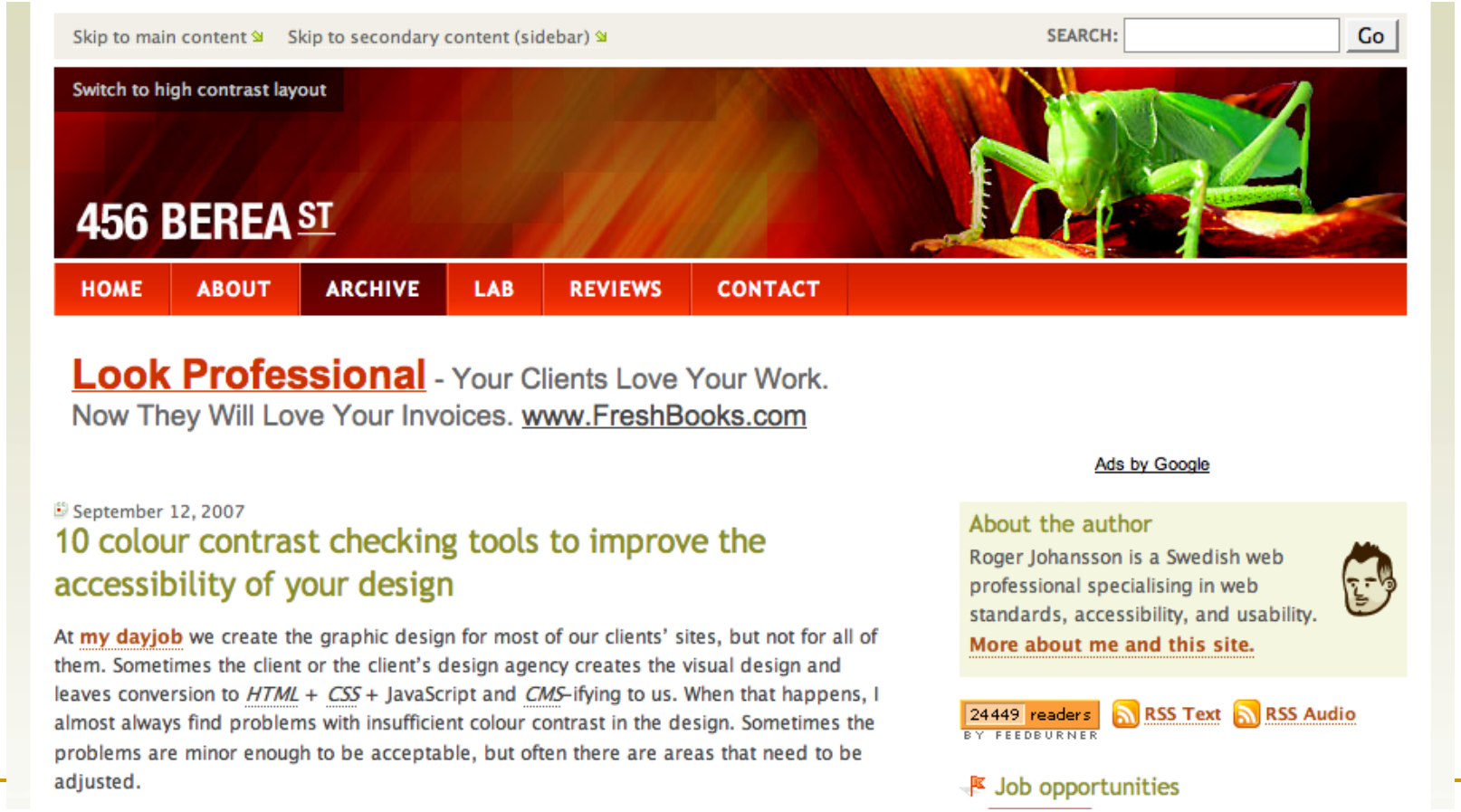
Accessibilità Guida completa

Apogeo, Milano 2007 - **Acquista il libro online**

Questa è l'edizione online in HTML del libro, pubblicata con il consenso dell'editore Apogeo e grazie al lavoro volontario dell'autore e di alcuni lettori del sito *Diodati.org*, che hanno prestato disinteressatamente la propria opera, consistita in un lungo e complesso lavoro manuale di sistemazione del codice HTML derivato dai file di stampa, allo scopo di renderlo ben strutturato e accessibile.

La versione online nasce essenzialmente per consentire una consultazione rapida e gratuita dell'opera e, soprattutto, la sua lettura per mezzo di tecnologie assistive. Per tale ragione, non è presente un CSS per la stampa né una versione integrale in PDF: l'edizione stampata del libro può essere acquistata nelle librerie oppure sul Web.

Color checking tools (dal blog 456bereastreet):
http://www.456bereastreet.com/archive/200709/10_colour_contrast_checking_tools_to_improve_the_accessibility_of_your_des



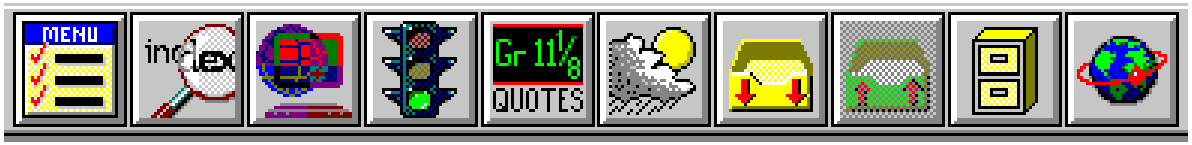
riferimenti

Wikipedia – color blindness:
http://en.wikipedia.org/wiki/Color_blindness
Web Accessibility Initiative – W3C: http://www.w3.org/WAI/

Icon Design

- In using icons the following guidelines should be observed:
  - Represent object or action in a familiar and recognizable manner
  - Limit number of different icons, make each icon distinctive
  - Make icon stand out from background
  - Ensure that singly selected icon is clearly visible when surrounded by unselected ones
  - Make icons harmonious members of icon family
  - Avoid excessive detail

Example



What do each of these signify? Almost always want to accompany your icons by a text label

Part III – Web design principles

GUI and Web interface differences

- Interface design for traditional GUI and Web is basically different.
- In traditional GUI design, the designer controls every pixel on the screen: the designer knows the system he/she is designing for, the fonts it has installed, the dimension of the screen…..In traditional GUI design, the difference in screen area between a laptop and a high-end workstation is a factor of six.
- For web interface design these assumptions are no more true: users may be accessing the web through traditional computers, a WebTV, a pen-based hand-held device, a cellphone…and through different connections..
  - The difference in screen area is a factor of 100 between handhelds and workstations.
  - There is a factor of 1,000 in bandwidth between modems and T-3 connections.

- In traditional GUI design, the designer can control where the user can go when. Each application is regarded as a self-defined operational space. Users accept that interfaces reflect the specific goals that the application is addressing.

- For web interface design the designer must take into account that users feel that they are using the web as a whole rather than any specific site:
  - Users want to use a site on the basis of the *web conventions* that reflect their experience using other sites. They complain whenever they are exposed to sites with too diverging ways of doing things.
  - The web has become a genre and each site is interpreted relative to the rules of the genre.

Web users

- Web users generally have a purpose. Typically they are impatient and conservative. They will usually leave if:
  - Web pages take too long time to load.
  - They can't easily find what they want on your site.
  - There are too many steps from the beginning to the end of the sequence of pages they are following.
  - Learning new techniques for using web pages
- Users do not have full domain knowledge and must navigate through web pages. Users of the web browse instead of reading information
  - When reading, it is about 25% slower than reading from paper (J. Nielsen)
  - Prolonged reading from a screen can cause discomfort:
  - Even the best screens are less clear than printed books.

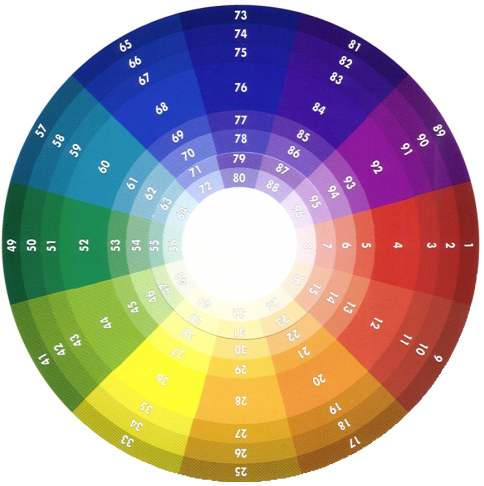
- Web sites must be structured in order to require the minimum number of steps to access the desired information in the shortest time as possible.
  - Typically humans keep in mind at the same time a number of items ranging from 4 to 7. Long sequences of pages, each of which with few choices should be avoided.
  - Access time per page should not be higher than *10 seconds (5-6 sec. In most cases).* Bitmaps or multimedia gadgets should be avoided as much as possible.

Cultural Nuances

- Issues in cultural diversity are vitally important to the future of web interaction, they cannot be addressed by prejudicing the results with overly generalized characteristics of user populations.
  - There are colors to be avoided:
  - Some cultures associate the pointing-finger cursor with thieves,
  - Some cultures don't accept female voice-overs.
  - Icons with hand gestures of any kind can have undesired meanings
  - Clip art of local figures and landmarks are often completely useless or obscure outside their home cultures.
- Individual colors can be associated with meanings according to the local culture. According to harmonic accordances new meanings can be built.

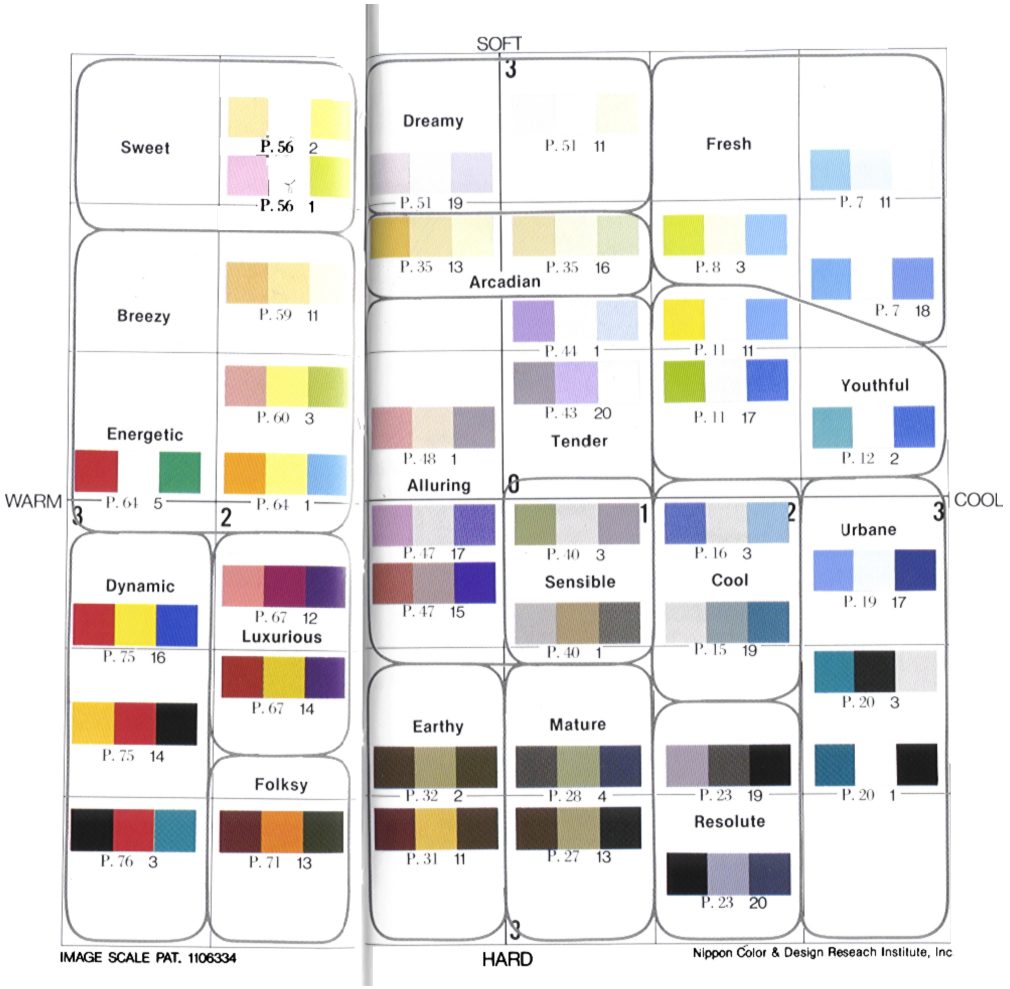
Color	Western European	Japanese	Chinese	Arabic
Red	Danger Aristocracy (France)	Anger, danger	Joy, festive occasions	
Yellow	Caution, cowardice	Grace, nobility Childish, gaiety	Honor Royalty	Happiness Prosperity
Green	Safe Sour Criminality (France)	Future Youth, energy		Fertility, strength
Blue	Masculinity Sweet Calm Authority	Villainy		Virtue, faith, truth
White	Purity Virtue	Death, mourning	Death, mourning	
Black	Death Evil			

William Horton's Color Table



Kobayashi, 1990,
Color image scale

- Powerful
- Rich
- Romantic
- Vital
- Earthy
- Friendly
- Soft
- Welcoming
- Moving
- Elegant
- Fresh
- Traditional
- Refreshing
- Tropical
- Classic
- Dependable
- Calm
- Regal
- Magical
- Energetic
- Subdued
- Professional



5 typical errors in web design that impact negatively on usability

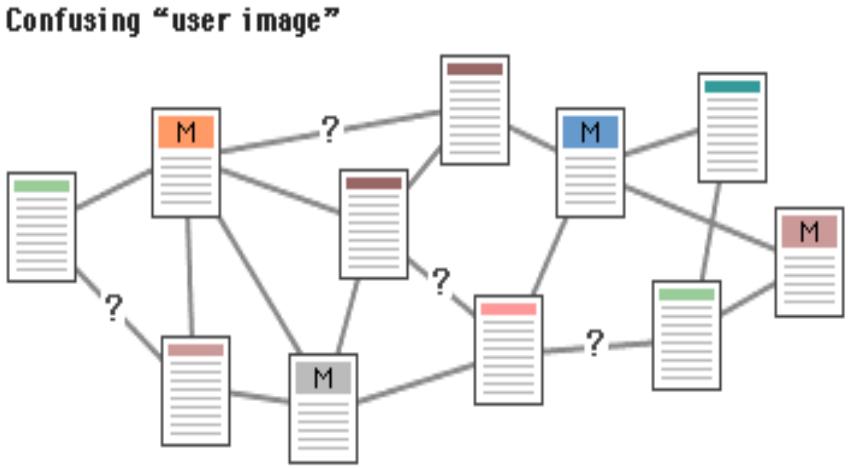
- distracting motion
  - Advertising has contrasting goals and effects
  - Different impact on transit and content pages (against efficacy)
- form not following function
  - Too much time spent waiting for decoration
  - Pleasantness against speed (satisfaction vs efficiency)
- ambiguous links
  - Where link goes?
  - Is that useful for the task?.. (against efficiency/efficacy)
- unhelpful search
  - Searching is too complex
  - Too many results or no useful result (against efficiency/efficacy)
- design doesn’t care what the user cares about
  - Optimize normal cases

- Web sites must be designed according to rules that are based on:
  - the *basic principles of communication;*
  - the *typical characteristics of the web user* ;
  - the *unique characteristics of the web electronic media*.
- To make web accessible to any user, web accessibility principles have been defined by W3C

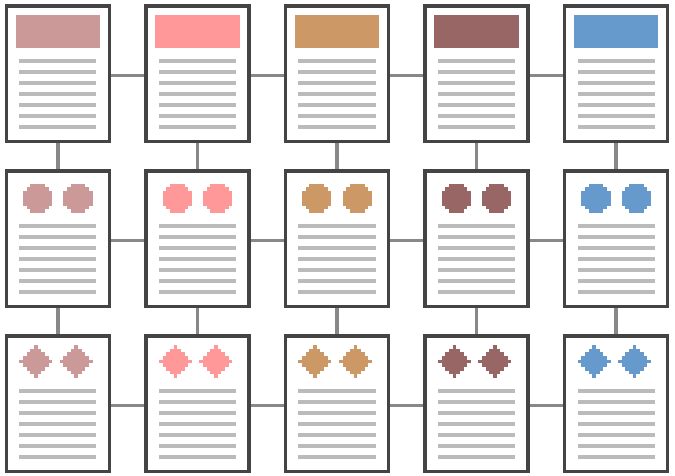
Web site design

Structure

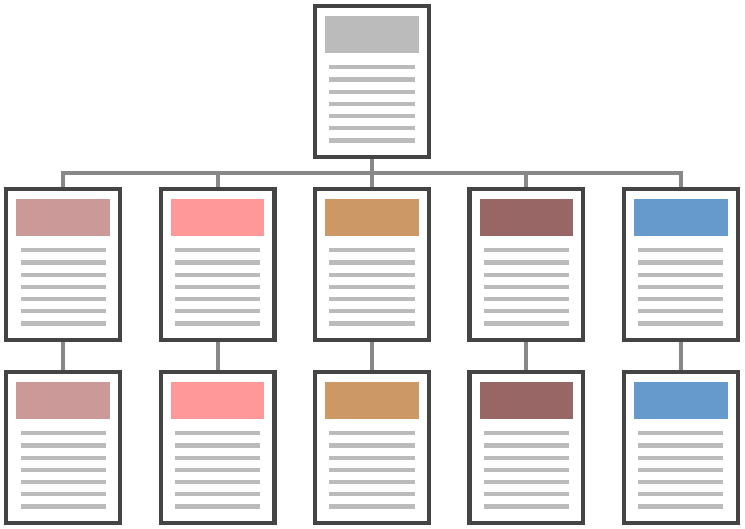
- The quality of a web site depends on the definition of an efficient hierarchical organization of information in a way that permits to minimize the number of steps needed to reach any piece of information and memory effort.
- Information units can be related each other using different logical schemas:



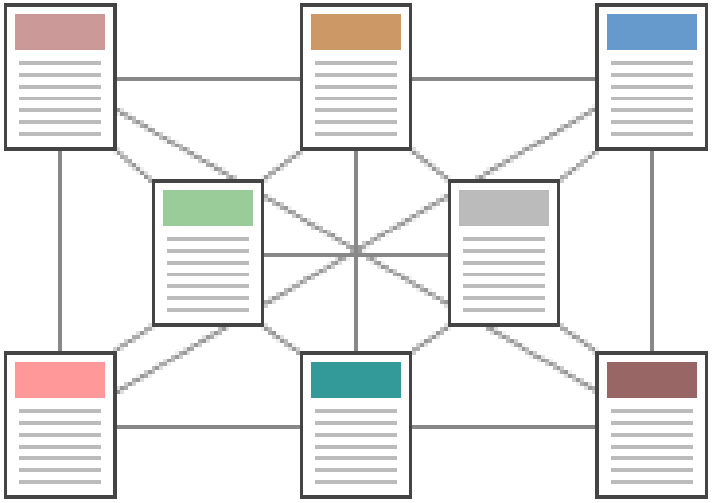
- Sequence: in any sequential order (temporal, alphabetical, from general to specific ….. It is typical for indices
- between elements, considering two variables; e of contents.



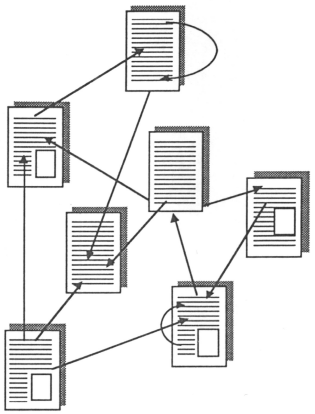
- Hierarchy: organized as a tree, from general to specific. Access is defined through *menus*. The tree must be balanced and not too deep. The home page must have a limited number of links, but rather include the *directory* of the general categories so as to point at *submenus* that are like home pages for their sections; the appropriate number of links for each submenu is 4 or 5.



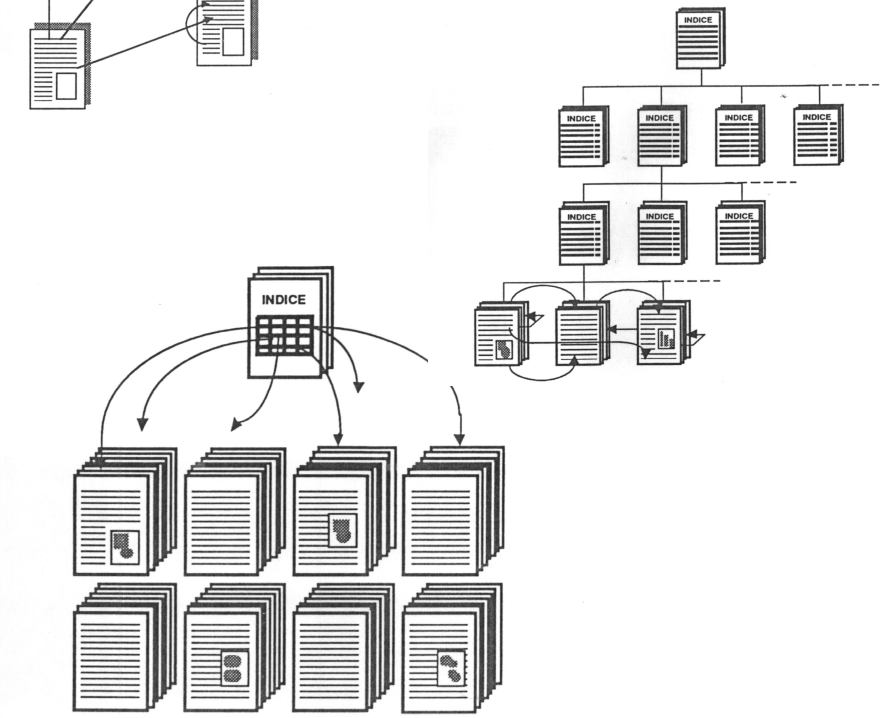
- *Web-like*: is based on association links. Links are used according to the user's interest. This organization is typical of web sites with many links (both internal and external) but is appropriate only for small sites.

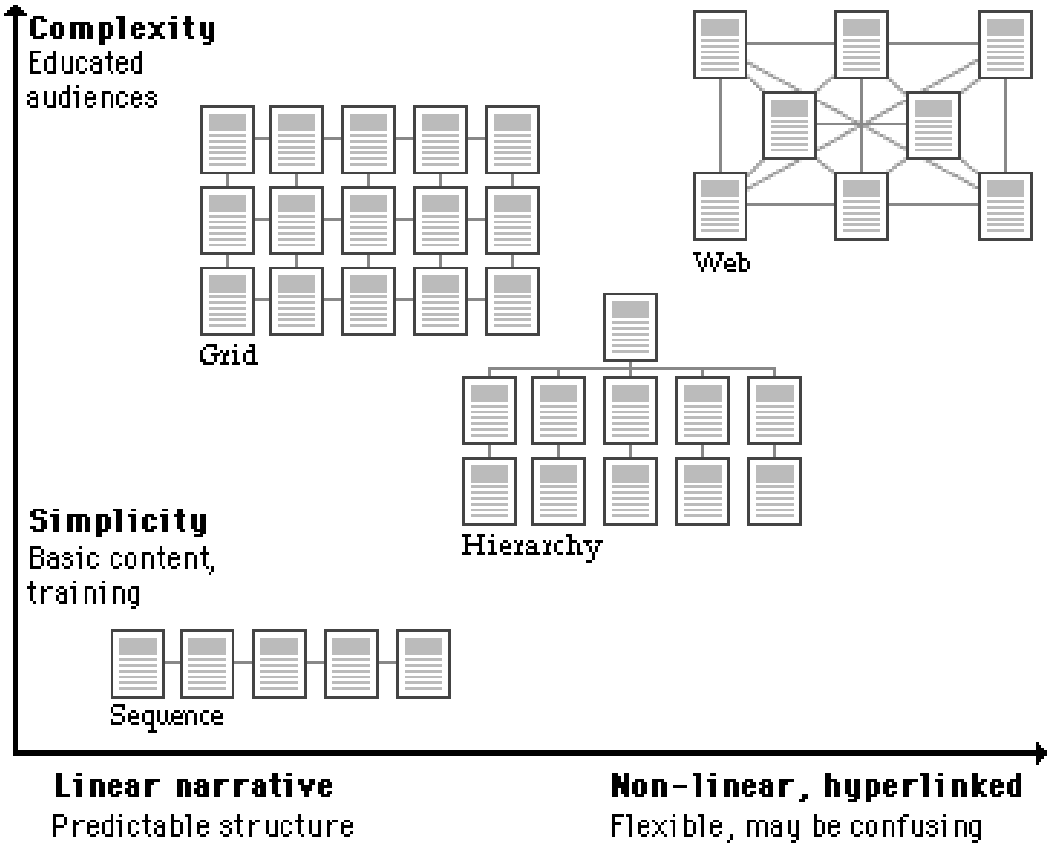


- web like
  is appropriate for browsing

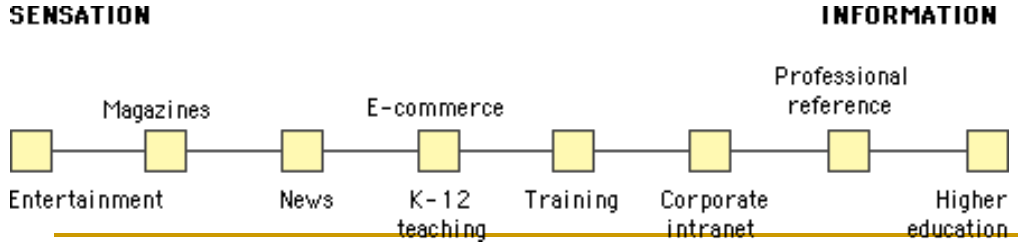


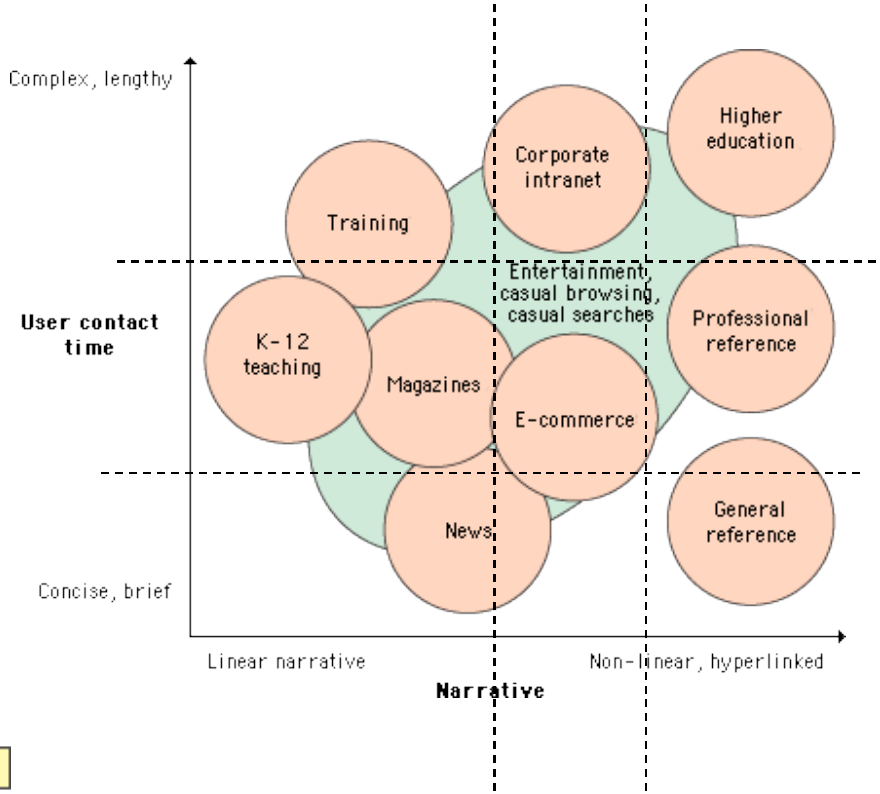
- Hierarchical and sequential
  are appropriate for searching




Complexity
Educated audiences
Grid
Web
Hierarchy
Simplicity
Basic content, training
Sequence
Linear narrative
Predictable structure
Non-linear, hyperlinked
Flexible, may be confusing

- All presentations of information on the web are governed by parameters determined by the objectives and the audience. The figure plots major themes for information delivery against the linearity of the structure and the length of the user's contact time





- Internet versus intranet: although intranet sites employ the same technology as sites designed for the larger web audience, their design and content should reflect the different motivations of intranet users.
  - External sites are usually aimed at capturing an audience. The overall goal is to maximize contact time, drawing readers deeper into the site and rewarding their curiosity with interesting or entertaining information.
  - Successful intranet sites assemble useful information, organize it into logical systems, and deliver the information efficiently. Allow employees and students to get exactly what they need quickly and then move on.

- Training sites, educational sites, general reference and many well-known news and information sites have:
  - audiences that know what to expect at a particular site and arrive there with a *specific goal* in mind without the need for site-supplied motivation.

- E-commerce and entertainment sites have a complex dual mission:
  - to balance: to *motivate casual browsers* to spend time in the site and become customers as well as to *provide fast access* to products and information to experienced users.

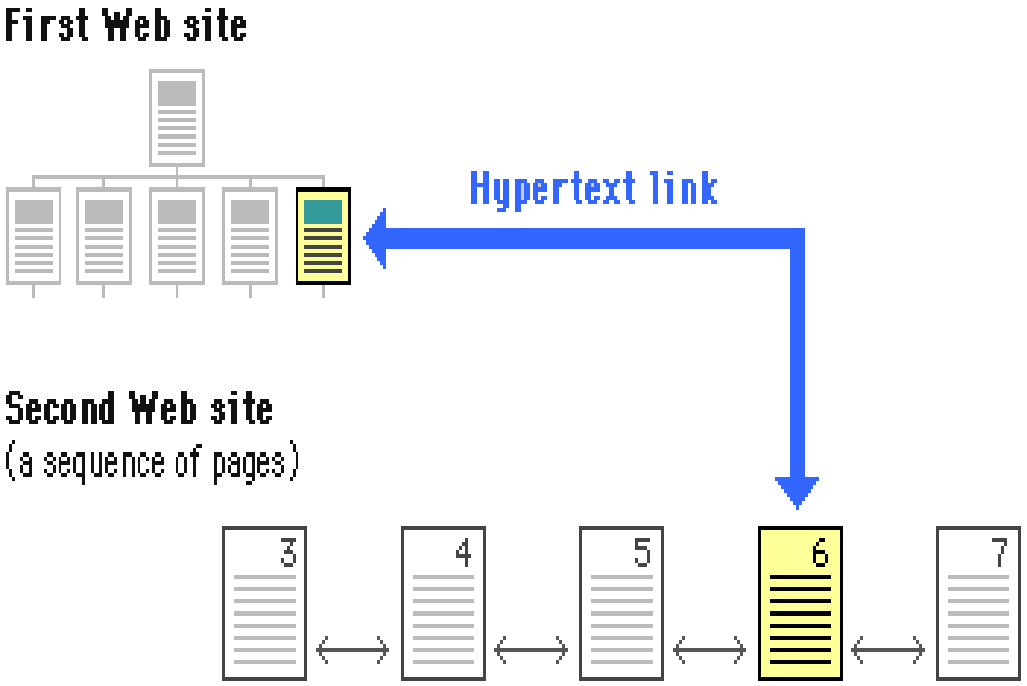
- Training
  - Web-based training applications tend to be linear in design and typically present few opportunities to digress from the central flow of the presentation.
  - Don't confuse readers or confound your own expectations by offering many links away from the central message. Restricting links to the "Next" and "Previous" paging functions guarantees that everyone will see the same core presentation and allows you to predict users' contact time more accurately. Most training presentations assume a contact time of less than one hour or are broken up into sessions of an hour or less.
- Teaching
  - Good teaching applications are also built around a strong central narrative, but they typically offer more opportunities to pursue interesting digressions from the main themes of the Web site. The information presented is usually more sophisticated and in-depth than in training applications.
  - If you wish to provide links to other Web-based resources beyond your local site, you might consider grouping the links on a separate page away from the main body of the material. Often readers will want to print material from a teaching site and read it later from paper. Make this easy for them by providing a "printing" version that consolidates many separate pages into one long page.

- Entertainment and magazine sites
  - Entertainment sites usually cater to an audience whose interests and motivations are usually less focused. This audience needs to be grabbed immediately by compelling graphic and text presentations, or they'll simply hop somewhere else in search of stimulation.

- E-commerce
  - In e-commerce sites the crucial design parameters are efficient navigation and search, along with speed to the final "place order" button. Meanwhile, the Web's most successful commerce sites kept things technically simple and basic. Another area where e-commerce sites often fail is in providing search engines that are smart enough to "degrade gracefully" when there is no exact match to a request.

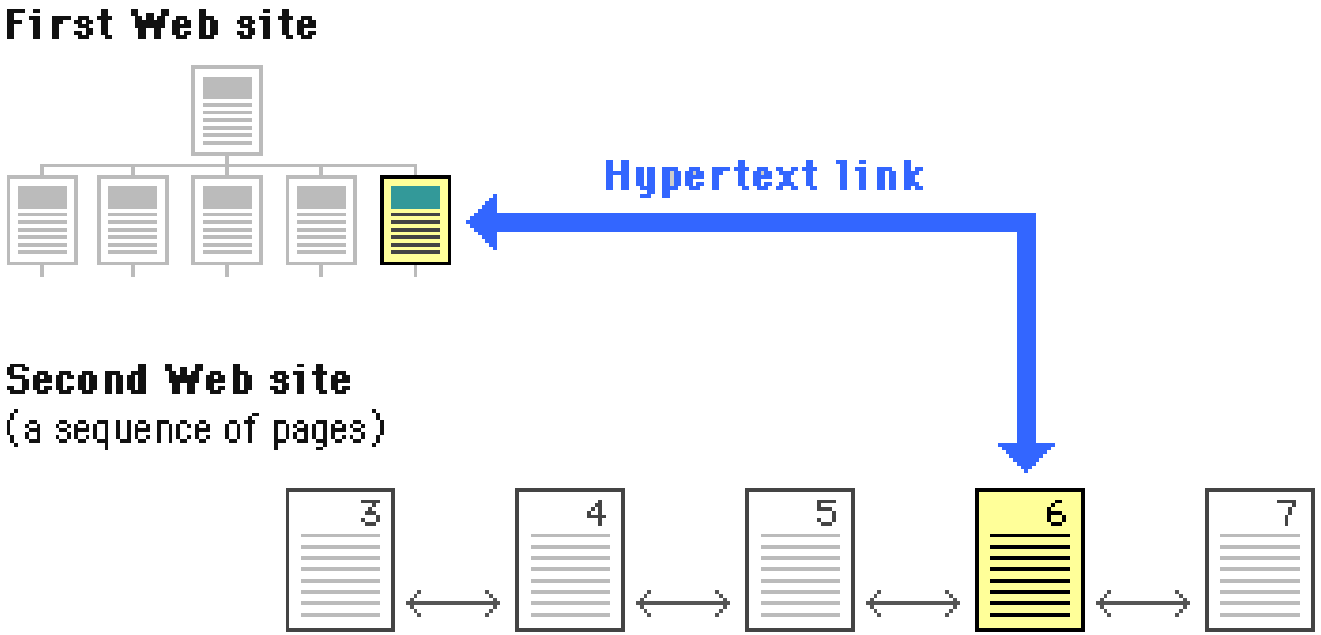
Navigation

- Navigation offered is perhaps the most crucial element of effective web interface: on the web, the user fundamentally controls navigation through the pages. Users can take paths that were never intended by the designer: for example, they can jump straight into the guts of a site from a search engine without ever going through the home page.

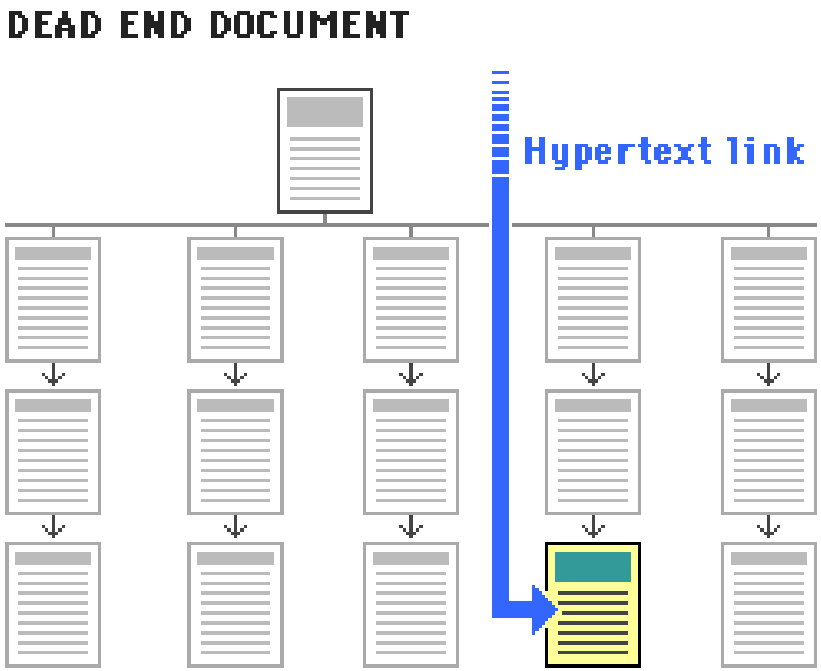


- Give the user information of the context in each page of the web site
- Give the user an understanding of the structure of the information space using:
  - Table of Contents (Site Map)
  - Index
  - Navigation bar
  - Search capability

- I collegamenti a siti diversi devono essere ben evidenziati in modo che per l'utente sia chiaro quando sta entrando in un sito diverso.



- No “dead end documents”



Home page

- La home-page del sito è in genere il luogo appropriato per rendere visibile
  - Il soggetto che propone l'informazione.
  - che cosa viene comunicato.
  - Il luogo da cui proviene l'informazione (link esterni)
  - La data dell'ultimo aggiornamento dell'informazione.

- La home page è anche un luogo appropriato per mettere annunci di variazioni, nuovi servizi o prodotti, notizie di stampa ….o il collegamento ad apposita sezione "*news*". L'aggiornamento di informazione soggetta a variazioni deve essere almeno mensile.

- Homepage guidelines
  - Show the company name and/or logo in a reasonable size and noticeable location – larger than items around it should get first attention
  - Include a tag line which explicitly summarises what the site or company does – eg Global Sources' tag line 'Product and trade information for Volume Buyers'
  - Emphasise what the site does that is valuable from the customers point-of-view, as well as how you differ from key competitors
  - Emphasise the highest priority tasks so that users have a clear starting point on the homepage
  - Design the homepage to be clearly different from all the other pages on the site

Homepage design statistics

Logo placement

Upper left	84%
Upper right	6%
Upper centre	6%
Other position	4%

Search Placement

Upper right	35%
Upper left	30%
Upper centre	14%
Middle left	12%
Other position	12%

Search Label Value

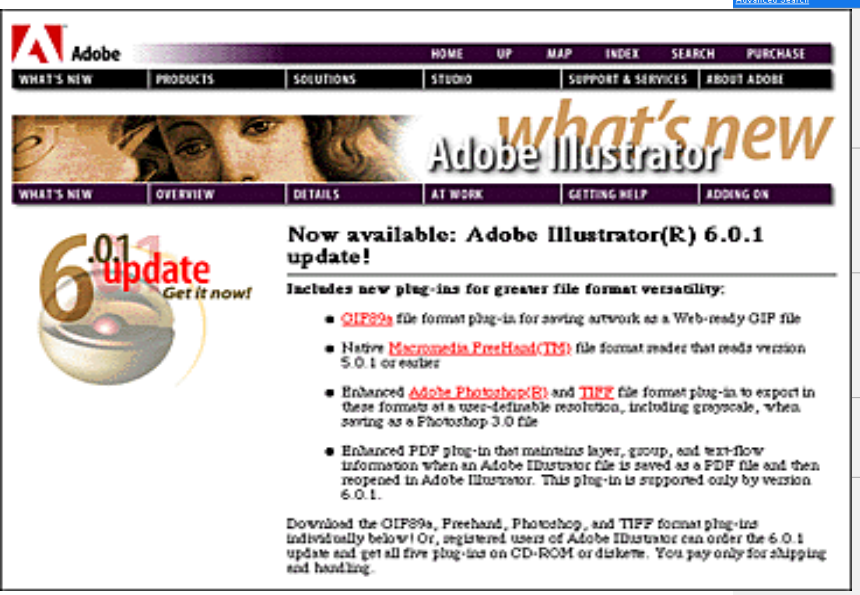
Search	42%
Go	40%
Find	9%
Find it	5%

Navigation Scheme

Left-hand navigation rail	30%
Tabs	30%
Links across the top of page	18%
Categories in middle of page	12%
Pull-down menus	10%
Other (right, bottom, upper centre)	6%

Placement of help

Upper right	41%
Upper centre	11%
Upper left	4%
Middle left	11%
Lower right	7%
Lower centre	11%
Lower left	19%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Quella guerra non è mai cominciata di EUGENIO SCALFARI
"Fuoco amico" uccide 18 curdi e 4 americani
Bombardato nel nord dell'Iraq un convoglio curdo che comprendeva anche militari delle forze speciali Usa
Il Papa chiede pace "Penso agli inermi civili iracheni"
Colpiti diplomatici russi
24 ore
•Marrakech, 18:09 Tennis, Coppa Davis: Marocco supera Italia 3-2
•Bruxelles, 18:07 Costituzione Ue, Europa avrà ministro degli Esteri
•Washington, 17:43 Iraq, militari Usa: fuoco amico su curdi, non su russi
•Verona, 17:33 Calcio, Serie A: Chievo-Udinese 3-0
•Baghdad, 17:33 Iraq, colpi artiglieria e mortaio vicini a centro città
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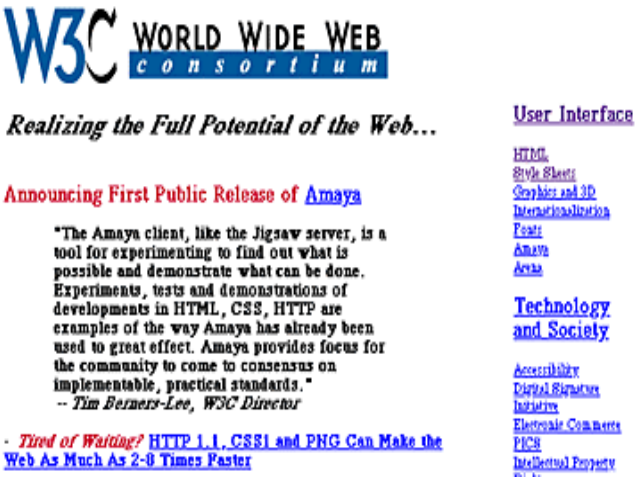
W3C WORLD WIDE WEB consortium
Realizing the Full Potential of the Web...
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"The Amaya client, like the Jigsaw server, is a tool for experimenting to find out what is possible and demonstrate what can be done. Experiments, tests and demonstrations of developments in HTML, CSS, HTTP are examples of the way Amaya has already been used to great effect. Amaya provides focus for the community to come to consensus on implementable, practical standards."
-- Tim Berners-Lee, W3C Director
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How to Include Your Site - Company Information - Contributors - Yahoo! to Go

PACE WILDENSTEIN
LOUISE NEVELSON
Selected works
Biography
Selected Public Collections
Biography
1899 Born Louise Berliawsky on September 23 in Kiev, Russia.
1905 Family moves to the United States; settles in Rockland, Maine.
1929-30 Studies at the Art Students League, New York.
1931 Studies with Hans Hofmann in Munich.
1932 Works as an assistant to Diego Rivera.

Web page design

Organizzazione dell'informazione

- Information content must be divided into blocks (chunks). These should be sufficiently *short* and *independent* each other as much as possible.
- Chunks are the basic elements of information units, on which *web pages* are built. Page independency allows to access each page free of any pre-requisite information. On the other hand, page independency requires that page headers are *very visible* and *very informative* (much more than in a printed page, chunking must be appropriate).
- All of this is obtained through a combination of layout and graphics.

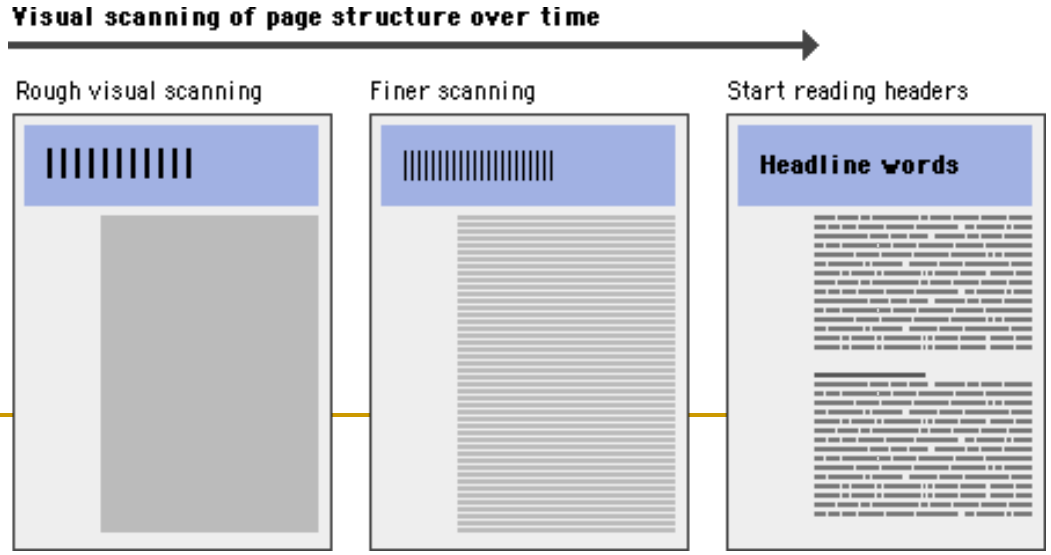
  Main design elements are:
  - Chunking
  - Visual hierarchy
  - Contrast
  - Visual balance
  - Consistency

Chunking

- Recommendations:
  - Break up your information into logical "chunks" connected by hypertext links, but only where it makes sense.
  - Don't break up a long document arbitrarily; users will have to download each segment and will have difficulty printing or saving the entire piece.
  - The key to good chunking is to divide your information into comprehensive segments. That way readers will have direct and complete access to the topics they are interested in without having to wade through irrelevant material or follow a series of links to get the whole picture. Limit the use of within-page links (named anchors, bookmarks).Users may think they’re being taken to another page

Visual hierarchy

- Recommendations:
  - Create a strong, consistent visual hierarchy in which important elements are emphasized and content is organized logically and predictably to lead the reader's eye through the page.
  - Readers first see pages as large masses of shape and color, with foreground elements contrasting against the background field. Secondarily they begin to pick out specific information, first from graphics if they are present, and only then do they start parsing the harder medium of text and begin to read individual words and phrases



Contrast

- The overall graphic balance and organization of the page is crucial to drawing the reader into the content.

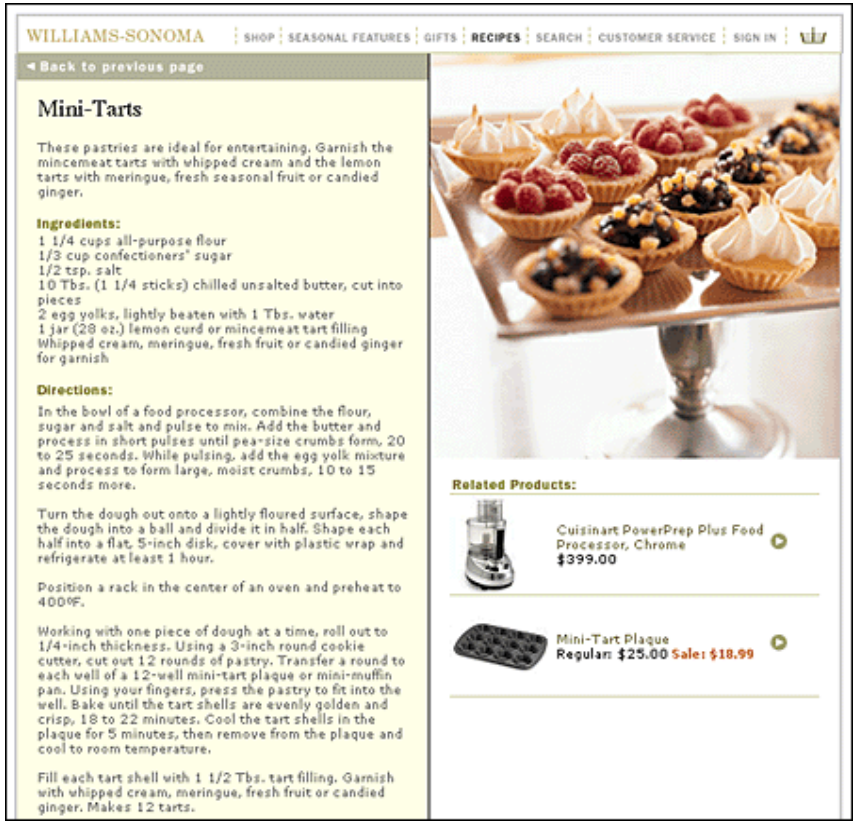
- A full page of text repels the eye as a mass of undifferentiated gray, without cues to the structure of information. A page dominated by poorly designed or overly bold graphics or typography will repel users looking for substantive content. Strike appropriate balance between attracting the eye with visual contrast and providing a sense of organization.

Dull; no focal points,
no graphic structure

Stronger visual structure;
better contrast, visual entry points

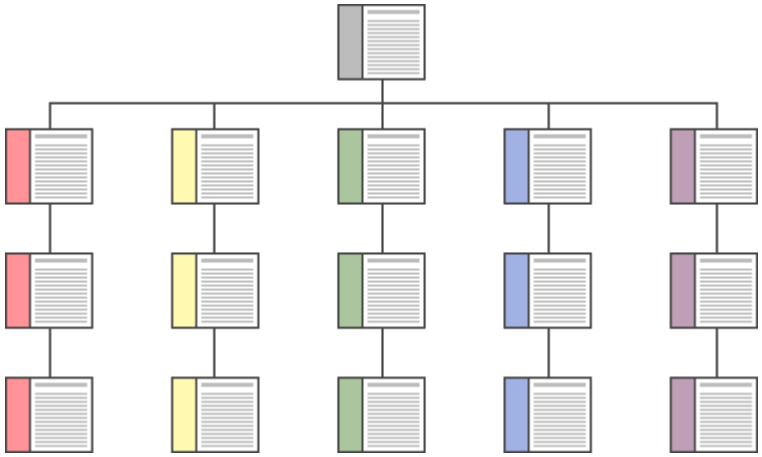
Visual balance

- Visual balance and appropriateness to the intended audience are the keys to successful design decisions. The most effective designs for general Internet audiences use a careful balance of text and links with relatively small graphics.

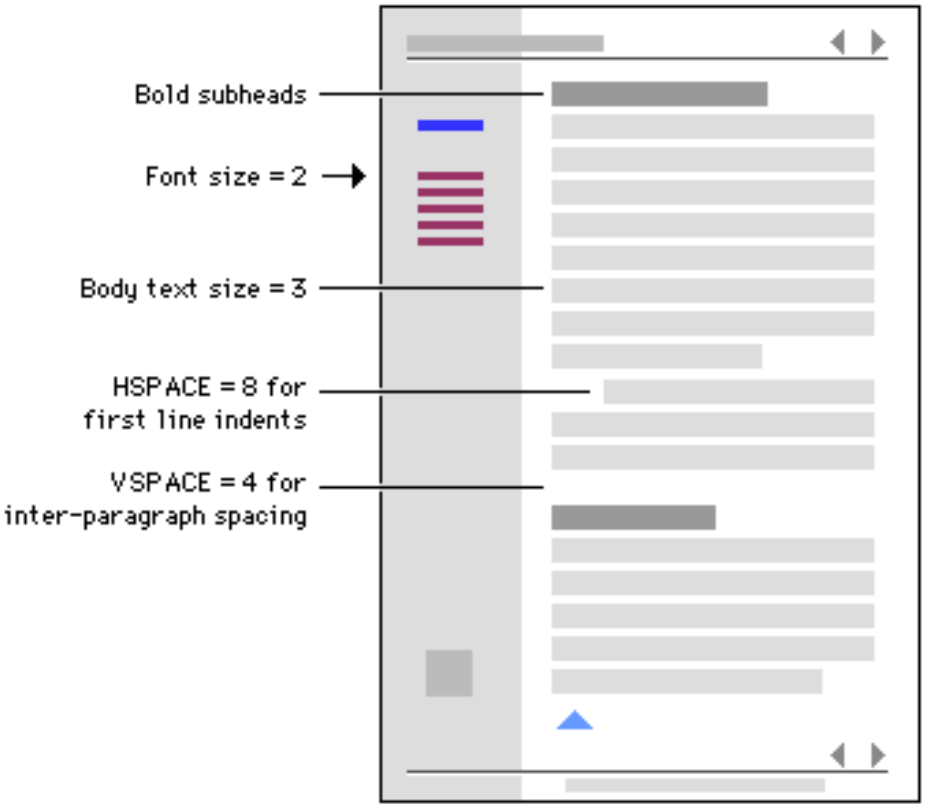


Consistency

- Establish a layout grid and a style for handling your text and graphics, then apply it consistently to build rhythm and unity across the pages of your site. Repetition is not boring; it gives your site a consistent graphic identity that creates and then reinforces a distinct sense of "place" and makes your site memorable.
- A consistent approach to layout and navigation allows readers to adapt quickly to your design and to confidently predict the location of information and navigation controls across the pages of your site.



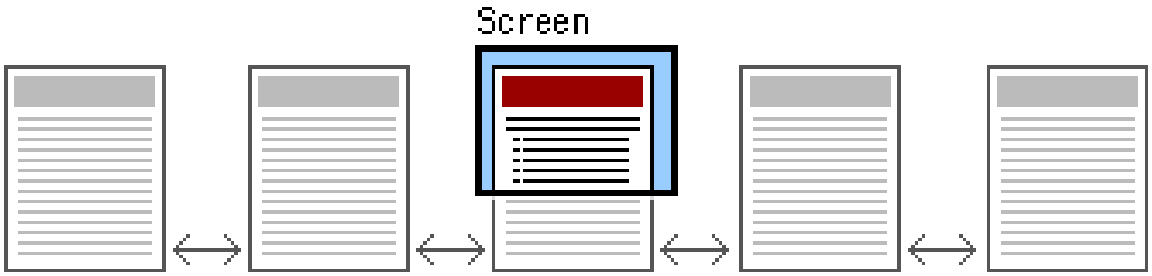
- Pages must have a consistent size and uniform organization format



- A "signature" graphic and page layout allows the reader to grasp immediately the purpose of the document and its relation to other pages. Unlike designers of print documents, designers of Web systems can never be sure what other pages the reader has seen before linking to the current page.
- If you choose a graphic theme, use it throughout your Web site (from home page banner, to banners at the top of interior pages)

Page length

- You must give the user the sense of context. Determining the proper lenght of web pages is crucial. It requires balancing:
  - The relation between page and screen size
  - The content of your documents
  - Whether the reader is expected to browse the content online or to print or download the documents for later reading
  - The bandwidth available to your audience



- Scrolling on computer screens determines user disorientation. The reader's loss of context is particularly troublesome when document titles, site identifiers, and links to other site pages disappear off-screen while scrolling.

- This disorientation effect argues for the creation of navigational web pages (especially home pages and menus) that contain no more than one or two screens' worth of information and that feature local navigational links at the beginning and end of the page layout.

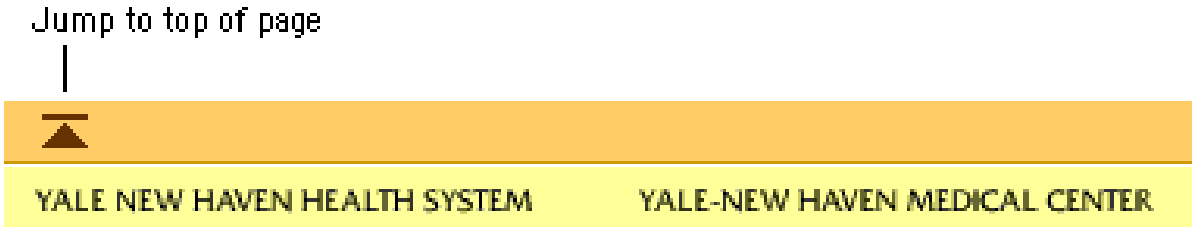
- In viewing pages scrolling should be used moderately:
  - Early views:
    - Put all information in one screen page
  - Latest opinions are changing: scrolling doesn’t seem to be a big plus or minus
    - If possible put all information in one screen page
    - Avoid scrolling on navigation pages, put it instead on content pages (to be printed)
    - Link to top at bottom of a long page

- Horizontal scrolling is almost always bad. You might shrink most pictures to fit the screen area.

- Where you need to show a full-size version of a large graphic like maps or diagrams which include lettering, shrinking would make the lettering illegible. In this case, as an alternative to horizontal scrolling you may split a map / diagram into sections and create a separate smaller overview picture with a link to a full-sized image of each section…

- Long web pages do have their advantages, however.

- They are often easier for creators to organize and for users to download. Web site managers don't have to maintain as many links and pages with longer documents, and users don't need to download multiple files to collect information on a topic.
- Long pages are particularly useful for providing information that you don't expect users to read online (realistically, that means any document longer than two printed pages) and you expect the user to print or save the text. You can make long pages friendlier by positioning "jump to top buttons" at regular intervals down the page.



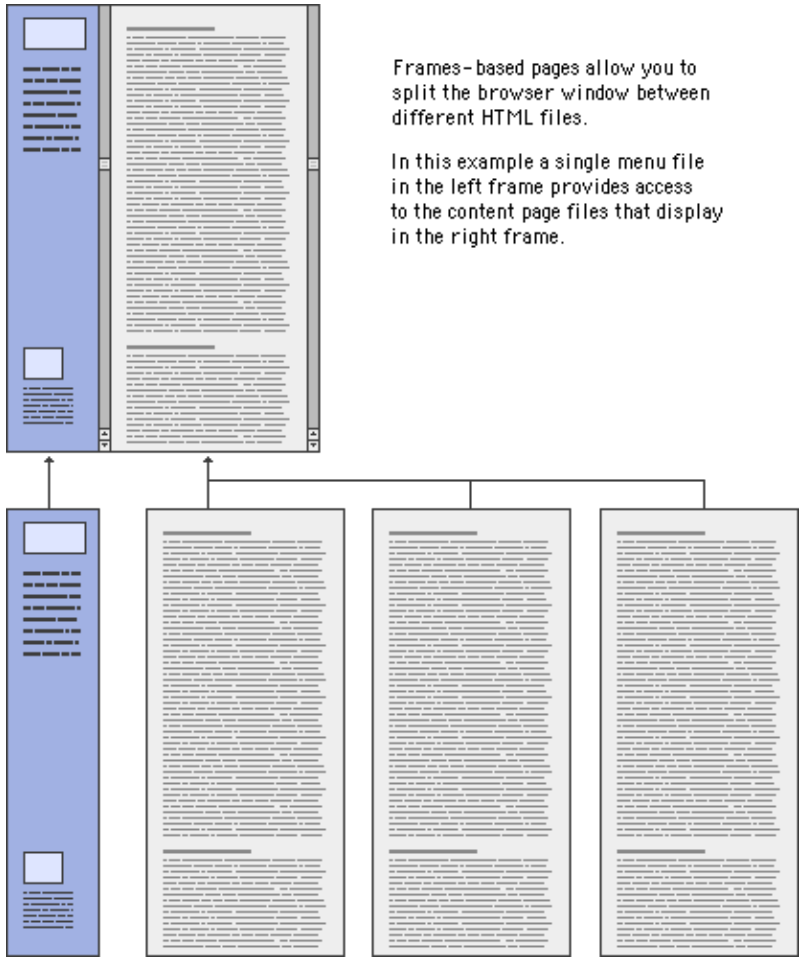
- If you wish to provide both a good online interface for a long document and easy printing or saving of its content:
  - Divide the document into chunks of no more than one to two printed pages' worth of information, including inlined graphics or figures. Use the power of hypertext links to take advantage of the Web medium.
  - Provide a link to a separate file that contains the full-length text combined as one page designed so the reader can print or save all the related information in one step.

- You should favor shorter web pages for:
  - Home pages and menu or navigation pages elsewhere in your site
  - Documents to be browsed and read online
  - Pages with very large graphics

Frames

- Frames are *meta*-documents that call and display multiple HTML documents in a single browser window.

- A frame document contains no BODY HTML tags, just the parameters for the frames and the URLs of the HTML documents designated to fill them. Frames-based pages do not function as an integrated unit, which is both good and bad.



Frames-based pages allow you to split the browser window between different HTML files.

In this example a single menu file in the left frame provides access to the content page files that display in the right frame.

- Frames are useful for certain content and greatly facilitate site maintenance. They provide a good way to maintain narrative and design consistency in your site; you can split the browser screen between site navigation and the material you wish to bring up with a link.
- But frames also impose interface and design limitations. Frames can easily confuse readers who wish to print material on a page or bookmark a page for later reference or navigate using the browser's "Forward" and "Back" buttons. And screen space becomes an issue with frames; if you use frames to divide the browser screen, you will force many readers to scroll both horizontally and vertically to see the full contents of each frame.

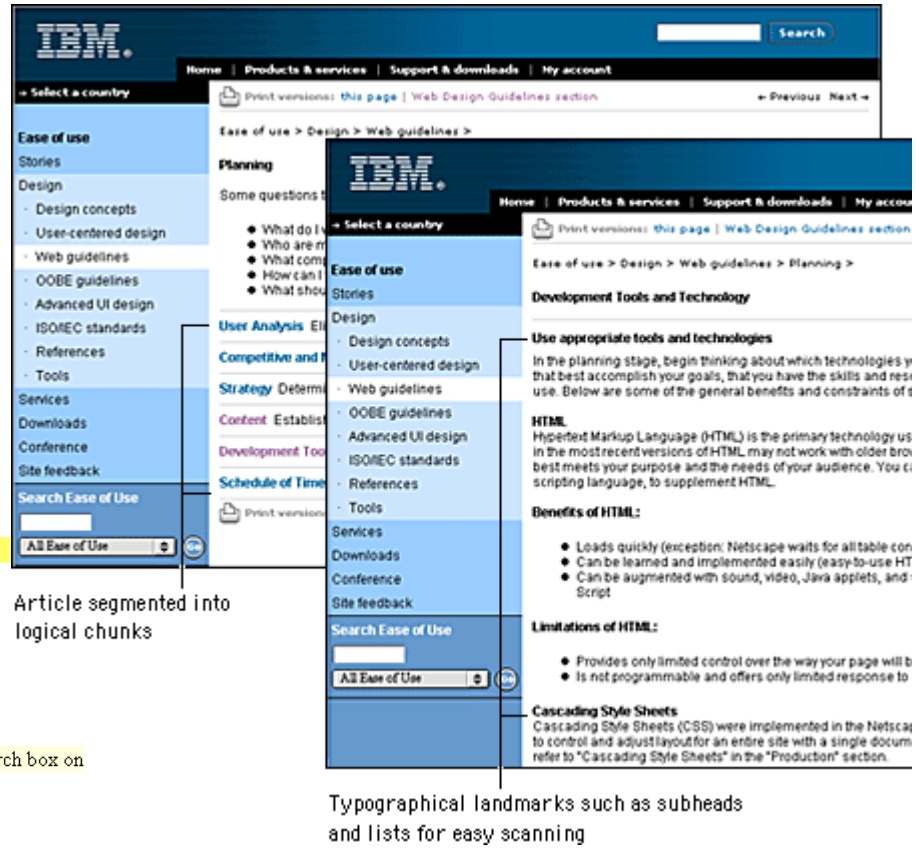
- The current consensus among Web design and usability experts is that frames should be used only in the rare instances when their limited advantages clearly outweigh the many problems they can cause.

Editorial style

Organizing the prose

- Documents written to be read online must be concise and structured for scanning. People tend to skim web pages rather than read them word by word.
  - Use headings, lists, and typographical emphasis for words or sections you wish to highlight; these are the elements that will grab the user's attention during a quick scan. Keep these elements clear and precise
  - Use your page and section heads to describe the material.
  - The "inverted pyramid" style used in journalism works well on Web pages, with the conclusion appearing at the beginning of a text.
  - Place the important facts near the top of the first paragraph where users can find them quickly.

- Inverted pyramid examples



useit.com → Alertbox → May 2001 Search

Jakob Nielsen's Alertbox, May 13, 2001:

Search: Visible and Simple

Summary:
Search is the user's lifeline for mastering complex websites. The best designs offer a simple search box on the home page and play down advanced search and scoping.

Users love search for two reasons:

- Search lets users **control their own destiny** and assert independence from websites' attempt to direct how they use the Web. Testing situations routinely validate this. A typical comment is: "I don't want to have to navigate this site the way they want me to. I just want to find the thing I'm looking for." This is why many users go straight to the **home page** search function.
- Search is also users' **escape hatch when they are stuck** in navigation. When they can't find a reasonable place to go next, they often turn to the site's search function. This is why you should make search **available from every page** on the site; you cannot predict where users will be when they decide they are lost.

Text formatting

- Excessive markup. Beware of too much markup in your paragraphs. Too many links or too many styles of typeface will destroy the homogeneous, even "type color" that characterizes good typesetting.

- Link colors. If you are including links in the body of your text, choose custom link colors that closely match your text color. Reading from the screen is hard enough without struggling with distracting link colors scattered across the page.

- Special characters. Don't use the "smart quotes" feature. Avoid all special characters, such as bullets, ligatures, and typographer's en and em dashes, that are not supported in standard HTML text.

- Fonts must favor readability: sans serif (eg. Arial) is preferred for web wrt serif (eg. Times Roman),
- Words must be written in small caps with capital initials. Text and background must be highly contrasted

Links

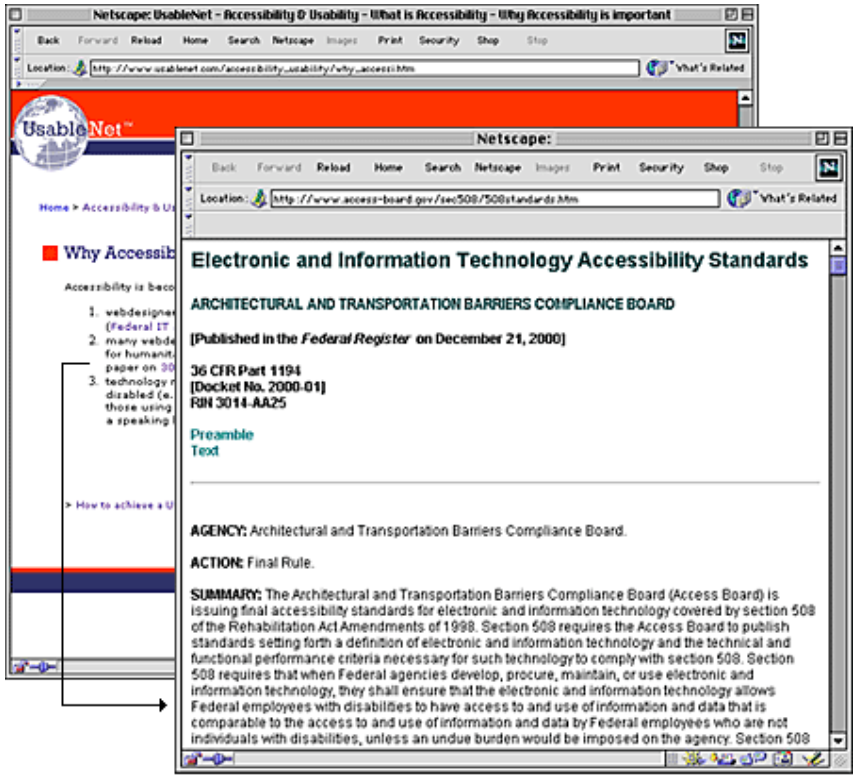
- Two basic types of links are used in Web sites: navigational links connect pages within a site and the classic hypertext links offer parenthetical material, footnotes, digressions, or parallel themes that the author believes will enrich the main content of the page. Although navigational links can cause problems in site design, more disruptive is the overuse or poor placement of hypertext links.

  - Hypertext links pose two fundamental design problems. They disrupt the flow of content in your site by inviting the reader to leave your site. They can also radically alter the context of information by dumping the reader into unfamiliar territory without preamble or explanation. The primary design strategy in thoughtful hypertext is to use links to reinforce your message, not to distract readers or send them off chasing a minor footnote in some other Web site..

  - If you must send your reader away, make sure the material around the link makes it clear that the reader will be leaving your Web site and entering another site by following the link. Provide a description of the linked site along with the link so users understand the relevance of the linked material.

- The key to good hypertext linking is to *maintain context,* so that the reader stays within the narrative flow and design environment of your site. If you place a simple link on your page, these plain links will work within a single browser window — your content will disappear and the linked page will fill the window. If you use this kind of link to point away from your site, you will probably lose your readers.

- The simplest way to maintain context using links to other sites is to add the TARGET="main" argument to your link tags. This will cause the linked page to appear in a new browser window in front of the one containing your page. This feature allows your reader to access new material without losing visual contact with your site.



Opening links in a secondary window allows users to explore related material without losing contact with your site

Graphics and multimedia content

Disadvantages

- Takes more time to download
- (some) require special plug-ins
  - Some users don't have/don't want/can't install plug-in
- Not accessible to all users
  - Esp. those with sight/hearing disabilities

Advantages

- Can convey information quickly
- Can enhance e-commerce
- Can be useful for cognitively impaired

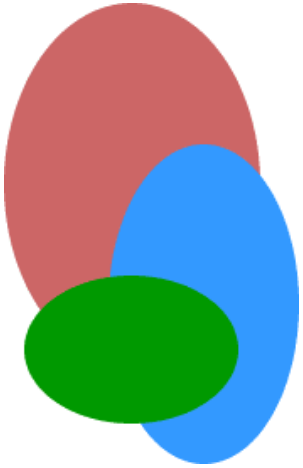
- Subtle pastel shades of colors typically found in nature make the best choices for background or minor elements. Avoid bold, highly saturated primary colors except in regions of maximum emphasis, and even there use them cautiously.

- Horizontal rules, graphic bullets, icons, and other visual markers have their occasional uses, but apply each sparingly (if at all) to avoid a patchy and confusing layout. The same consideration applies to the larger sizes of type on Web pages.

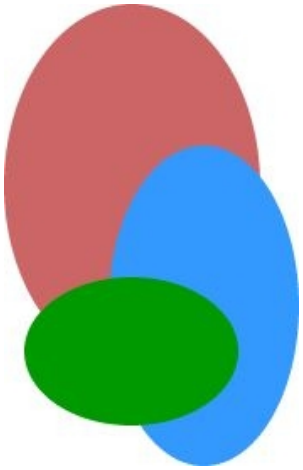
- The tools of graphic emphasis are powerful and should be used only in small doses for maximum effect. Overuse of graphic emphasis leads to a "clown's pants" effect in which everything is garish and nothing is emphasized.

- Never use gratuitously (see fig)
- Graphics should provide information
- Graphics should complement/relate to content
- Resist temptation to render text as graphic

- Use appropriate format to achieve
  - better compression
  - better quality
  - better rendering



GIF – 2.5Kb



JPEG – 4.6Kb

JPEG – 25Kb

GIF – 44Kb

- Optimize file size (dimensions) by crop and scale
- Relevance-enhanced image reduction results in images that preserve both context and detail, even at very small sizes.

cropped

scaled

cropped and scaled

- For audio / video:
  - Provide short previews
  - Use the previews to motivate users to download – in other words, allow users to make an informed choice
  - Segment larger works into topical chunks
  - Allow users to choose portions they want to view or hear

Part IV – Accessibility

Accessibility

- Un sito web è accessibile quando è progettato in modo da garantire la consultazione anche da parte di individui affetti da disabilità motorie (controllo arti) o sensoriali (vista e udito), o cognitive, o da individui condizionati dall'uso di strumenti con prestazioni limitate o da condizioni ambientali sfavorevoli

- Un utente potrebbe infatti:
  - non essere in grado di vedere, udire, muoversi o elaborare alcuni tipi di informazione
  - avere difficoltà a leggere o comprendere il testo
  - non essere in grado di usare un mouse o una tastiera
  - avere uno schermo che visualizza solo testo, un piccolo schermo o una connessione lenta ad Internet
  - non comprendere il linguaggio nativo del documento
  - avere una vecchia versione del browser, un diverso browser, un voice browser….

- Un sito web accessibile fornisce comunque vantaggi anche alla generalità degli utenti

- In pratica, rendere accessibili siti e documenti disponibili nel Web significa garantire la possibilità di:
  - orientarsi e navigare all'interno di un sito
  - leggere i contenuti delle pagine
  - interagire con le procedure che prevedono scelte, immissione di dati

- Un sito web accessibile sfrutta la possibilità di tradurre l'informazione in formato elettronico in diverse modalità percettive e di rendere fruibili contenuti e procedure a utenti dotati di browser con diverse configurazioni

Linee guida W3C: check point

- Il W3C ha definito un certo numero di linee guida per rendere accessibili siti web e documenti multimediali. Ogni linea guida ha una serie di checkpoint che dettagliano come applicare la linea guida in tipici contesti di sviluppo di pagine web.

- Ogni check point ha un livello di priorità in base al suo impatto sull'acccessibilità. I livelli di priorità sono 3:
  - **[Priorità 1]**
    - Una sito web **deve** osservare questi check point altrimenti l'informazione non risulta accessibile a uno o più gruppi di utenti.
  - **[Priorità 2]**
    - Una sito web **dovrebbe** osservare questi check point altrimenti l'informazione risulterà difficilmente accessibile a uno o più gruppi di utenti. Osservare questi check point riduce notevolmente le barriere di accesso al contenuto
  - **[Priorità 3]**
    - Una pagina web **può** osservare questi check point altrimenti l'informazione può risultare in qualche modo difficilmente accessibile a uno o più gruppi di utenti

.

Linee guida W3C: Conformità

- Si definiscono tre livelli di conformità per un sito web:
  - **Conformità di livello A**
    - Sono stati rispettati tutti i check point di Priorità 1

  - **Conformità di livello AA**
    - Sono stati rispettati tutti i check point di Priorità 1 e 2
  - **Conformità di livello AAA**
    - Sono stati rispettati tutti i check point di Priorità 1,2 e 3

Linee guida

- Guideline 1. Offrire informazione equivalente per contenuto uditivo o visivo

- Checkpoints
  - Contenuto testo equivalente per ciascun contenuto non testo (es.”alt” per le immagini) [Priorità 1]
  - Link testuali per ogni regione di una image-map [Priorità 1]
  - Prevedere testo equivalente per la descrizione di ogni contenuto multimediale [Priorità 1]

- Guideline 2. Non affidarsi ai colori: assicurarsi che il testo e la grafica siano comprensibili anche se visti senza colori

- Checkpoints
  - Assicurarsi che ogni tipo di informazione legata al colore sia comprensibile anche in assenza di colori attraverso il contesto o il markup [Priorità 1]
  - Assicurarsi che la combinazione di colori di sfondo e quelli di primo piano realizzino un adeguato contesto [Priorità 2 per le immagini, Priorità 3 per il testo]

- Guideline 3. Usare markup e fogli di stile e farlo in modo appropriato

- Checkpoints
  - Se esiste uno specifico linguaggio di markup per il contenuto deve essere usato (Ad esempio usare MathML per equazioni e formule) [Priorità 2]
  - Usare fogli di stile per controllare il layout e la presentazione [Priorità 2]
  - Usare gli header in accordo con la struttura del documento e non per ottenere effetti sui font [priorità 2]
  - …..

- Guideline 4. Rendere chiaro l'uso di linguaggio corrente: usare markup che facilitino l'interpretazione di abbreviazioni e di parole straniere

- Checkpoints
  - Identificare il linguaggio primario di un documento. In HTML settare l'attributo "lang" nell'elemento HTML [Priorità 3]
  - Specificare l'espansione di ogni abbreviazione [Priorità 3]
  - …..

- Guideline 5. Creare tabelle che si trasformino in maniera adeguata: assicurarsi che le tabelle abbiano i markup necessari per trasformarsi adeguatamente con l'uso di browser alternativi

- Checkpoints
  - Per tabelle di dati specificare l'intestazione di riga e di colonna. In HTML usare sempre TD per le celle e TH per l'header [Priorità 1]
  - Per tabelle di dati che hanno due o più livelli logici di intestazione di riga o di colonna. Ad esempio in HTML, usare THEAD, TFOOT, e TBODY per raggruppare le righe, COL e COLGROUP per raggruppare le colonne, e gli attributi "axis", "scope", and "headers" per descrivere le relazioni tra i dati [Priorità 1]

- Guideline 6. Assicurarsi che le pagine contenenti nuove tecnologie si trasformino in maniera adeguata: assicurarsi che le pagine siano accessibili anche quando le nuove tecnologie non sono disponibili (Es. nuovi Plug-in)

- Checkpoints
  - Organizzare la pagina in modo che possa essere letta correttamente anche senza fogli di stile [Priorità 1]
  - Assicurarsi che il il contenuto equivalente per contenuto dinamico si aggiorni quando il contenuto dinamico cambia [Priorità 1]
  - Assicurarsi che la pagina sia leggibile anche quando script, applett o altri oggetti non siano disponibili o disabilitati. Se non fosse possibile usare la pagina senza script rendere disponibile una pagina testo equivalente o usare scripting server side al posto di scripting client side [Priorità 1]

- Guideline 7. Assicurarsi che l'utente abbia il controllo di contenuti mutevoli nel tempo possano essere: assicurarsi che oggetti che lampeggiano, si muovono o si auto aggiornano possano essere messi in pausa o stoppati

- Checkpoints
  - Evitare lo sfarfallio dello schermo [Priorità 1]
  - …

- Guideline 8. Assicurare l'accessibilità alla interfaccia utente: assicurarsi che l'interfaccia utente segua principi di accesso indipendente dal mezzo

- Checkpoints
  - Usare script e elementi di programmazione che siano compatibili con tecnologie che assistono alla navigazione [Priorità 1]

- Guideline 9. Design indipendente dall'interfaccia: usare funzionalità che permettano l'attivazione degli elementi della pagina da diversi dispositivi di input

- Checkpoints
  - Rendere disponibili image-map lato client piuttosto che lato server [Priorità 1]
  - Creare shortcut da tastiera per link importanti. Ad esempio in HTML specificare gli shortcut attraverso l'attributo "accesskey" [Priorità 3]…..

- Guideline 10. Usare tecnologie “di passaggio”: tenere presente l’esistenza di browser datati e delle tecnologie di navigazione assistita in modo da renderne possibile il funzionamento

- Checkpoints
  - Rendere possibile disabilitare i pop-up [Priorità 2]
  - ….

- Guideline 11. Usare tecnologie e linee guida W3C

- Checkpoints
  - Se , nonostante gli sforzi non si riesce a creare una pagina accessibile, rendere disponibile un link ad una pagina alternativa che usi le tecnologie e le linee guida W3C con informazione equivalente e stessa frequenza di aggiornamento [Priorità 1]
  - Non usare funzionalità deprecate dal W3C [Priorità 2]
  - ….

- Guideline 12. Rendere disponibili informazioni sul contesto e informazioni di orientamento

- Checkpoints
  - Assegnare un titolo ad ogni frame per facilitarne l'identificazione e la navigazione [Priorità 1]
  - Dividere larghi blocchi di informazione in gruppi più appropriati [Priorità 2]
  - ….

- Guideline 13. Rendere disponibile un chiaro meccanismo di navigazione

- Checkpoints
  - Identificare chiaramente il target di ogni link. In HTML scrivere “informazioni su W3C” invece di “clicca qui” [Priorità 2]
  - Usare metodi meccanismi di navigazione in modo consistente [Priorità 2]
  - Usare barre di navigazione del sito [Priorità 3]
  - …

- Guideline 14. Assicurare che il documento sia chiaro e semplice

- Checkpoints
  - Usare il linguaggio più semplice e adeguato per il contenuto del sito [Priorità 1]
  - Creare uno stile di presentazione che sia coerente in tutto il sito [Priorità 3]
  - …

Sintesi raccomandazioni

- Trattare separatamente, il contenuto, la struttura e la presentazione di una pagina, facendo uso di "fogli di stile"
- Non usare il colore come unico veicolo di informazione
- Usare grandezze relative per indicare le dimensioni e la posizione delle componenti di una pagina
- Creare documenti "scalabili" che non dipendono da un solo tipo di hardware

- Corredare le componenti sonore di segnalazioni alternative visive
- Fornire testo equivalente a immagini, video e contenuto multimediale

  corredare le immagini di descrizioni testuali (es. "alt" di HTML) per indicare la funzione dell'immagine o la descrizione del contenuto (es. "longdesc" o "description link" in HTML) quando è importante per la comprensione del documento

- Usare parole o brevi frasi di chiaro e univoco significato anche fuori del contesto
- Seguire la stessa regola anche per la didascalia alternativa di collegamenti realizzati con immagini o simboli grafici
- Prevedere procedure alternative a script, applet …. nel caso che non siano gestibili con i comuni ausili usati dagli utenti disabili.
- Prevedere un messaggio di avvertimento di apertura di una finestra.

- Limitare l'uso di frame ai casi di vera utilità

  Una presentazione ristretta ad una porzione di schermo può creare problemi alle persone ipovedenti che preferiscono sfruttare tutta la larghezza dello schermo per la lettura con caratteri ingranditi, evitando più che è possibile lo scorrimento orizzontale del testo

- Limitare l'uso di tabelle ai casi di vera utilità

  Assicurarsi che il contenuto e la struttura delle tabelle risultino chiari anche quando la tabella stessa viene letta cella dopo cella e una riga alla volta

Browsers alternativi

- Browsers specifically designed for disabled people
  - Speech output, simple keyboard interface / standard graphical user interface
  - Speech output, Braille support, special screen fonts
- Screen readers
  - navigation of the screen presented by the operating system, using speech or Braille output
- Adaptive browsers
  - enhanced screen magnification or navigation options
- Voice browsers
  - voice-driven navigation, (voice-in/ voice-out, telephone-based web access).
- Other access methods
  - "image sonification" technique / E-mail retrieval

W3C CONSORTIUM

- Gli standard di accessibilità sono definiti dal World Wide Web Consortium (W3C)
  - Si occupa di definire specifiche linee guida (guidelines) , sviluppare software e tecnologie che permettano l'utilizzo del web in tutte le sue potenzialità: http://www.w3c.org
  - Web Accessibility Initiative (WAI**): http://www.w3.org/WAI/**

Part V – Natural interfaces

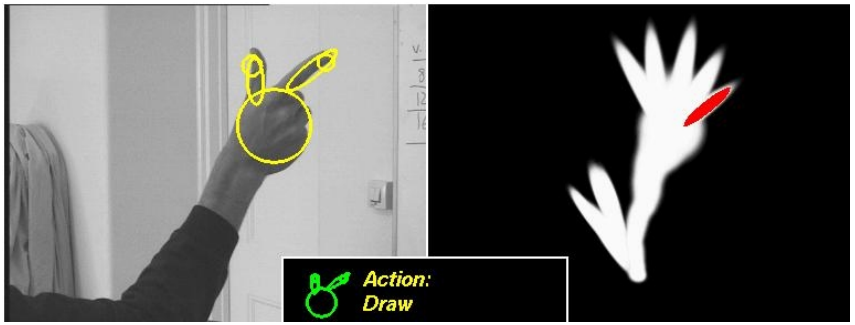
Natural (multimodal) interfaces

- Today, the keyboard, the mouse and the remote control are used as the main interfaces for transferring information and commands to computerized equipment.

- With the development of information technology in our society, we can expect that computer systems to a larger extent will be embedded into our environment such as homes and offices. These environments will impose needs for new types of human-computer-interaction, with interfaces that are natural and easy to use, and allow people to interact with them the way they do with other people. In particular, the ability to interact with computerized equipment without need for special external equipment is attractive.

- The user interfaces of these systems are not menus, mice, and keyboards but instead gesture, speech, affect, context, and movement.

- Their applications are not word processors and spreadsheets, but smart homes and personal assistants. Instead of *making computer-interfaces for people, it is of more fundamental value to make people-interfaces for computers.*



- The most important factor in making these applications possible in recent years has been the novel viability of real-time computer vision and speech understanding.

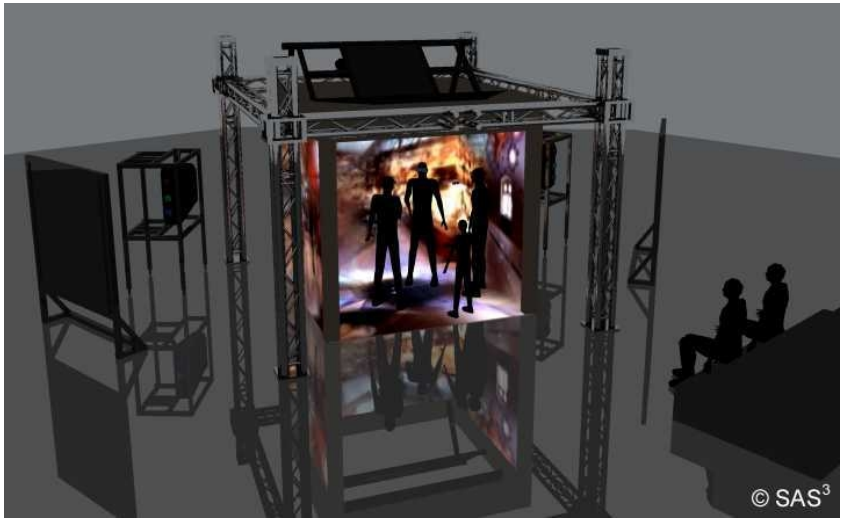
- Coupled with their natural interfaces is the expectation that these systems are not only highly interactive but more importantly, that they are useful during ordinary activities.

- They enable tasks historically outside the normal range of human-computer interaction by connecting computers to phenomena (such as someone walking into a room) that have traditionally been outside the purview of contemporary user-interfaces. With natural interfaces the user experiences a form of context awareness, exploiting dialog modalities and behaviors that are commonly used in his real daylife.

- Natural (multimodal) interfaces are classified into:
  - Virtual reality /augmented reality environments (input/output sensors for data input and navigation - users need external I/O equipment)
  - Perceptual interfaces:
    - Natural language interfaces (speech recognition technology - ev. users do not need external I/O equipment)
    - Computer-vision based interfaces (computer vision technology - users do not need external I/O equipment)
  - Mixed solutions

Virtual / augmented reality environments

- The advantage in creating a virtual environment is concerned with the possibility that the users interact in real-time with their whole body and link the environment (via Internet) to other virtual environments. The user is inside the environment surrounded by stereoscopic retro projections thus the user is fully immersed in a 3D environment. The user can see his body, and the presence of other visitors. The movement and perspectives of the environment change according to the user's position and navigation.



Perceptual Interfaces: Natural Language based

- Users interact with the system through spoken words that are interpreted. Main questions for Natural Language Interfaces:
  - For what and under what conditions is Natural Language appropriate in the human-computer interface?
  - For what types of tasks or communication is Natural Language appropriate?
  - How do performance limitations of automated Natural Language interpretation and generation technologies (e.g., speech recognition errors) affect appropriateness?

Perceptual Interfaces: Computer vision - based

- Perceptual interfaces for human-computer-interaction based on visual input employ computer vision systems. They complement or replace traditional interfaces based on keyboards, mouses, remote controls, data gloves or speech. Main advantages of using visual input in this context are that visual information makes it possible to communicate with computerized equipment at a distance, without need for physical contact with the equipment to be controlled.

- Compared to speech commands, hand gestures are advantageous in noisy environments, in situations where speech commands would be disturbing, as well as for communicating quantitative information and spatial relationships. The idea is that the user should be able to control equipment in his environment as he is, and without need for specialized external equipment