

INTERAZIONE  
UOMO-MACCHINA

# For IxD to Affective User-Experience

Stefano Valtolina

Dipartimento di Informatica  
Università degli studi di Milano

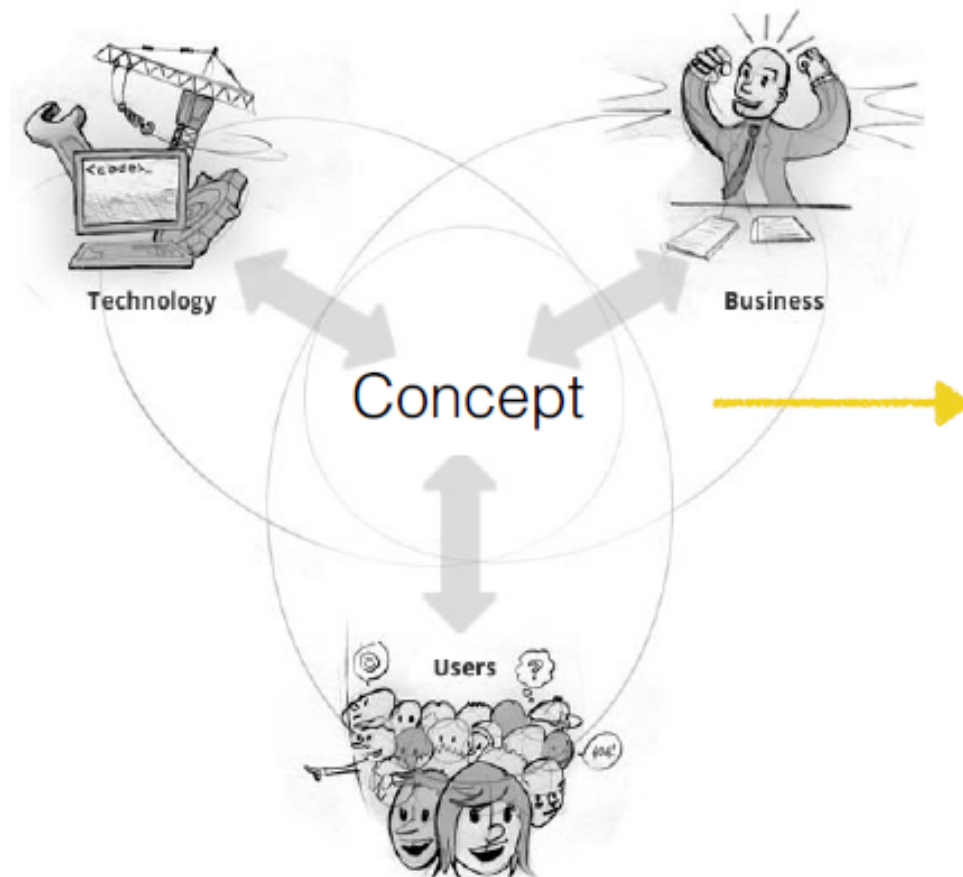
# Affective interaction design

2

- **IxD**: the **practice of designing** interactive digital products, environments, systems, and services
- <http://www.ixda.org/>
- But what about visual impact ?
  - ▣ The **visual aspect** is an important dimension at the base of the **affective interaction design**
  - ▣ The need for products and systems to convey positive emotions and avoid negative ones is critical to product success
- In this lecture:
  - ▣ *From IxD to the emotional design for ensuring a successful and “affective” user experience*

# Integration Design

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## Wireframes

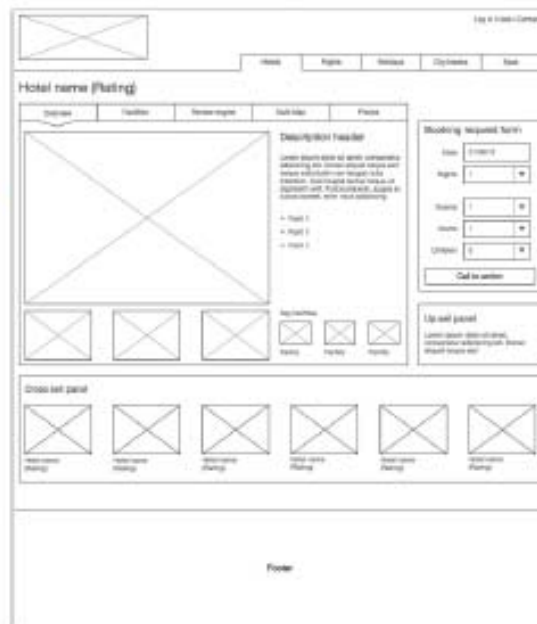
The wireframe shows a layout for a hotel booking page. It includes a header with a logo, navigation links (Home, Rooms, History, City/State, Book), and a main content area. The main content area is divided into sections: Hotel name (flating), Description Header, Booking required form, Up sell panel, and Gross sell panel. The Booking required form includes fields for Date, Nights, Rooms, and Children, and a Call to action button. The Up sell panel and Gross sell panel contain placeholder boxes for additional content.

image: Koos Looijesteijn

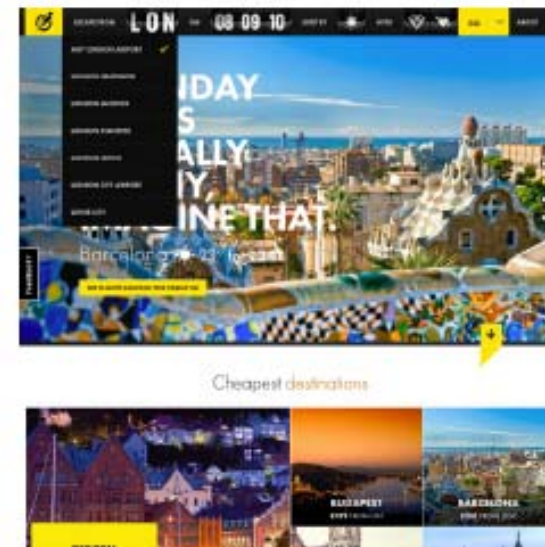
# Integration Design

4

## Wireframes



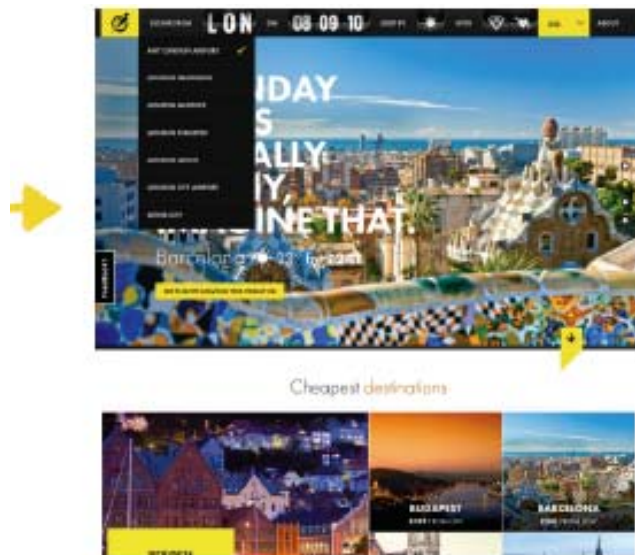
## Graphic design + Content



# Integration Design

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Graphic design +  
Content

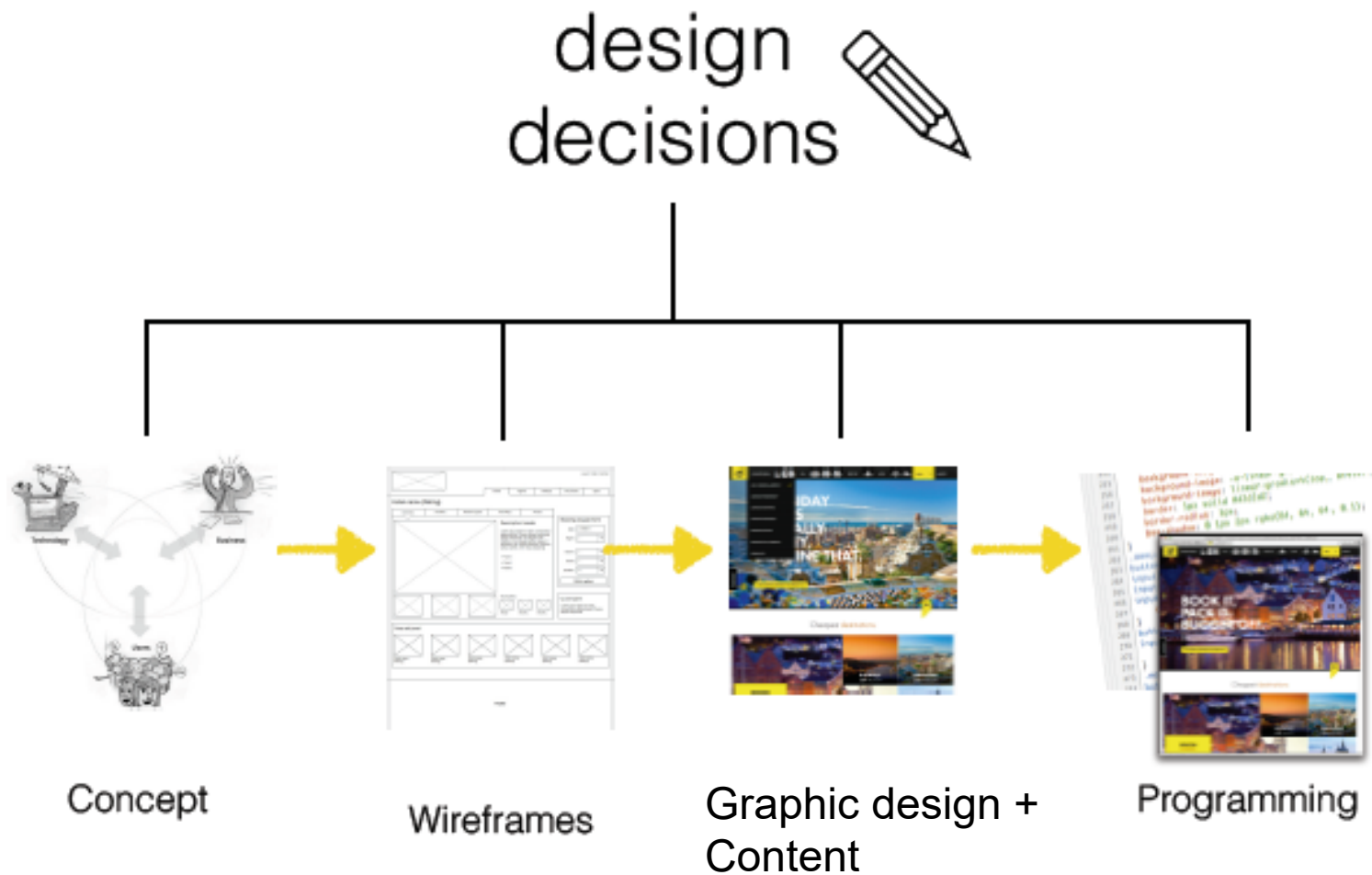


Programming



# Integration Design

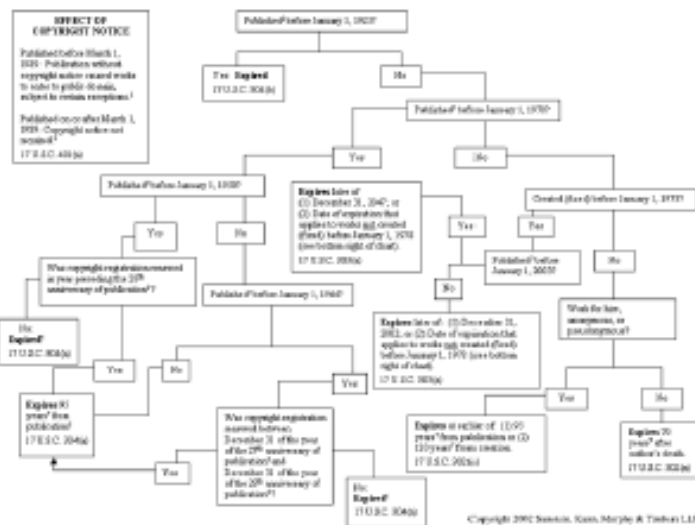
6



# The blind spot

7

## □ From function to experience



Fulfilling functional needs



Fulfilling emotional needs

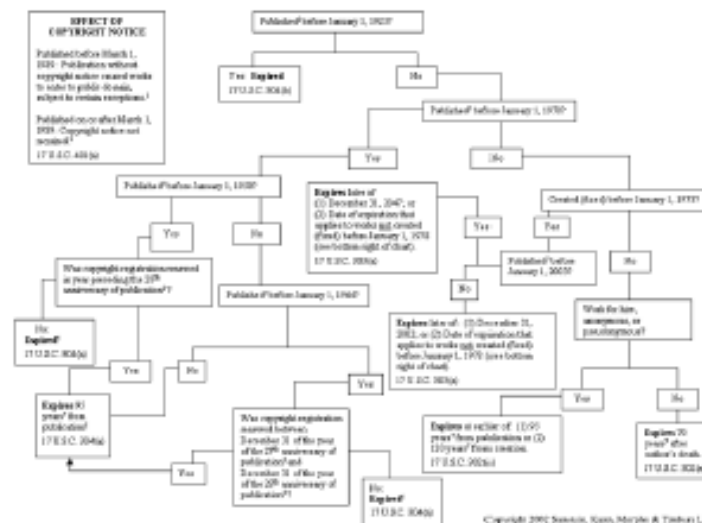
Why user experience cannot be designed

# Functional needs

8

## □ End users:

- “I need a way to **record audio**”
- “I need to **buy** this product”
- “I need an **overview** of the creative industry in Amsterdam”





# Emotional needs 1/2

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## □ End users:

- *“I need to feel safe”*
- *“I want to feel loved”*
- *“I want to feel like a rich person”*



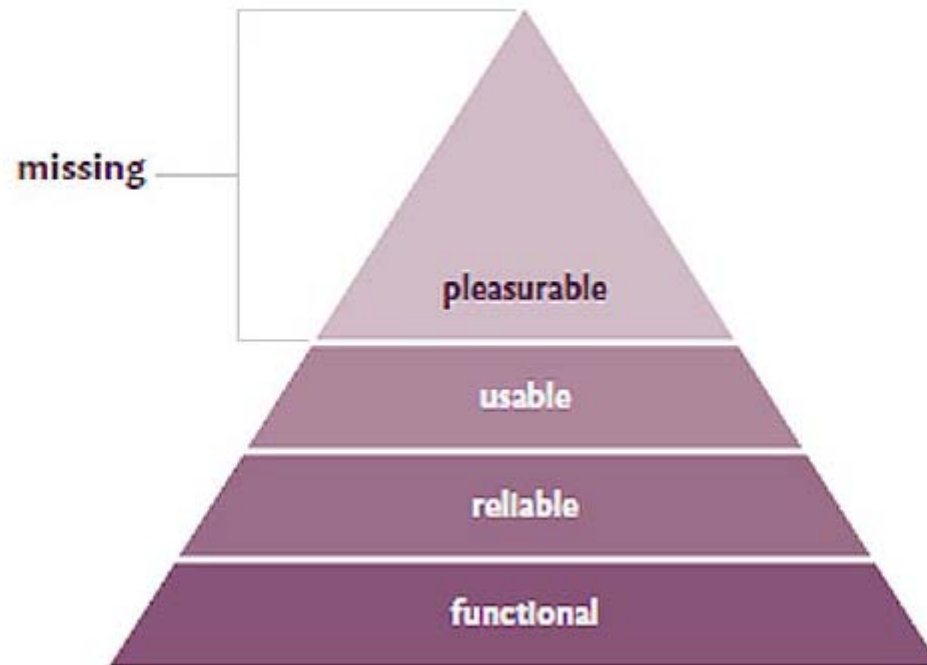
# Emotional needs 2/2

10

- **Basic human needs** are pretty easy to predict
- But emotions can be tricky:
  - Emotions are often **complex and layered!**
    - “Sad & hopeful”/”happy & surprised”/”grief & joy”
  - They can be **hidden or latent**

# Interaction design: what is missing

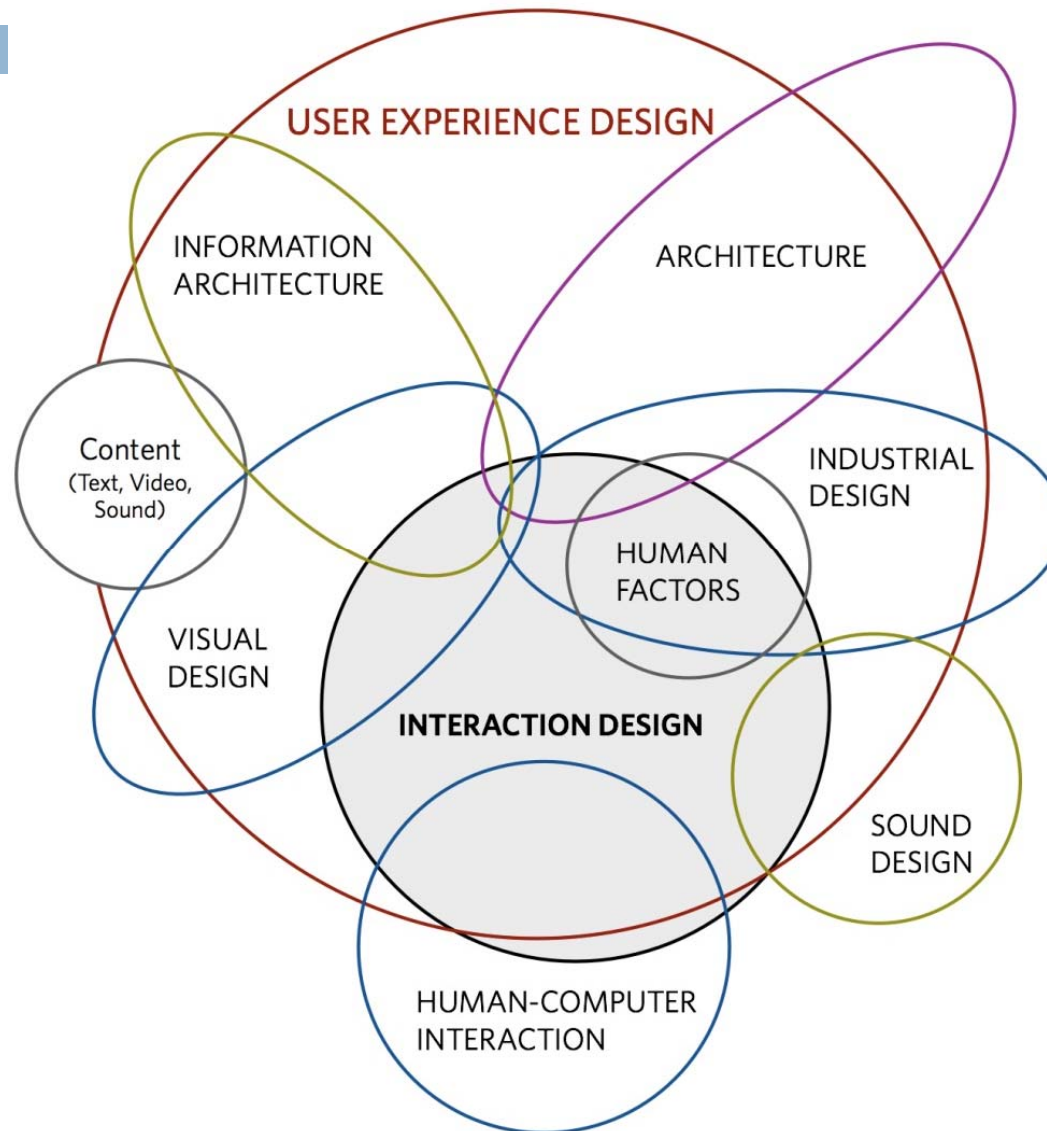
11



## ***Users' Needs Pyramid***

*suggested by Aaron Walter (UX designer of Mailchimp)*

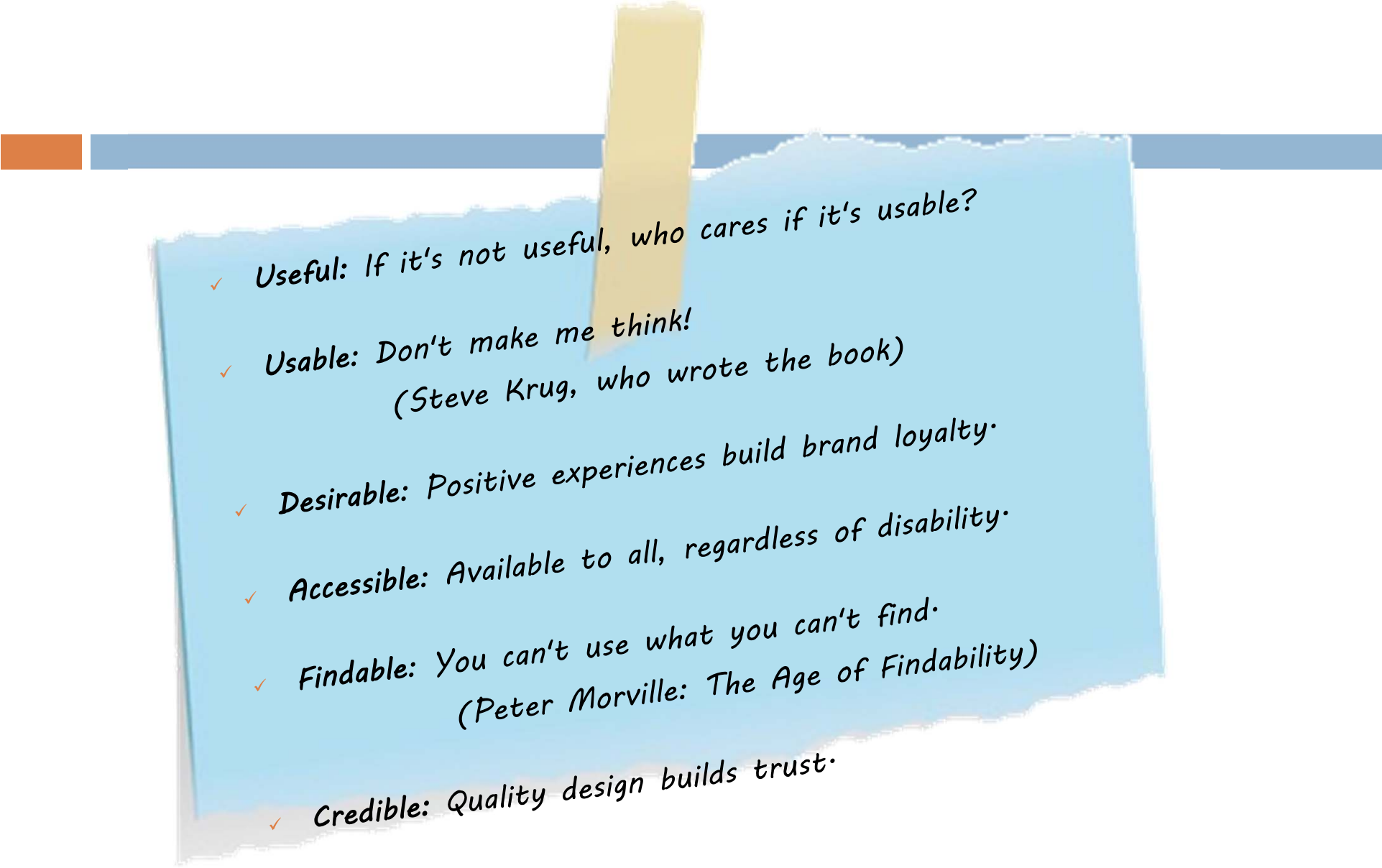
# IxD vs User Experience Design



# UX honeycomb ( Peter Morville )



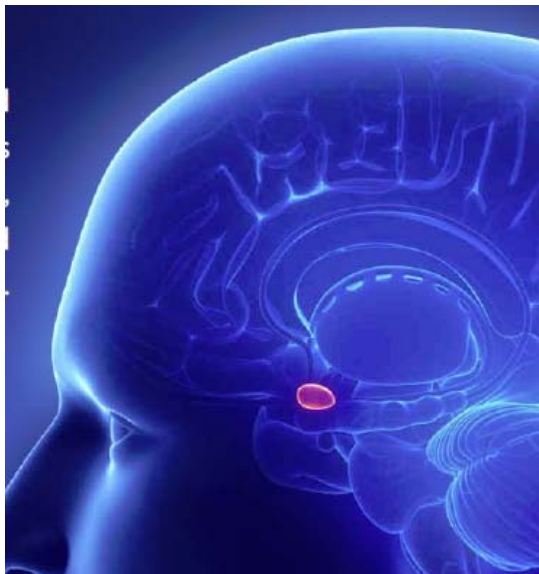
<http://www.poetpainter.com/thoughts/category/Experience-Design-Strategy/>

- 
- ✓ Useful: If it's not useful, who cares if it's usable?
  - ✓ Usable: Don't make me think!  
(Steve Krug, who wrote the book)
  - ✓ Desirable: Positive experiences build brand loyalty.
  - ✓ Accessible: Available to all, regardless of disability.
  - ✓ Findable: You can't use what you can't find.  
(Peter Morville: The Age of Findability)
  - ✓ Credible: Quality design builds trust.

# UX+ Emotion= Unforgettable

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- In an **emotionally charged experience**, the amygdala releases dopamine into the system, which greatly aids memory and information processing.



Medina, J (2008) *Why Emotional Memories Are Unforgettable* (May 2008) *Psychiatric Times* 14-17  
[http://www.brainrules.net/pdf/JohnMedina\\_PsychTimes\\_May08.pdf](http://www.brainrules.net/pdf/JohnMedina_PsychTimes_May08.pdf)

# What to do

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- Usability clears the way for a good experience by eliminating troublesome interface **distractions**, but a **GREAT EXPERIENCE** stems from something more – an awareness of why people could or do care...

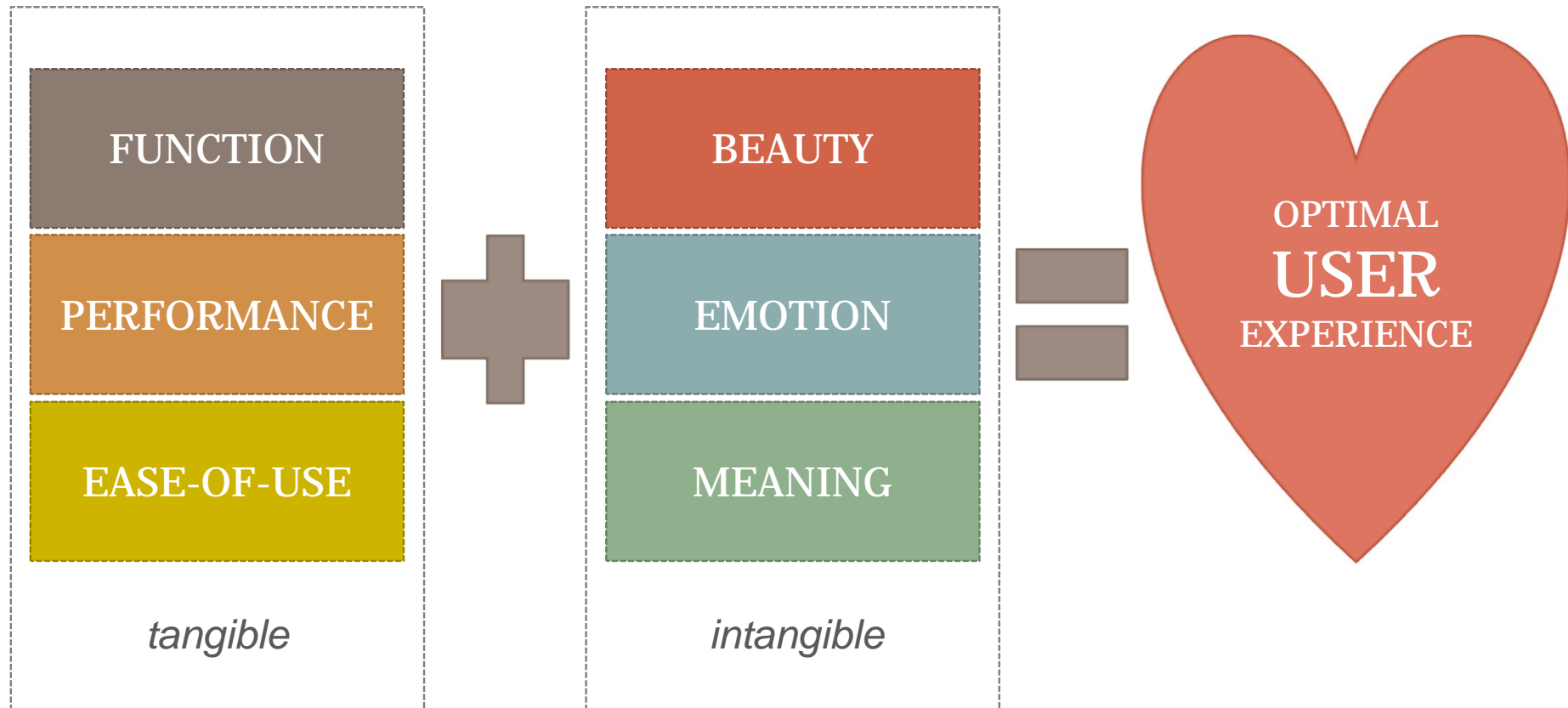
Stephen Anderson, Seductive Interaction Design



# Emotional design: Optimal User Experience

– Cindy Chastain

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# Great design

18

- *Getting people to do what YOU want*

Seth Godin

- More often, designers find ourselves working to get the user **to want what we want**.
- The goal is to create design that takes the **user's long-term needs and desires into account**, and helps him focus his **attention** and **goals** on accomplishing something worthwhile.

# Halo Effect

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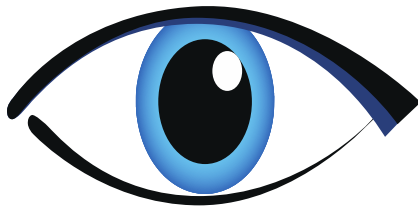
- Every decision you make on a daily basis are chosen with **emotion**... emotion is the gut instinct, a gut reaction
- The **Halo Effect** is when one trait of a person or thing is used to make an overall judgment of that person or thing. It supports rapid decisions, even if biased ones.
  - ▣ The Halo Effect is a well **documented social-psychology phenomenon** that causes people to be biased in their judgments by transferring their feelings about one attribute of something to other, unrelated, attributes.
  - ▣ For example, a tall or good-looking person will be perceived as being intelligent and trustworthy, even though there is no logical reason to believe that height or looks correlate with smarts and honesty.
- The Halo Effect works both in **both positive and negative directions**.

Source: <http://www.nngroup.com/articles/halo-effect/>

# Emotional design: Levels of Processing

– Donald Norman

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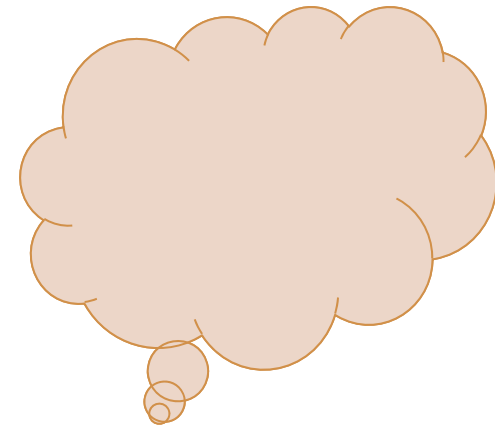
## VISCERAL

*pre-consciousness  
attractiveness  
first impression*



## BEHAVIORAL

*use of product  
function  
performance  
usability*



## REFLECTIVE

*full impact of  
thought & emotion  
message  
culture  
meaning of product  
or its use*

# Visceral Design

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- To design for **appearance** → **attractiveness**
  - ▣ “I like it?”, “I don’t like it?”
- To design the **look, shape, physical feel, structure of materials** in an effective way.
  - ▣ What it is necessary is the immediate emotion that has to be able to offer a **good feeling** and a **pleasant appearance**
- This design is based on a **predefined** and **coherent criteria** according to different **populations** and **cultures**



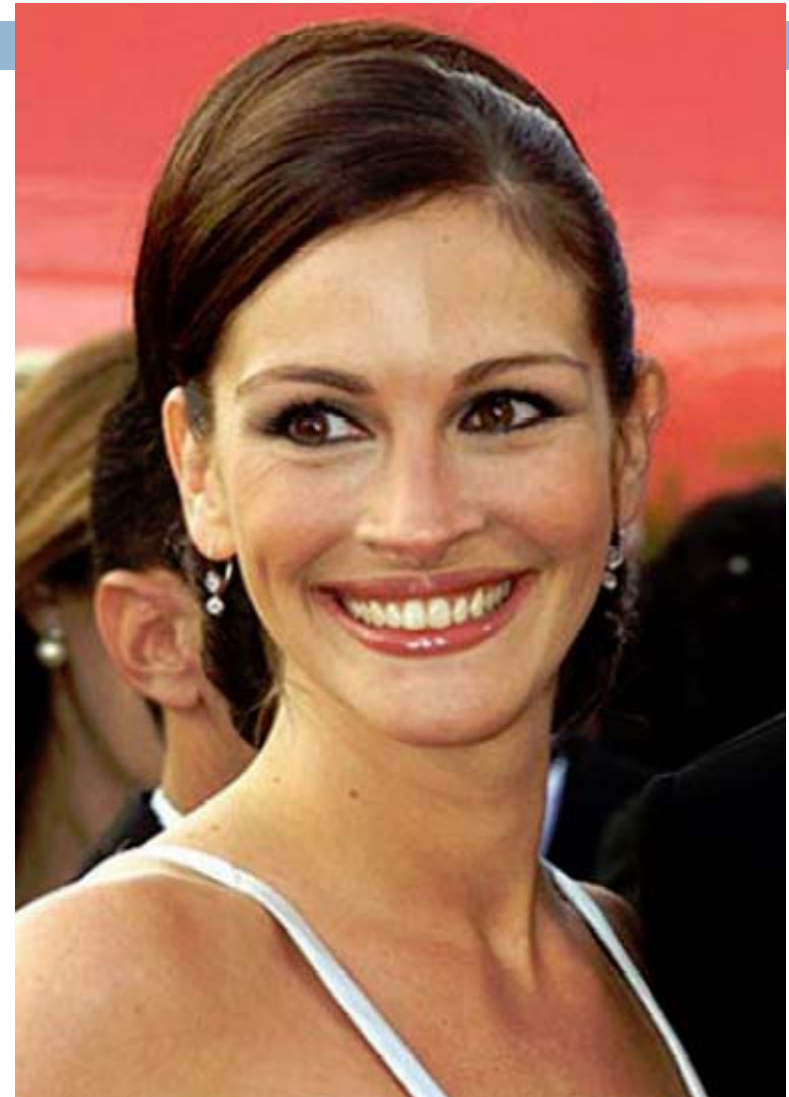
What detects cliffs – why we're afraid of heights



We like sweet but not bitter tastes. In plants, poison tends to be bitter, fruits sweet so that animals will eat them and carry and spread their seeds

Like symmetry. Asymmetry suggests malformation, bad health.

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# Behavioral Design

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- To design for the **function, comprehensibility** and **usability** and **performance** → **Behavioral is what we do.**
- ▣ **Function:** to define a goal of an object focusing on the strategic aspects of its utility
  - If an object doesn't present a specific and clear functionality, then it can be also very **pleasant** and **engaging** but it will **deserve to fail**
  - **Comprehensibility** : if an user is not able to understand a product, then he/she is not able to use it or to use it in a good way
  - The secret is to realize a good **conceptual model**

# Peels well, good grip

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# Reflective Design

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- To design in relation to the **message**, the **culture**, the **meaning** of a product and its **use** → **Reflective is how we interpret something**
- The reflective design produces **knowledge**
  - ▣ that it is generated starting from the **reasoning** carried out at the base of the application itself

Norman's Three Levels of Design

# Provokes conversation

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# Mini Cooper (1)

29



This car has many flaws.  
But it anyway – it's so much fun to drive.

New York Times reviewer

# Mini Cooper (2)

30



Old-fashioned toggle switches that are fun to flip.

# Sony Aibo

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- Sony Aibo. Designed to be like a puppy to make it more **endearing** despite its **rough capabilities**



# How to design for emotion

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- **Emotional design needs:**
  - ▣ evoke trust
  - ▣ simplify the workflow
  - ▣ personalize
  - ▣ delight
  - ▣ make an emotional connection



# Emotional design strategy -1

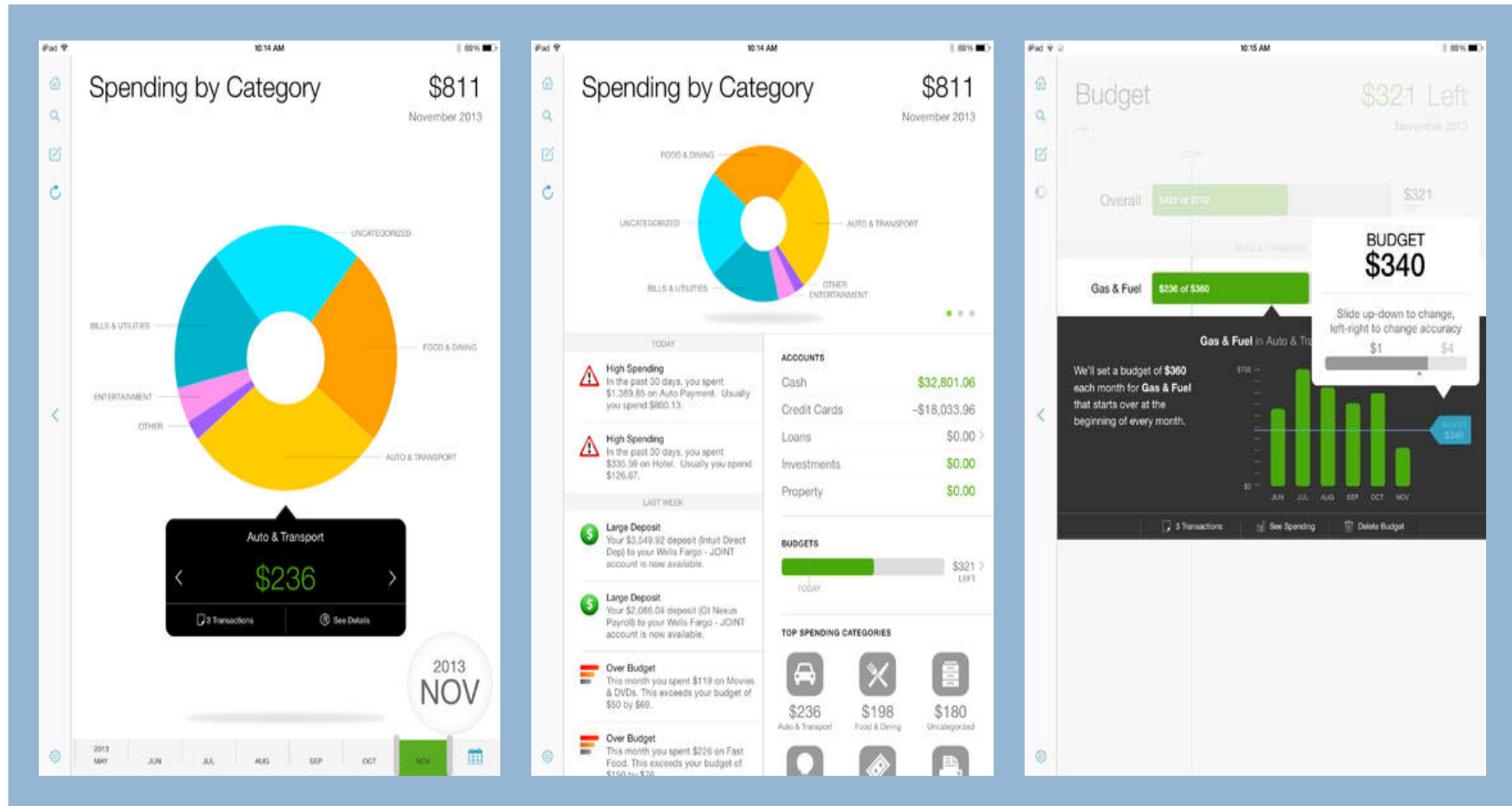
33

## □ Evoke trust

- “Interactions rarely happen with people we don't trust.” - *Seth Godin*
- **“Trust is a gut feeling ...more than a rational process**



# Mint.com for iPad



- Consumer trust was the most critical challenge for Mint.com when it launched. Its crisp, clean and polished visual design helps **evoke trust**.

# Emotional design strategy - 2

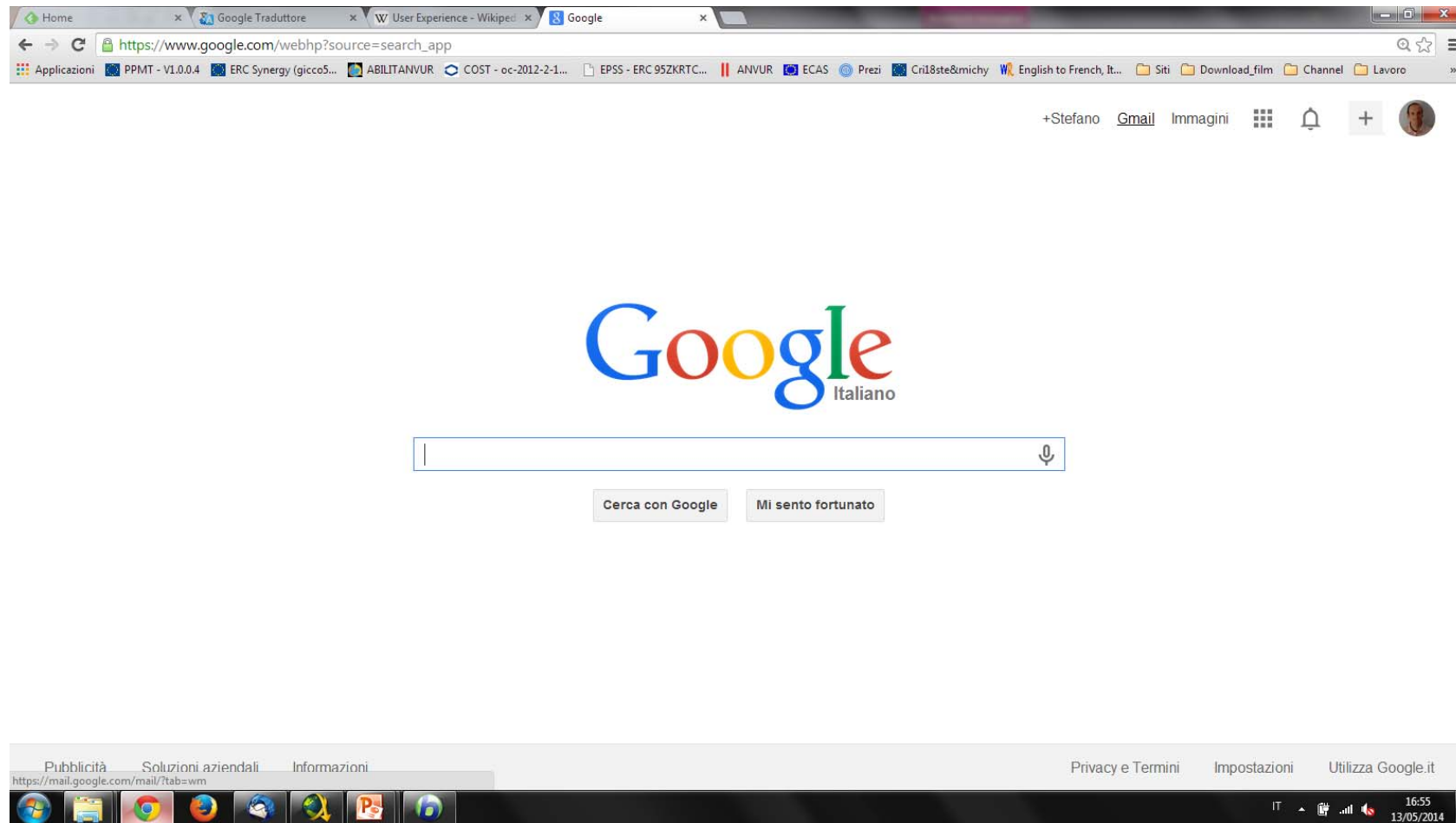
35

## □ **Simplify the workflow**

- “People liked ‘less.’” - *Jakob Nielsen*
- Simplifying down to just a few options helped people not get confused by having a new interface, which would be
  - SCARY FOR DOCTORS

# Google research Engine... is simple

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# ScoreCleaner for iPhone

connected

Record

SCORECLEANER

Archive

Archive

Deck the ha...  
Tue 25 Sep - 11:16

$\text{♩} = 126$

Play

0:00 -0:15

Settings

Record

Archive

Edit

Petronella - Wed 12 Sep - 09:09 0:19

Twinkle twinkle little star - Thu 6... 0:04

Who can sail without wind? - Wed... 0:22

Traditional - Wed 5 Sep - 10:51 0:17

Bassline - Wed 5 Sep - 10:41 0:15

Scale - Wed 5 Sep - 10:38 0:21

Account

Deck the halls

$\text{♩} = 126$

# Emotional design strategy - 3

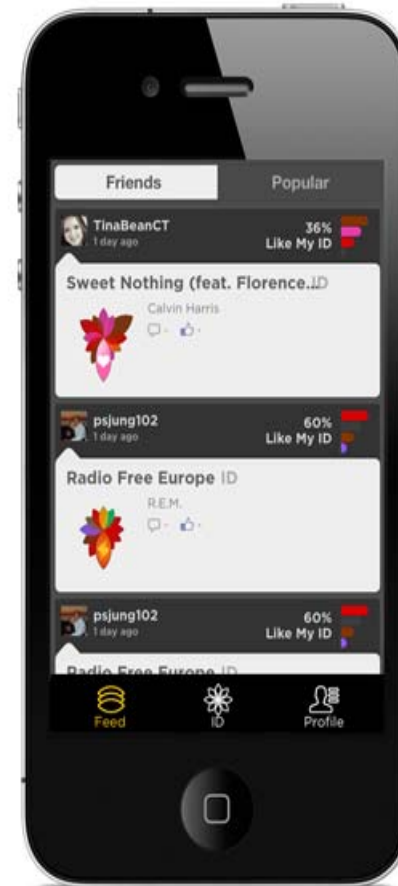
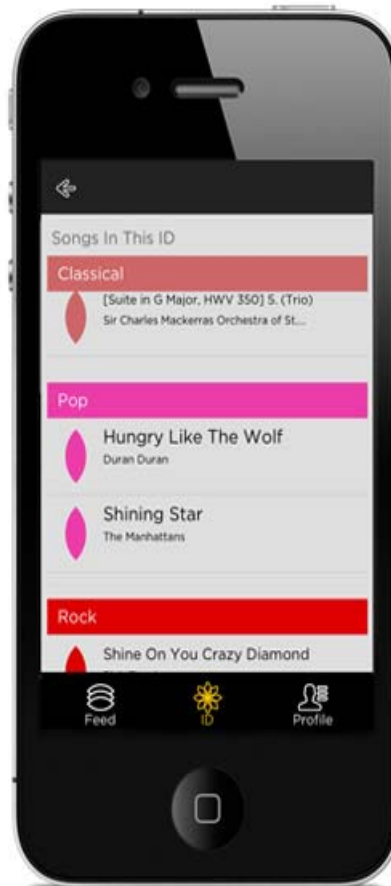
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## □ Personalize

- “Products are people too.” - Aarron Walter
- “The ability to personalize something makes it yours.” - *Don Norman*



# Miyamo for iPhone



# Emotional design strategy - 4

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## □ Delight

- “The pleasurable layer is very powerful.” - *Aarron Walter*
- People will forgive your shortcomings, follow your lead, and sing your praises if you...
  - **reward them with positive emotion** - *Aarron Walter*

## □ UI aesthetic usability effect

- A user will perceive an attractive product as **easier to use** than an **ugly one**. It doesn't matter if they are easier to use or not they are **perceived** as such.
  - users tolerate faults more
  - more likely to develop positive feelings
  - willing to share with friends



# Designing for Emotion

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## □ Source:

- Designing for Emotion – Aarron Walter
- <http://www.youtube.com/watch?v=ks91vBm3oT8>
- <https://www.youtube.com/watch?v=LNGQwT0bNYQ>

# Emotional design strategy - 5

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## □ **Make an emotional connection**

- ▣ “Empathy is the way we connect with one another, it is the platform for emotion.” - *Aarron Walter*
- ▣ “Attractive things make people feel good which in turn makes them think more creatively.” - Don Norman

[How to Create an Emotional Connection With Design](#)

Enjoy MURPHY'S Sensibly. Visit [drinkaware.ie](http://drinkaware.ie)



# WHEN IT RAINS, IT POURS.





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## WWF Together for iPad



*In-depth, interactive stories of endangered animals, including giant pandas, tigers, elephants, marine turtles, and polar bears.*



*Playful interactive elements that incorporate the iPad's unique features like swiping sea ice to reveal facts.*



*Touch gestures create unique experiences, such as chopping the panda's bamboo.*



*The iPad's camera is used to simulate the tiger's vision.*



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# CLOUDS OVER CUBA

THE CUBAN MISSILE CRISIS AND WHAT MIGHT HAVE BEEN

RESUME DOCUMENTARY

PLAY FROM BEGINNING



REAL-TIME CALENDAR



DOCUMENT DOSSIER



SYNC WITH MOBILE



CHAPTER SELECTION

MAIN MENU

SHARE



FOLLOW JFK



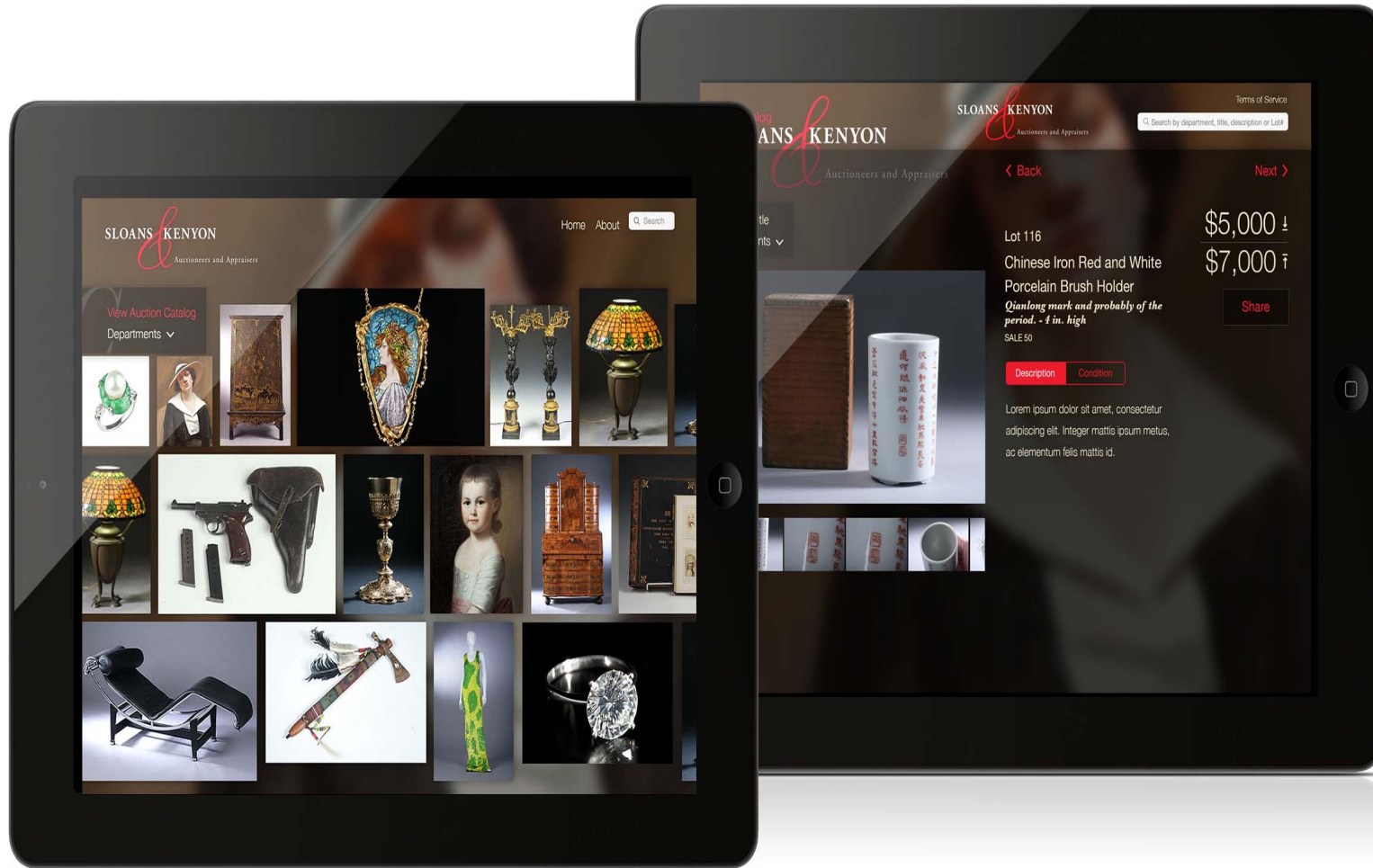
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TERMS

PRIVACY







## Sloans & Kenyon Auctioneers for iPad

<https://itunes.apple.com/us/app/vip-black/id321971059?mt=8>

# In conclusion

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## □ ***Emotional design needs:***

- evoke trust
- simplify the workflow
- personalize
- delight
- make an emotional connection

→ **affective interaction design**

# UX and emotion design for an affective experience

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- How to design for **appearance** ? (Visceral design... but not only)
  - ▣ How to support emotional design through **visual design strategies**
  - ▣ Visualization = graphical representation of data/concepts [Ware, 2004]
- Main elements [*Dan Saffer, 2006*]:
  - ▣ Layout
  - ▣ Grid
  - ▣ Visual flow
  - ▣ Typography
  - ▣ Color, Shape, Texture



# Visual Design features

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- **Layout:** where & how content and interaction controls are placed
  - <http://alistapart.com/topic/layout-grids>
  - [Adaptive vs. Responsive Design](#)
- **Grid:** gives a coherent structure of information
  - [www.thegridsystem.org](http://www.thegridsystem.org)
- **Visual Flow:** refers to methods of understanding and/or interacting with presented data
  - [Visual Movement: Flow in Web Design](#)
- **Typography:** presents the textual content via fonts conforming to certain presentation rules
  - <http://webtypography.net/toc>
- **Visual dimensions:** such as: Color, shape, texture that are used for a proper perception of information







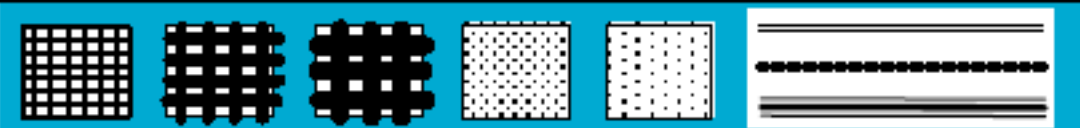
# Visual Design: visual dimensions

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- To properly present information, **visual dimensions** are used
- Visual dimensions are distinguished via **visual variables** [*Jacques Bertin, 1989*]

# Visual Design: visual dimensions

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Bertin's Original Visual Variables	
<b>Position</b> changes in the x, y location	
<b>Size</b> change in length, area or repetition	
<b>Shape</b> infinite number of shapes	
<b>Value</b> changes from light to dark	
<b>Colour</b> changes in hue at a given value	
<b>Orientation</b> changes in alignment	
<b>Texture</b> variation in 'grain'	

# Visual variables

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- Different **perceptions** regarding a certain **visual dimension**
- Visual variables have different **levels of perception**
  - ▣ Most important levels – **hue** and **value**
  - ▣ Then → **size**
  - ▣ Finally → **orientation**
- Some **visual variables** could not be **easily recognized**



detect all letters placed in the right



detect all letters placed in the right  
we must perceive only the position

detect all **green** letters



detect all **green** letters  
we are using hue as a visual variable



N M Z K Z N M K Z N  
M K N M K N M K Z M K  
Z K M Z M N M Z N M K  
N M K M M N M Z N K Z  
K N K Z N M N K M

detect all N letters



detect all N letters (shape)  
interferences: multiple visual variables

# Visual variables → Gestalt

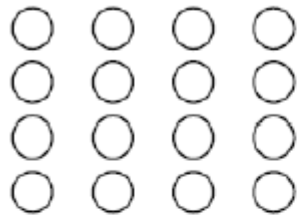
59

- Modularity (grouping) could be achieved by considering **the Gestalt principles of perception**
  - ▣ using visual perception, the mind creates the entire picture (Gestalt) from existing fragments

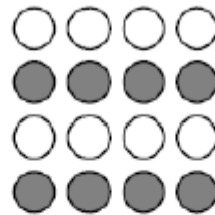
# Gestalt

60

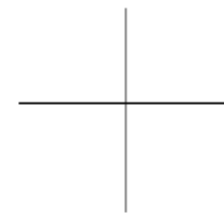
**proximity**



**similarity**



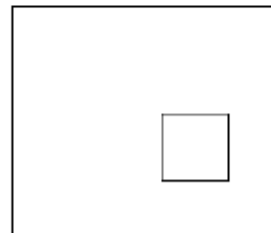
**continuity**



**closure**



**area**



**symmetry**



[www.interaction-design.org/encyclopedia/data\\_visualization\\_for\\_human\\_perception.html](http://www.interaction-design.org/encyclopedia/data_visualization_for_human_perception.html)

various examples: <http://tinyurl.com/y6ao7k>

# Visual variable → Color

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- Building the base level **emotional response** using **color theory**
- **Color matters** – in the next slides we discuss about:
  - ▣ *Symbolism*: the meanings of colors
  - ▣ *Color* and *Design*
  - ▣ Color *Blindness*

# Symbolism: the Meanings of Colors 1 / 2

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- **Color** as visual code



- Psychological (emotional) effects

“women perceive men to be more attractive [...] when seen on a **red** background and in **red** clothing”

A.J. Elliot et al., “Red, rank, and romance in women viewing men”,  
J Exp Psychol Gen. 139 (3), 2010

# Symbolism: the Meanings of Colors 2/2

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- Certain colors have multiple (cultural/philosophical/social) semantics

- **Green** → victory (ancient Greece)

*versus*

- **Green** → fertility (Middle Ages)

- **Culture Makes a Difference**



**Australian Aboriginals:** Land, earth

**Celtic:** Death, afterlife

**China:** Good luck, celebration

**Cherokees:** Success, triumph

**Hebrew:** Sacrifice, sin

**India:** Purity

**South Africa:** Color of mourning

**Eastern:** Happiness and prosperity

**Western:** Excitement, danger, love, passion

# Choosing the Correct Hue

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Products with a feel-good message  
Happiness, energy, encouragement



Health care (but not food!)  
Relatable, calm, friendly, peace, security



Startups / innovative products  
Creativity, imagination



Auction sites (but not sales sites!)  
Passion, stimulation, excitement, power

[The Meanings of Colors](#)

[Stanford Encyclopedia of Philosophy - Color](#)



# Global Color Survey

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Happy	Yellow
Pure	White
Good Luck	Green
Dignity	Dark Blue
High Technology	Silver
Mourning	Black
Expensive	Gold
Inexpensive	Brown
Deity	White
Bad Luck	Black
Favorite Color	Blue
Least Favorite Color	Dark Yellow

- colour semantics survey results (130,000+ answers)
- <http://www.colormatters.com/color-symbolism/global-color-survey>

# Color Symbolism Theories

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- The **communicative properties** of a color is based on two categories:
  - ▣ **natural associations** and
  - ▣ **psychological (or cultural) associations**

# Natural Associations

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- Occurrences of colors in nature are
  - ▣ **universal**
  - ▣ **timeless**
- For example,
  - ▣ The green is the color of **vegetation** and the blue is the color of the **sky** and **water** →
  - ▣ These color associations are **common to all people**. Therefore, this symbolism is both timeless and universal.

# Psychological or Cultural Associations

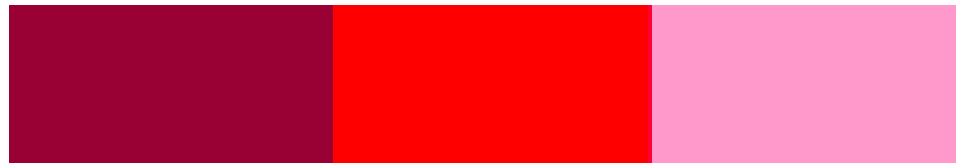
68

- This symbolism arises from **cultural** and **contemporary contexts**
  - ▣ **Green** → fruitfulness, freshness and ecology **but also** good luck, seasickness, money and greed
- Furthermore, color may have both **positive** and **negative symbolism**
  - ▣ **Blue** → blue is the beautiful color of the sky on a sunny day, but also it can be symbolic of sadness or stability
  - ▣ **Red** → is the color of fire and blood, it is an energizing, aggressive and bold color but also red is used for “STOP” signs

# Color Symbolism Influences 1 / 2

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- There are several factors that influence the **symbolism of a color**:
- **The specific shade (variation) of a color:**  
Dark and light shades of any color convey completely different meanings.
  - ▣ E.g. **pink** loses all of **red's** associations with energy and takes on new connotations of tenderness and sweetness.
  - ▣ **Dark blue** is dignified and authoritative, **sky blue** is ethereal and softer.



# Saturation Makes a Difference!

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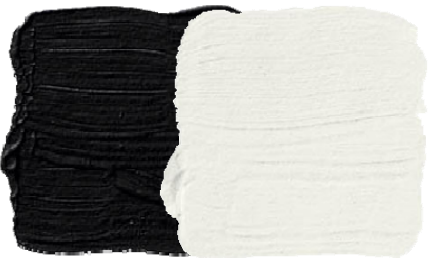
**Dark:** Rage, anger, leadership, courage

**Light:** Romance, feminine, innocence



**Dark:** Moodiness, unease, frustration, power

**Light:** Nostalgia, romance, softness



**Dark:** Power, elegance, mystery

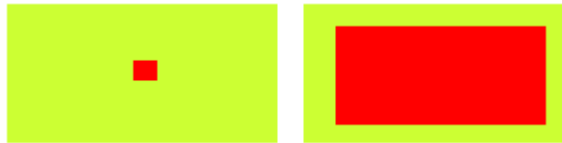
**Light:** Clarity, openness, perfection

# Color Symbolism Influences 2/2

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- **The quantity and placement of the color:**

Colors deliver the most powerful symbolism when used in large areas.



- **The shape or object the color occupies:**

Symbolism becomes more complex when a color is used in combination with a basic shape.



- **The color combination:**

Colors take on new meaning when combined with other colors.

- For example, red and green are the colors of Christmas in Western cultures

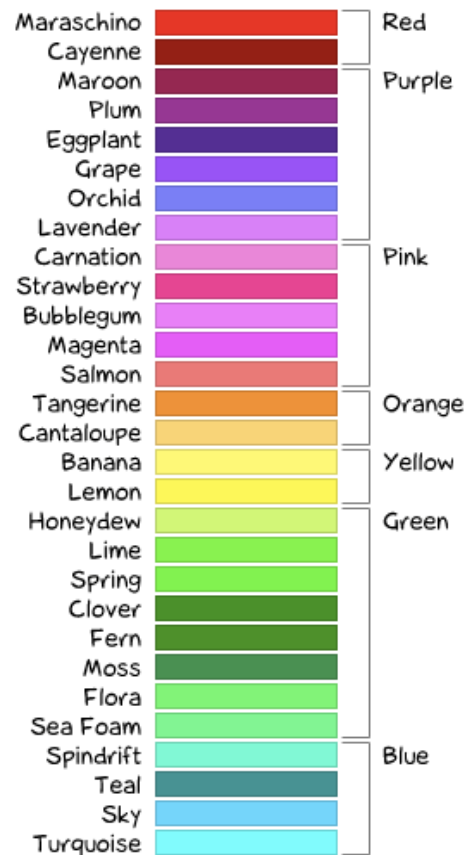


# Gender Differences

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- **Stereotypes** say that guys have much smaller color vocabularies.

Color names if  
you're a girl...



Color names if  
you're a guy...

Doghouse Diaries  
"We take no as an answer."



# Gender Differences

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- ... it isn't quite true, as Randall Munroe has shown in a really excellent post, but it's still a funny stereotype.

*Actual color names*      *Actual color names*  
if you're a girl ...      if you're a guy ...



# Basic Color Theory

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- **Color theory** encompasses a multitude of definitions, concepts and design applications
- Basically, there are **three categories** of color theory that are logical and useful :
  - ▣ **The color wheel,**
  - ▣ **The color harmony,**
  - ▣ **The context of how colors are used.**

# The Color Wheel

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- A color circle, based on red, yellow and blue, is traditional in the field of art



- Definitions (or categories) of colors based on the color wheel:



Primary Colors



Secondary Colors



Tertiary Colors

# Color Theory and the Base Level

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- **Primary Colors:** Red, yellow and blue
  - ▣ In traditional color, primary colors are the 3 pigment colors that can not be mixed or formed by any combination of other colors.
- **Secondary Colors:** Green, orange and purple
  - ▣ These are the colors formed by mixing the primary colors.
- **Tertiary Colors:** Yellow-orange, red-orange, red-purple, blue-purple, blue-green & yellow-green
  - ▣ These are the colors formed by mixing a primary and a secondary color. That's why the hue is a two word name, such as blue-green, red-violet, and yellow-orange.



**Primary color**  
Principal Emotion



**Filler Color**  
Neutral glue



**Accent colors**  
Secondary emotional response

# Color Harmony

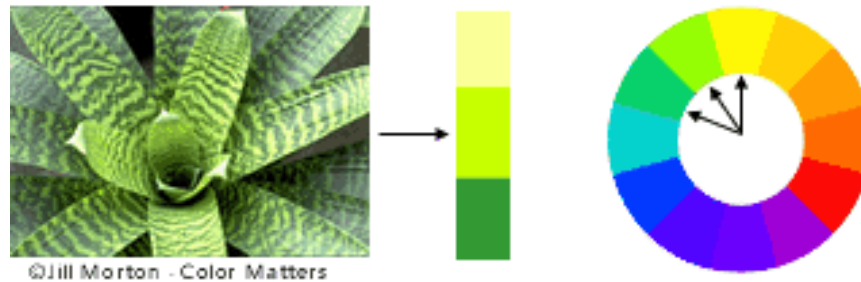
77

- **Harmony** can be defined as a pleasing arrangement of parts, whether it be music, poetry, color, ...
- In **visual experiences**, harmony is something that is pleasing to the eye.
- **Extreme unity** leads to under-stimulation, **extreme complexity** leads to over-stimulation. **Harmony** is a dynamic equilibrium
  - ▣ The human brain rejects what it can not organize, what it can not understand. The visual task requires that we present a logical structure. ***Color harmony delivers visual interest and a sense of order***

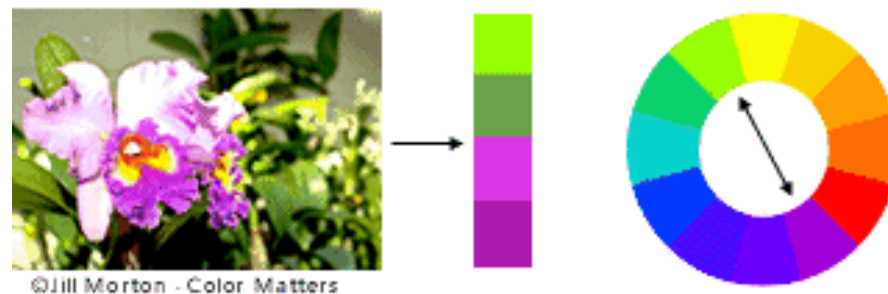
# Some Formulas for Color Harmony 1/2

78

- A **color scheme** based on **analogous colors**



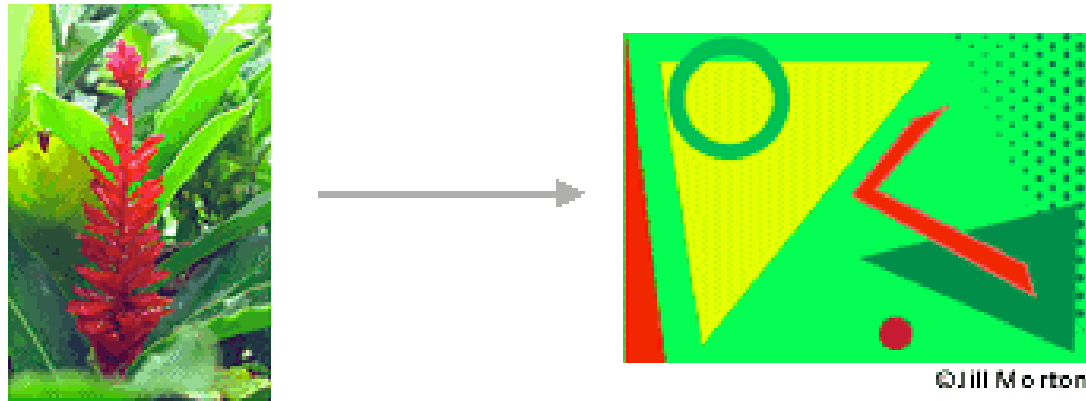
- A color scheme based on **complementary colors**



# Some Formulas for Color Harmony 2/2

79

- A color scheme based on **nature**



- Nature provides a perfect departure point for **color harmony**
- Pleasing arrangement of things
  - → **visual aesthetics**

# Color Harmony as Visual aesthetics 1/2

80

- Visual aesthetics as a differentiating factor



[www.interaction-design.org/encyclopedia/visual\\_aesthetics.html](http://www.interaction-design.org/encyclopedia/visual_aesthetics.html)



# Color Harmony as Visual aesthetics 2/2

81

**Visual aesthetics**



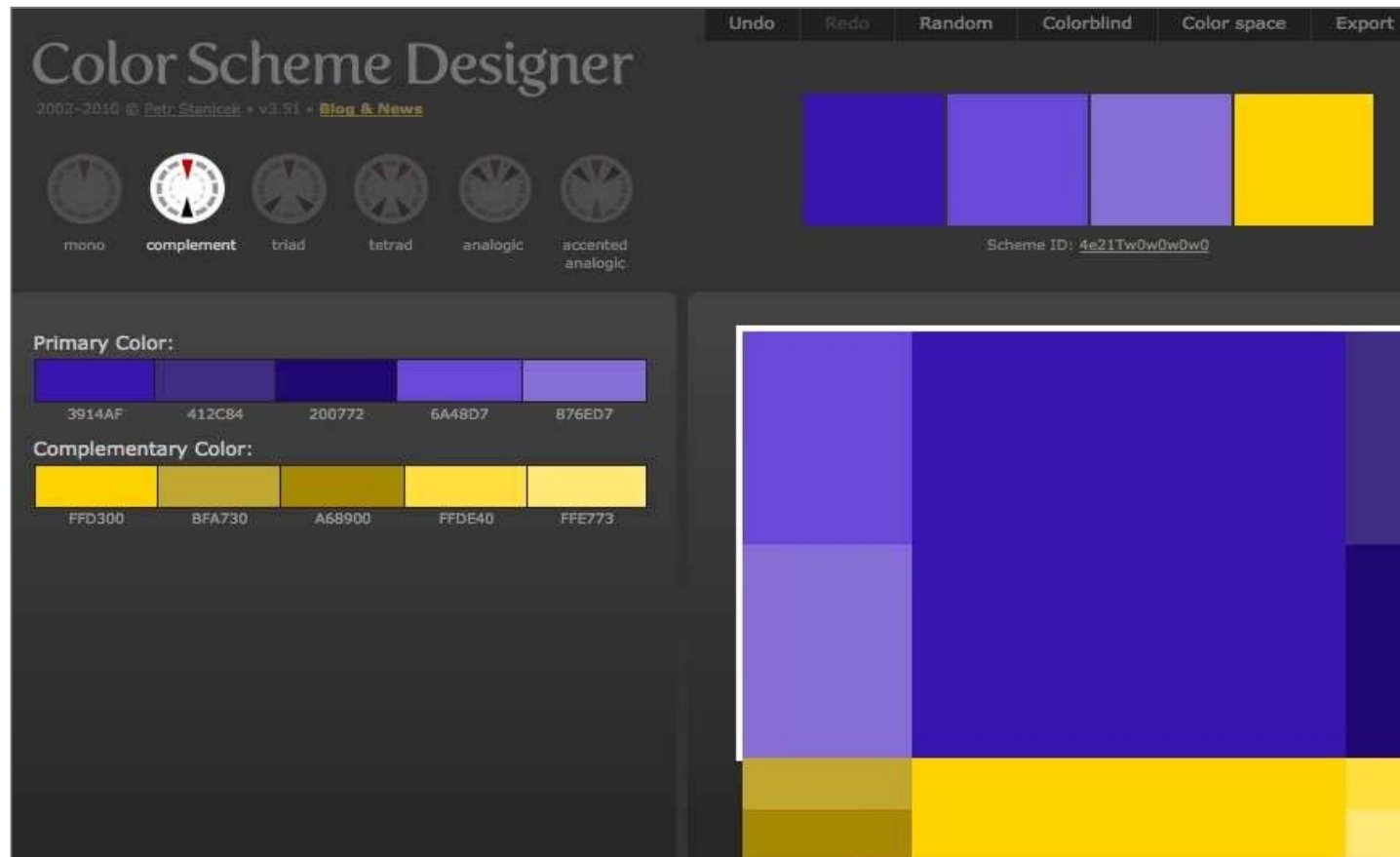
**User satisfaction + positive emotion**



**User experience (UX)**

# Color Harmony: how to do it 1/5

82



complement      harmony

# Color Harmony: how to do it 2/5

83



triad harmony

# Color Harmony: how to do it 3/5

84



triad harmony

# Color Harmony: how to do it 4/5

85



tetrad harmony

# Color Harmony: how to do it 5/5

86

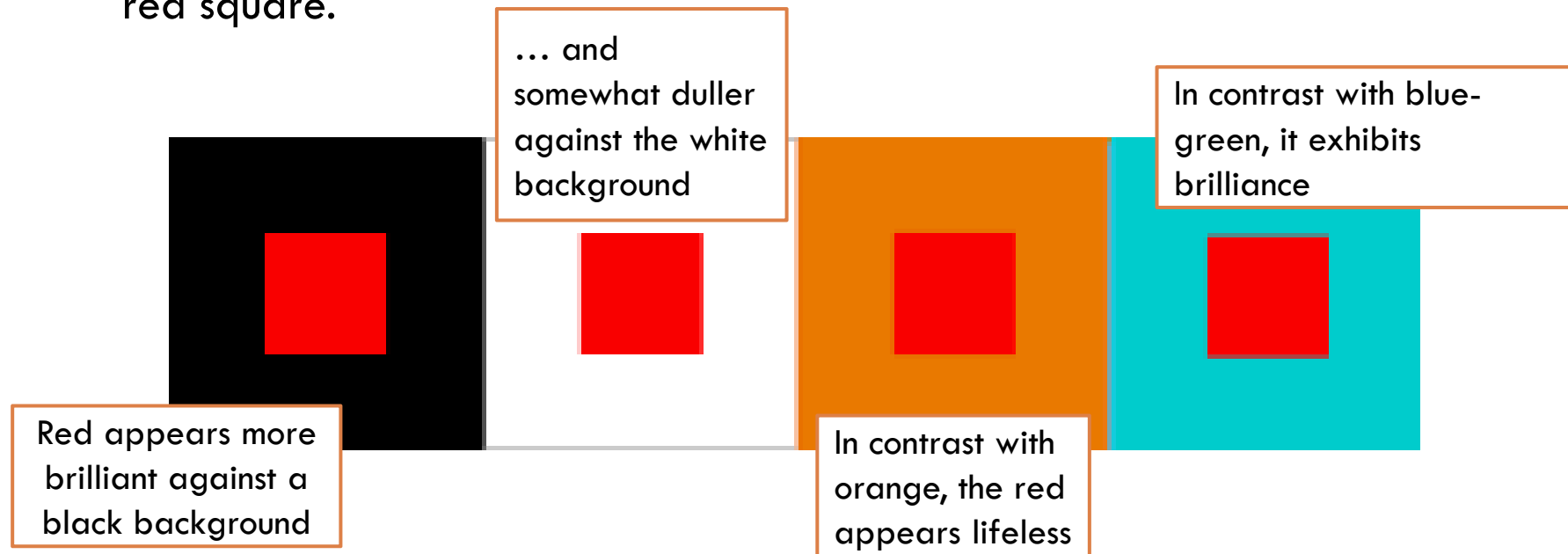


accented analogue harmony

# Color Context

87

- How **color behaves** in relation to **other colors** and **shapes** is a **complex area** of color theory.
  - ▣ Compare the contrast effects of different **color backgrounds** for the same red square.



- Notice that the red square appears larger on black than on other background colors

# Different readings of the same color

88

- The small purple rectangle on the left appears to have a **red-purple tinge** when compared to the small purple rectangle on the right.
  - ▣ This demonstrates how three colors can be **perceived as four colors**



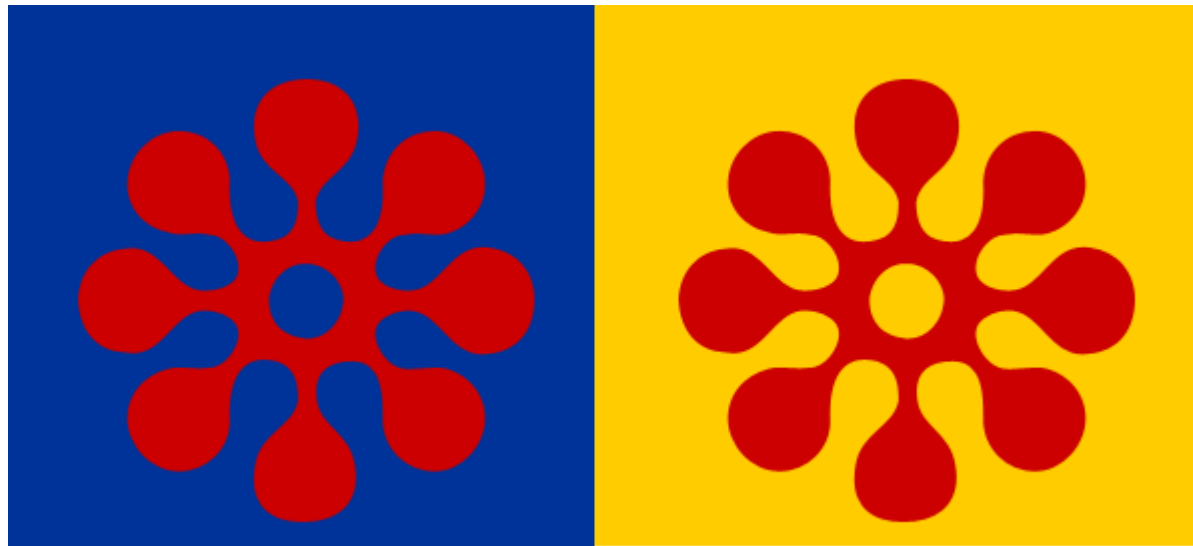
- The relationship of **values, saturations** and the **warmth** or **coolness** of respective hues can cause noticeable differences in our **perception of color**



# Color juxtaposing could be “dangerous”

89

- The color scheme on the left is **extremely hard** on the eye, while on the right the colors work well together and have an uplifting feel.



[www.sitepoint.com/principles-of-design-colour/](http://www.sitepoint.com/principles-of-design-colour/)

# Color & Usability Matters

90

- Color plays a **powerful role** in helping you use a tool or navigate a space
- **Color Coding for Wayfinding**
  - ▣ Color is the **critical factor** in the success of the visibility and readability of these signs.



- ▣ From the **visual interface** colors and symbols help you find your way and get the job done.

# Color for web design → Hue

91

- The use of the hue
  - It denotes an **object's color**. When we say “blue,” “green” or “red,” we’re talking about hue. The hues you use in your designs convey **important messages** to your website’s visitors
- Using a lot of **pure hues** together can **add** a **fun** and **playful** look to a design

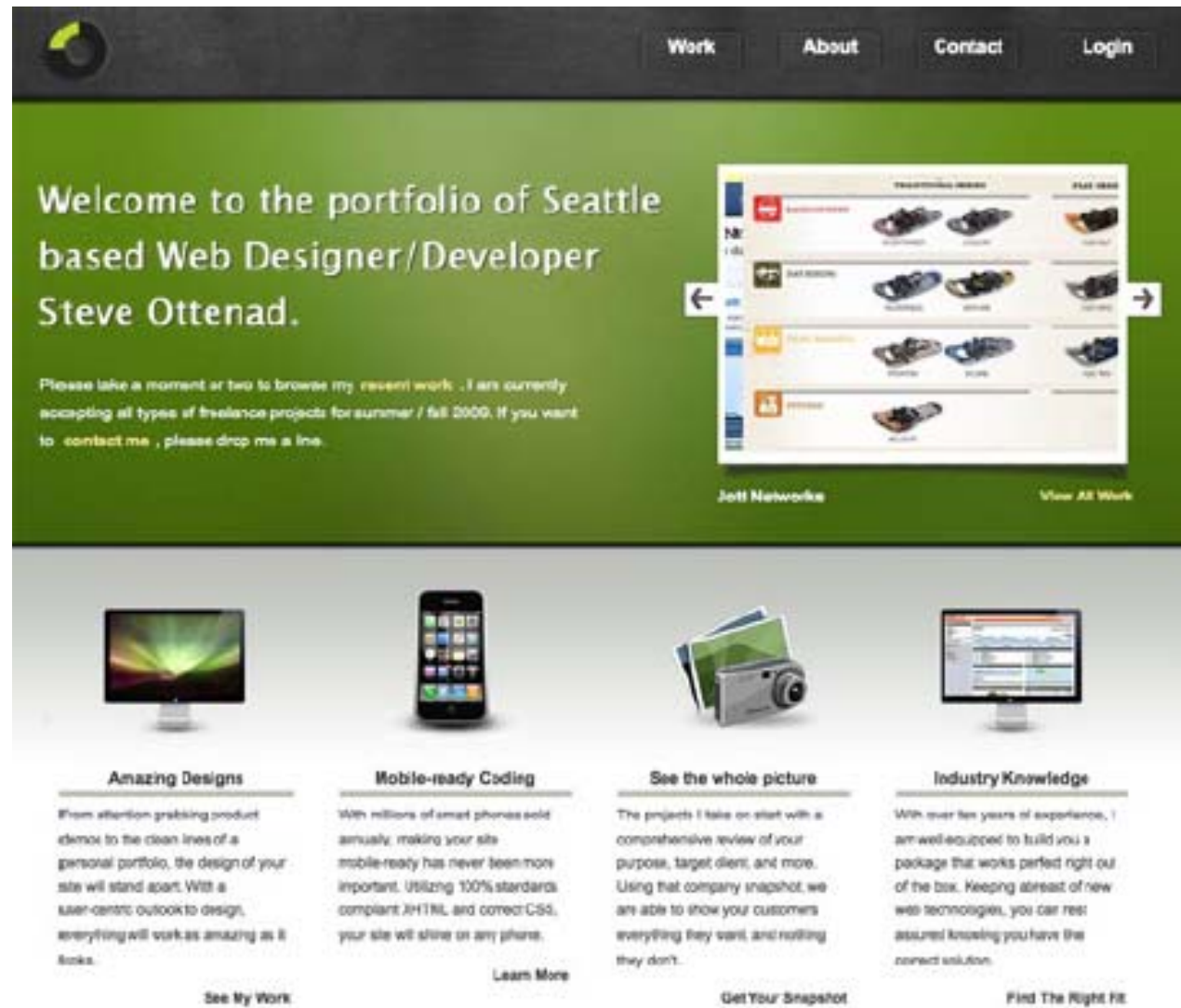
# Some examples

92



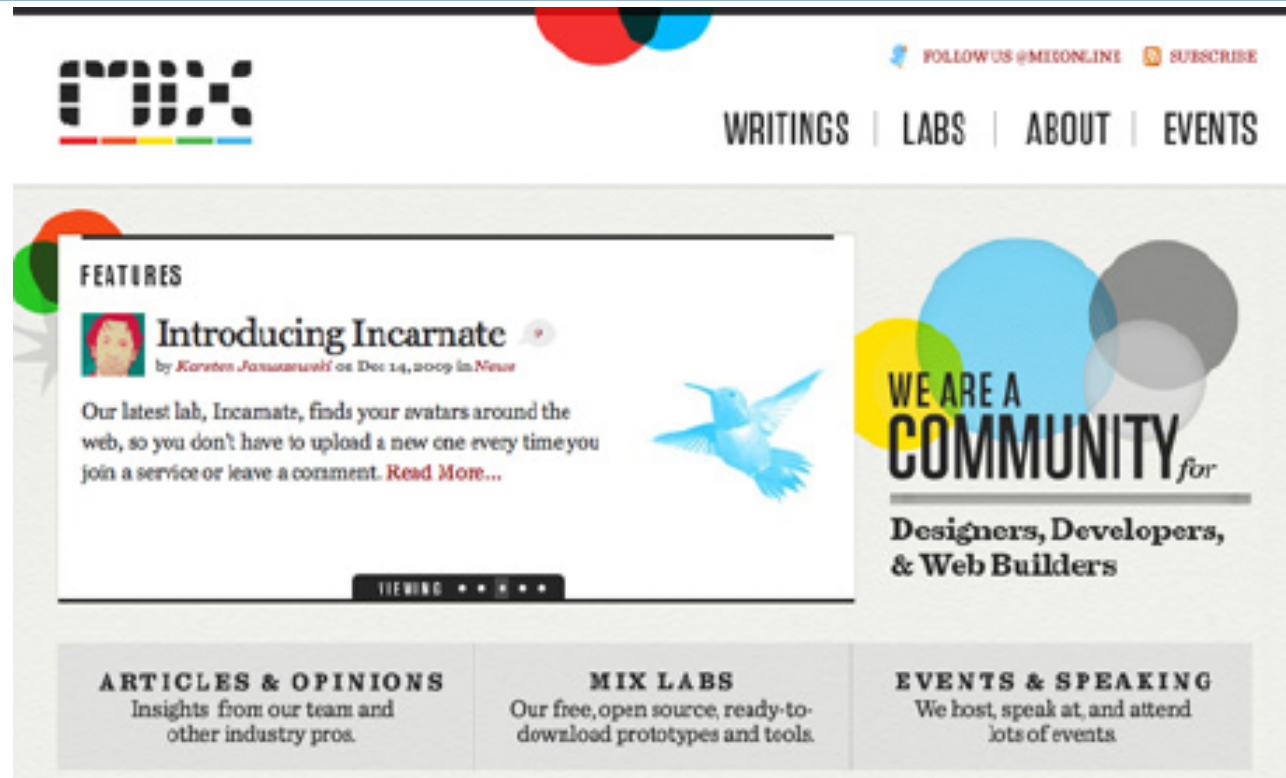
# Some examples

93



# Some examples

94



# Some examples

95

**estilorsms\*** [home](#) [nosotros](#) [servicios](#) [trabajos](#) [blog\\*](#) [contacto](#)

Hacemos [páginas web](#) con gusto y sentido común.  
Pero como eso es difícil de explicar, lo mejor será que  
le eches un vistazo a [nuestros trabajos](#) o te pongas en  
[contacto](#) con nosotros.

### Trabajos

Hacemos todo tipo de trabajos en entorno web a todos los niveles y para todo tipo de necesidades. Si crees que nuestros trabajos encajan en tus necesidades, puedes [contactar](#) con nosotros y trataremos de ayudarte.

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Desarrollo de web de dinámicas



**Alice & Bows**  
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Ofrecemos los siguientes servicios relacionados con el entorno web:

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- [Integración XHTML+CSS, E-mail marketing y Outsourceing](#)
- [E-learning. Creación de cursos de SCORM](#)
- [Gestión de contenidos](#)

### Novedades

**Problemas de correo (solucionado)**  
**Actualización:** hemos solucionado el problema con nuestro servidor de correo.

Estamos experimentando ciertos problemas con nuestro servidor de correo. Por favor, temporalmente contacta con nosotros a través de [estilorsms@gmail.com](mailto:estilorsms@gmail.com)

[Ver más de Problemas de correo \(solucionado\)](#)

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Estamos desarrollando el nuevo sitio tienda online para [asturtienda.es](#)

[Ver más de estilorsms creará la tienda online para asturtienda.es](#)



## 96





# Color for web design → Chroma

97

- Chroma refers to the **purity of a color**.
  - ▣ A hue with high chroma has no black, white or gray in it. Adding white, black or gray reduces its chroma. It's similar to saturation but not quite the same.
- Chroma can be thought of as the **brightness** of a color in comparison to white.
- In design, avoid using hues that have a **very similar chroma**.
  - ▣ Opt instead for hues with chromas that are **the same or a few steps away from each other**

# Some examples

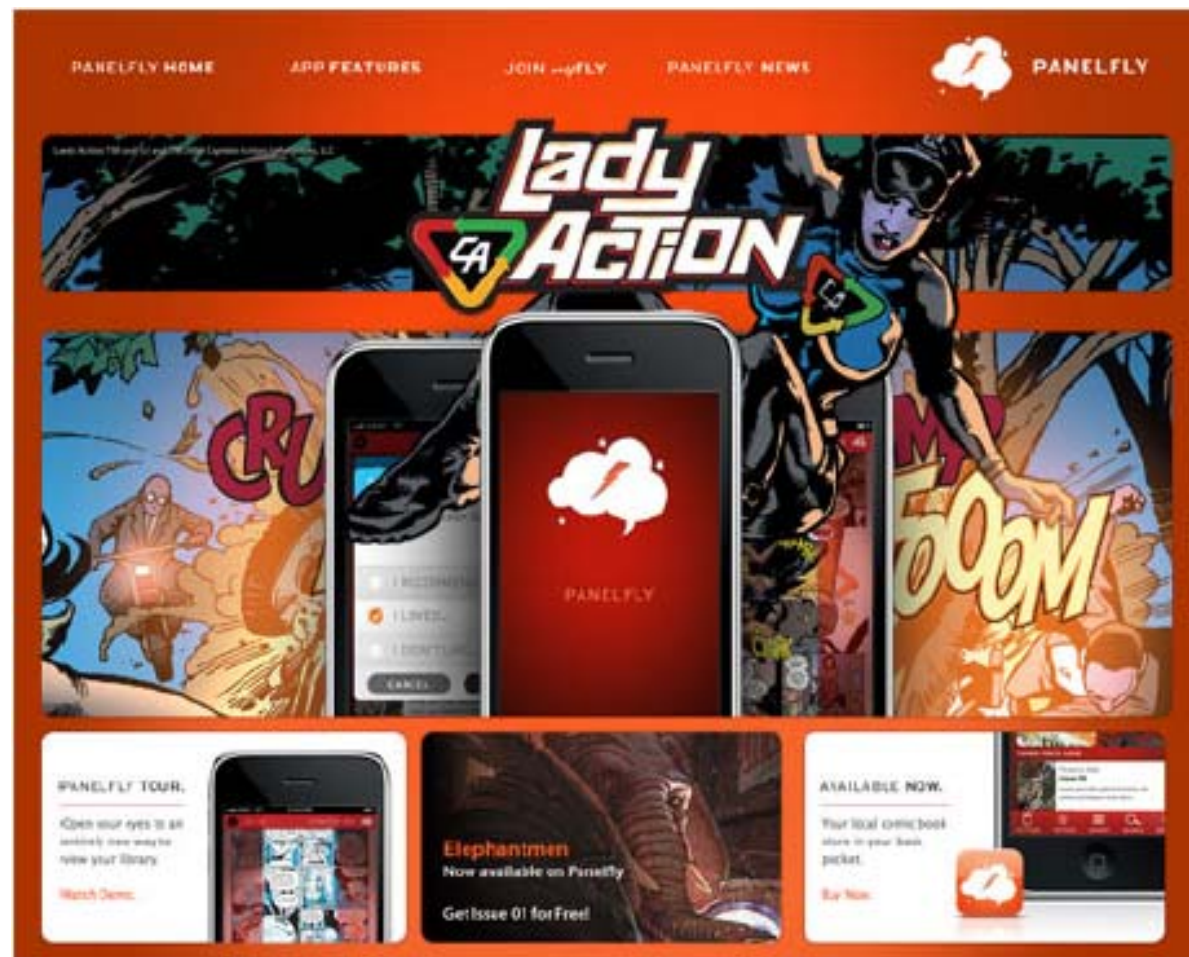
98



Cyan has a high chroma and so really stands out against black and white

# Some examples

99



Differences in chroma can make for a visually pleasing gradient.

# Some examples

100



Colors with very high chroma are best used in moderation, as done here.

# Some examples

101



Combining high and low saturation in the same hue can make for a sophisticated and elegant design.

# Color for web design → Saturation

102

- Saturation refers to how a hue appears under particular **lighting conditions**.
  - ▣ Think of saturation in terms of **weak vs. strong** or **pale vs. pure hues**.
- In design, colors with identical saturation levels make for more **cohesive-looking designs**.
  - ▣ As with chroma, colors with **similar** but not **identical** saturations can have a **jarring** effect on visitors.



# Some examples

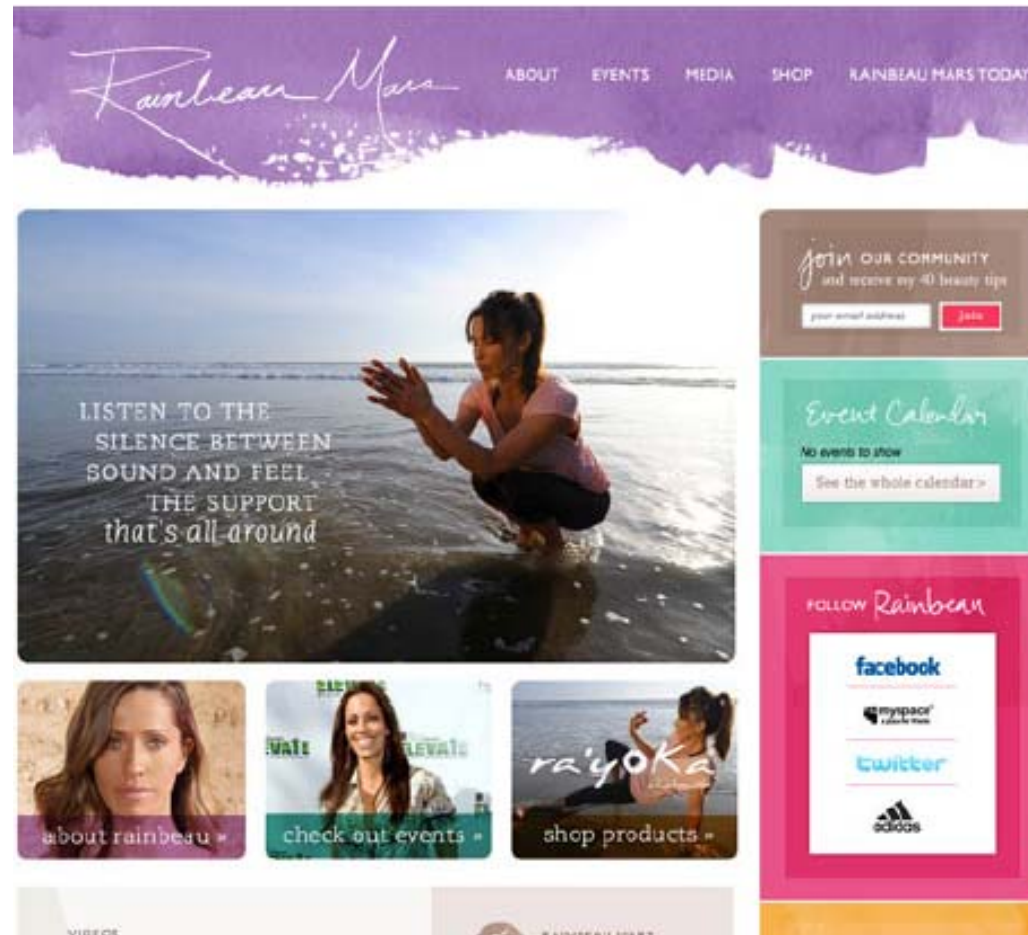
103



An excellent example of how using a hue with a high saturation against a background with low saturation can make the former really stand out.

# Some examples

104



Combining colors with similar muted saturation levels creates a soft design, which is emphasized by the watercolor effects.



# Some examples

105



The saturation levels of many of the different hues used here are similar, adding a sense of unity to the overall design.

**CAR LEASING - CONTRACT HIRE - CHEAP LEASE CARS**

Version 237.1. You can trust me! ... In 2012 I've had over £50 million of cars (at RRP)

**LING's PUBLIC SPEAKING TOUR**  
London, New York, & err... Scarborough

**Home** Cars and Vans How It Works Price Lists About Ling Customers Fun Stuff Quote/Order

Business Customer Pricing Personal Customer Pricing

**NEW SEXY** christine full rep **HERE**

**FEAR CARS**

Search Cars Here Go

**LING'S LIVE TWITTER FEED**

**LIVE WEB CAR**

Intro Film News Blog Office TV Contact Moan Links Play Quiz Privacy Policy Google Visitors

EU cookie law. Piss off Van Rumpy. He... I hammer visitors to death with cookies, so I can find out what they want. Cookies allow my website to serve visitors the content they need. Get used to it. The EU cookie law is an ass. - Ling

**You can't find a car? Apply for a CAR QUOTE**

**Richard Farleigh** - "I wanted to invest; I was amazed by Ling's complete lack of nerves, and also by her business acumen."

**Duncan Bannatyne** - "I wanted to invest... but ye turned me dooon!"

**Deborah Meaden** - "Harrumph! I'm out!"

**HM GOVERNMENT** HEAD OF CREATIVE ON GOV.UK WEBSITE, SAYS: "You have genuine lessons to learn from LINGsCARS.com"

**CHARLES MORGAN SAYS:** "...perhaps I should get you to redesign our website, Ling?"

**VIZ** Ling is OFFICIAL VIZ ethnic business ambassador! **PX** **OLD CAR** **CHEAP INSURANCE** **Google Spider** **Feed**

View LIVE videos: 11 online

**Hi! I am Lina from Dragons' Den. I lease cheap new cars!**

- The website floods the user with not only a sea of information, but also with jarring colors, inconsistent fonts choices coupled with confusing navigation links.
- This has quite a disconcerting effect on the user and simply warrant a quick and swift exit of the site by the user.

# Color for web design → Value

107

- Value could also be called “**lightness.**” It refers to how light or dark a color is. **Lighter colors have higher values.**
  - ▣ For example, orange has a higher value than navy blue or dark purple. Black has the lowest value of any hue, and white the highest.
- When applying color values to your designs, **favor colors with different values**, especially ones with high chroma
  - ▣ High contrast values generally result in more **aesthetically pleasing designs.**

# Some examples

108



The high value of the yellow used here really stands out against the lower-value black and gray.

# Some examples

109



Combining colors with similar values makes for an energetic and lively background (which is enhanced by the design itself).



# Some examples

110



The human eye can pick up differences in value even among such similar hues.

# Color for web design → Tones

111

- Tones are created when gray is added to a hue.
  - ▣ Tones are generally duller or softer looking than **pure hues**.
- Tones are sometimes **easier to use in designs**.
  - ▣ Tones with more gray can lend a certain **vintage** feel to websites. Depending on the hues, they can also add a *sophisticated or elegant look*.

# Some examples

112



Tones can give websites a sophisticated look while adding some vintage and antique flair.



# Some examples

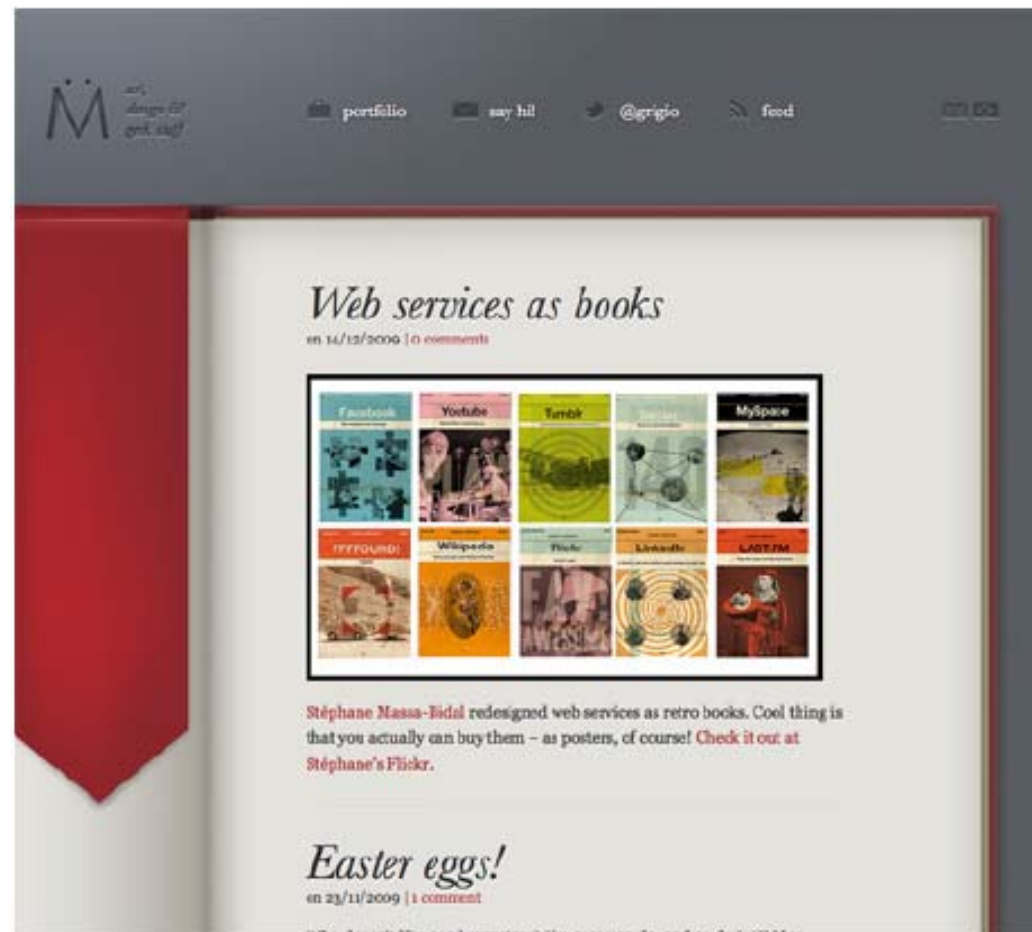
113



A great example of how a pure hue can really stand out against a background of tones.

# Some examples

114



A great example of how a pure hue can really stand out against a background of tones.

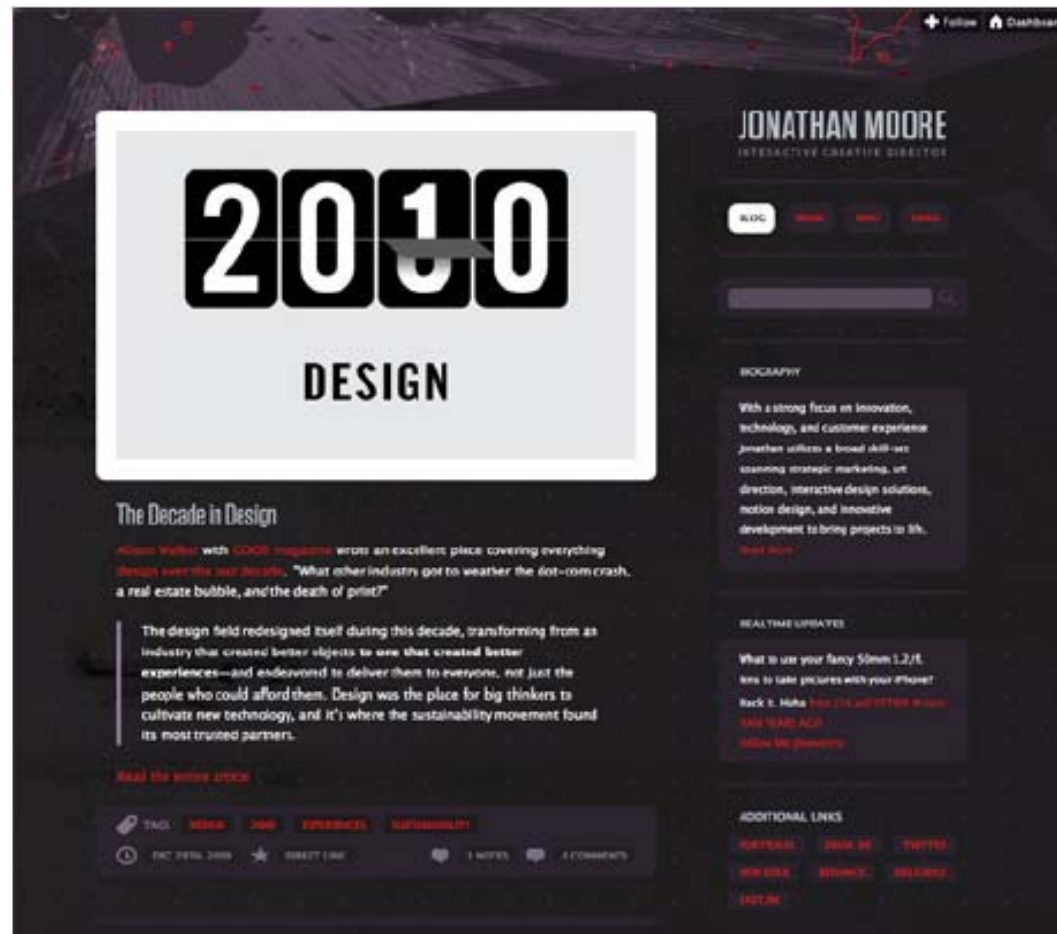
# Color for web design → Shades

115

- A shade is created when black is added to a hue, **making it darker.**
  - ▣ The word is often incorrectly used to describe tint or tone, but shade only applies to hues made **darker by the addition of black.**
- In design, very dark shades are sometimes used instead of black and can serve as **neutrals.**
  - ▣ **Combining shades with tints** is best to avoid too dark and heavy a look.

# Some examples

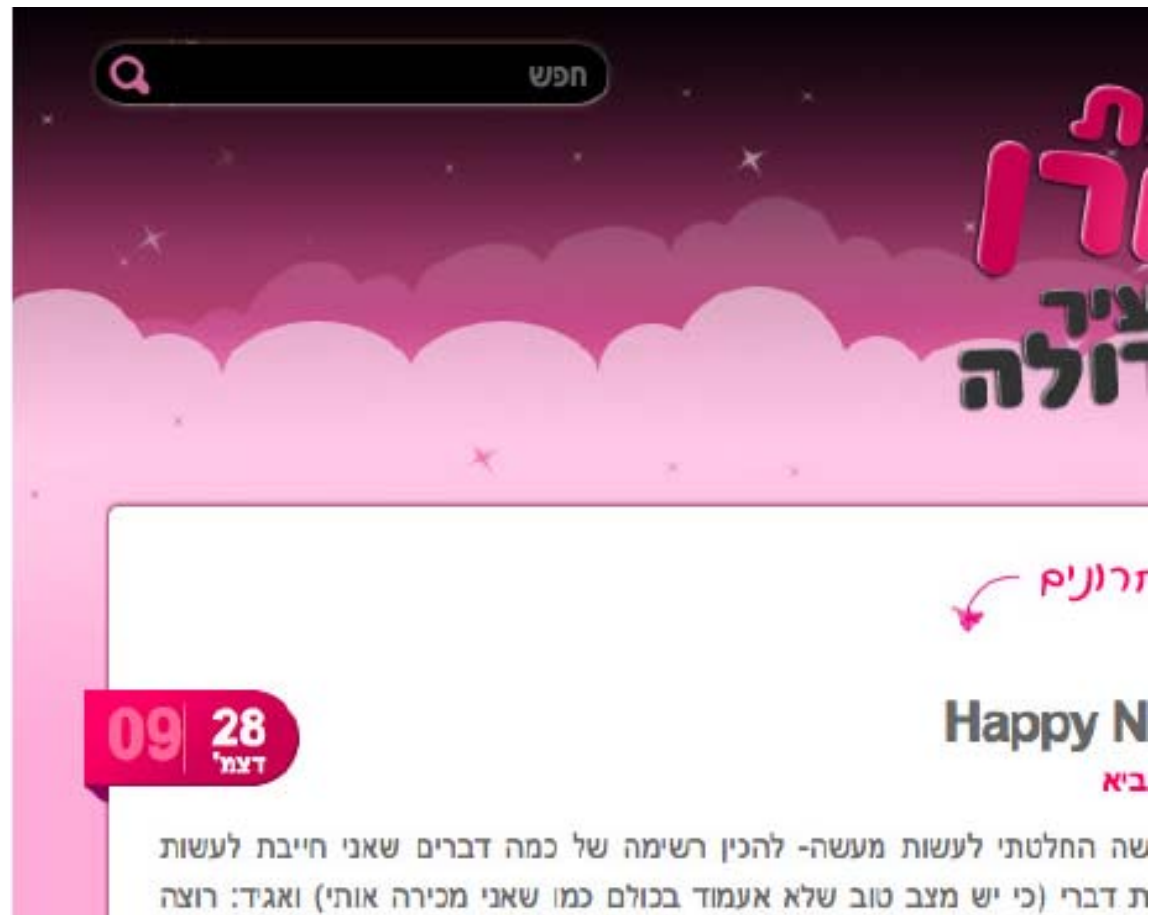
116



Jonathan Moore's website has a variety of different shades of purple in the background (and a couple of tints in other parts).

# Some examples

117



An effective combination of shades and tints, particularly in the header.

# Some examples

118



Using different shades together works well, as long as sufficient contrast between them is maintained.

# Color for web design → Tints

119

- A tint is formed when white is added to a hue, **lightening it**.
  - ▣ Very light tints are sometimes called **pastels**, but any pure hue with white added to it is a tint.
- Tints are often used to create **feminine or lighter designs**.
  - ▣ Pastel tints are especially used to make **designs more feminine**.
- They also work well in **vintage designs** and are popular on websites targeted at parents of babies and toddlers.

# Some examples

120



Tints are also popular in watercolor-based designs.



# Some examples

121



Blue tints are popular for sky and nature motifs.

# Some examples

122



Caio Cardoso's website has a variety of green tints in the background and in other elements.

# But how many colors?

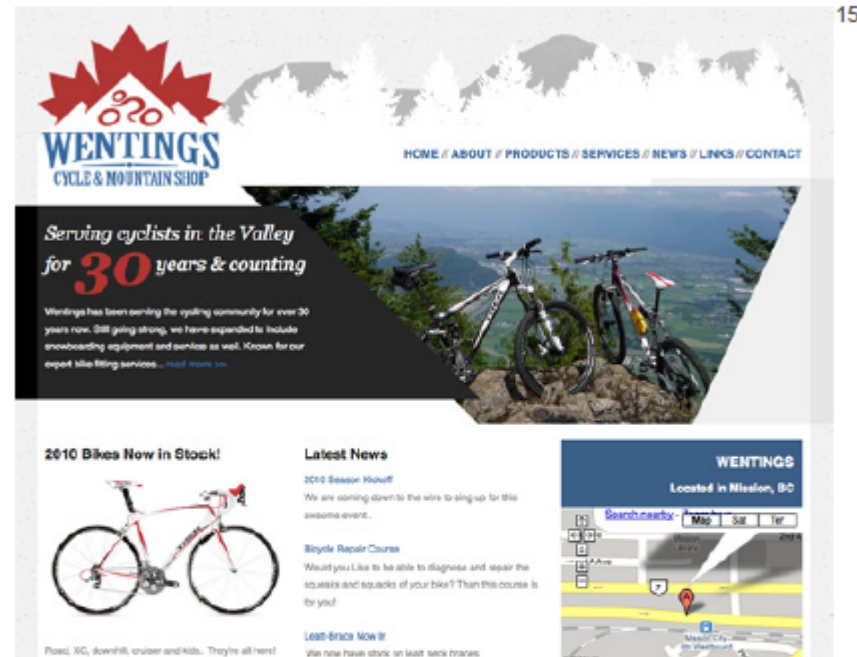
123

- **Five** is a good number that gives plenty of options for illustrating the concepts,
  - ▣ it's a workable number in a design.
  - ▣ But feel free to have more or fewer colors in your own schemes.
  - ▣ A lot of websites might only use three colors in their designs. Others use only two. And some might use eight or ten (which is a lot trickier than using fewer colors).
- **Experiment and use as many or as few colors as you need to for your design.**
  - ▣ But you may want to start with **a palette of five colors**, and then add or subtract as you see fit and as you progress through the design process.
- The easiest way to add a color is to start with one of the predefined, **traditional color schemes** and then work out from there.
  - ▣ That at least gives you a bit of direction as far as which other colors to consider.

# Sites With Great Color Schemes

124

## WENTINGS CYCLE & MOUNTAIN SHOP

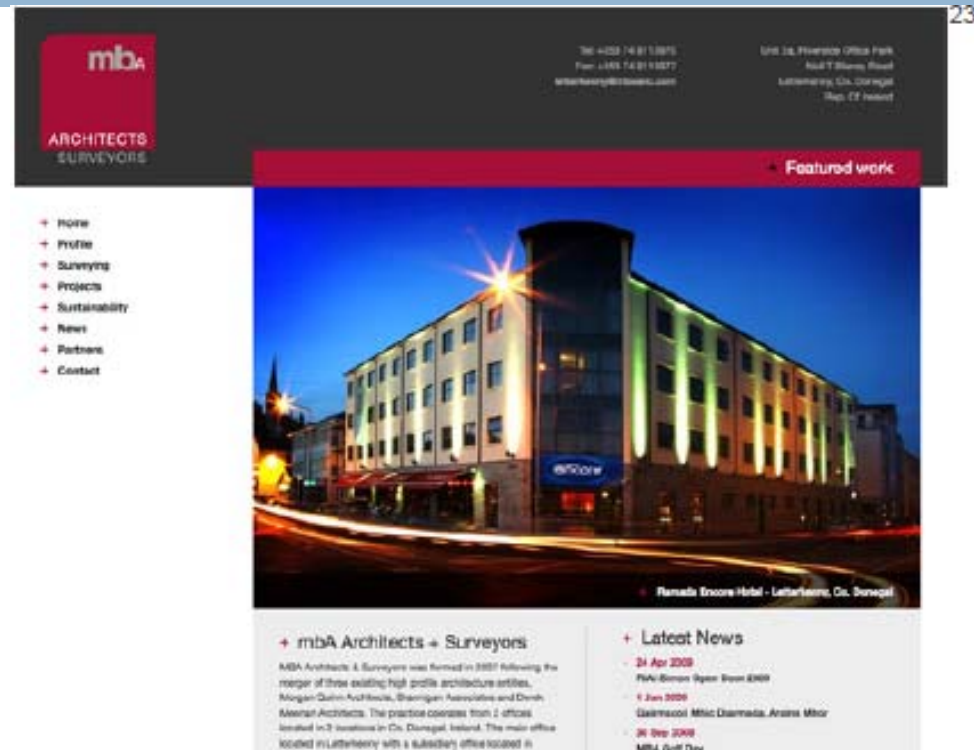


### Scheme:



# Sites With Great Color Schemes

125



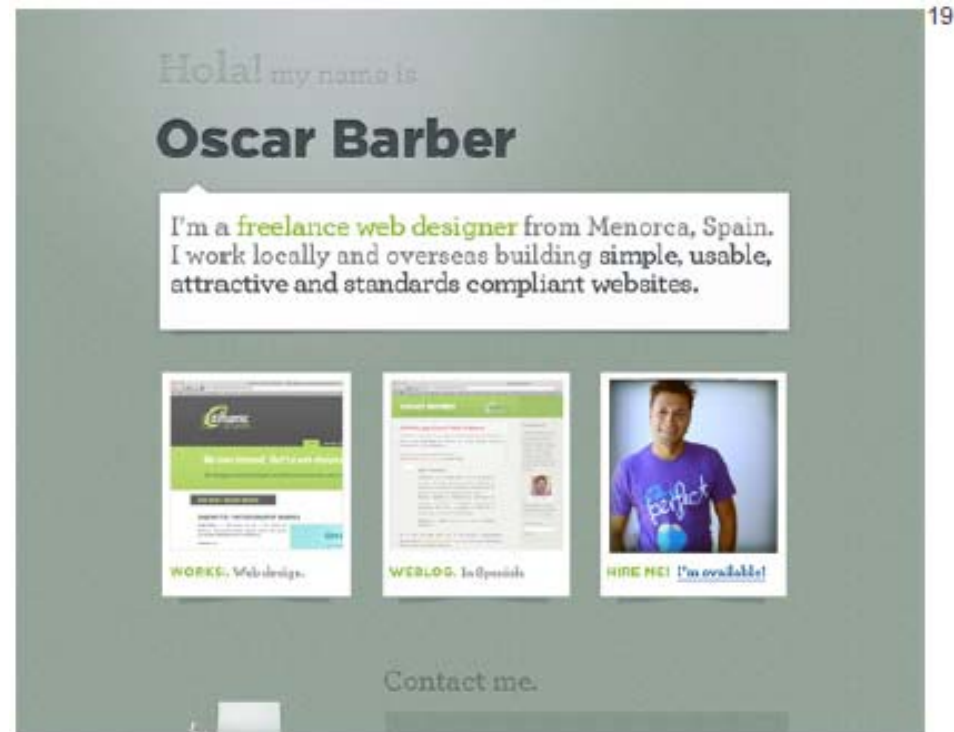
Scheme:



24

# Sites With Great Color Schemes

126

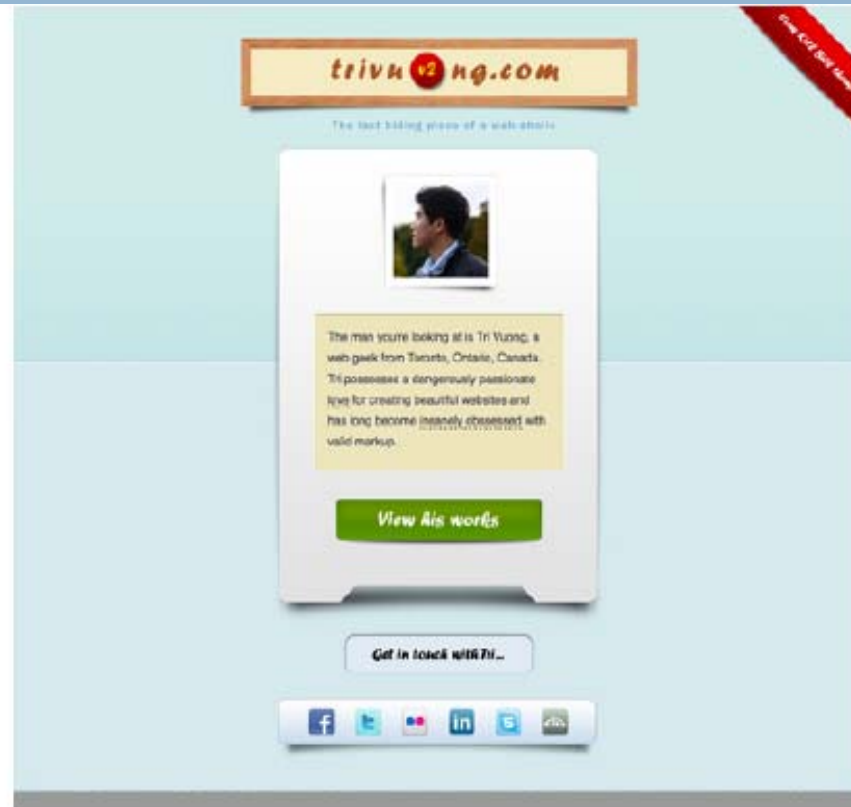


Scheme:



# Sites With Great Color Schemes

127



17

Scheme:



18

# Color and Marketing

128

- Research conducted by the secretariat of the Seoul International Color Expo documents the following relationships between **color and marketing**:
  - ▣ 92.6 percent said that they put most importance on visual factors when purchasing products.
  - ▣ When asked to approximate the **importance of color** when buying products, 84.7 percent of the total respondents think that color accounts for more than half among the various **factors important for choosing products**.
- Research reveals people make a subconscious judgment about a **person, environment, or product** within 90 seconds of initial viewing and that between 62% and 90% of that assessment is based on color alone. *Source: CCICOLOR - Institute for Color Research*



# Color and Brand Identity

129

- Color increases **brand recognition** by up to 80 percent
- Case Study: Apple Computer
  - ▣ Apple brought color into a marketplace where color had not been seen before. By introducing the **colorful iMacs**, Apple was the first to say, "It doesn't have to be beige". The iMacs reinvigorated a brand that had suffered \$1.8 billion of losses in two years. (And now we have the colorful iPads.)



# Color Increases Memory

130

- If a picture is worth a thousand words, a picture with natural colors may be worth a million, **memory-wise**.
- Psychologists have documented that "**living color**" does more than **appeal to the senses**.
- Color helps us to **process and store images** more efficiently than colorless (black and white) scenes, and as a result to **remember** them better, too.

# The Power of Color for Brands

131

- Brands and color are inextricably linked because color offers an instantaneous method for **conveying meaning and message** without words.
- Color is the **visual component** people remember most about a brand followed closely by **shapes/symbols** then numbers and finally words.



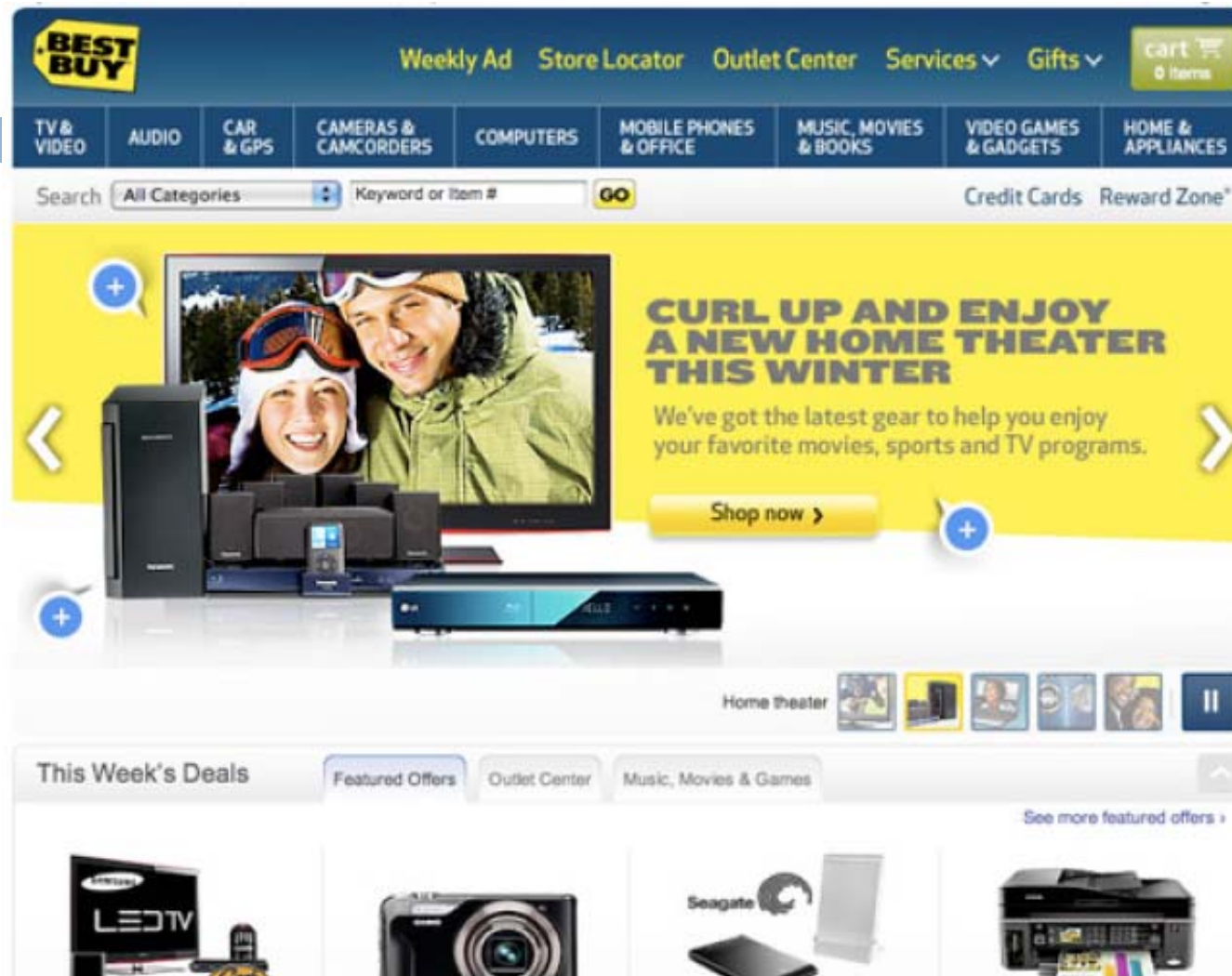
<http://www.trulydeeply.com.au/madly/2010/03/03/brand-design-colours/>

# Colorful websites based on their brands

132



The White House website is mostly white and light grey with some blue and red accents. The white symbolizes hope and freedom, showing a value for safety and purity. The red and blue are of course the other USA colors, but the blue shows stability and peace, while the red shows passion and energy.



Best Buy's site showcases dark blue hues, showing their stability and power in the electronic market. Buyers are making large purchases from Best Buy and need to feel secure and peaceful on their site. The yellow emits happiness and helps people feel excited and joyful while making their purchases.



The screenshot displays the Amazon.com homepage with a clean, white background and blue and orange accents. The top navigation bar includes the Amazon logo, a search bar, and links for account management. A left sidebar lists various product categories. The main content area features a large Kindle promotion, a 'What Other Customers Are Looking At Right Now' section with product recommendations, and a 'Hot Watch Brands' section. On the right, there are three promotional banners for disaster relief, tax software, and a Visa card.

**amazon.com** Hello, [Sign in](#) to get personalized recommendations. New customer? [Start here](#). Your Amazon.com [Today's Deals](#) [Gifts & Wish Lists](#) [Gift Cards](#) [Kindle: The #1 Bestseller on Amazon](#) [Your Account](#) [Help](#)

**Shop All Departments**

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- Toys, Kids & Baby
- Clothing, Shoes & Jewelry
- Sports & Outdoors
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**Check This Out**

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- Computer Accessories Store: Save on popular computer products.
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**Features & Services**

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- Amazon Exclusives
- Partner Services
- For Businesses
- For Developers
- For Advertisers

**Kindle and Kindle DX with Global Wireless**

Choose which Kindle is right for you.

- See Kindle DX (9.7" screen)
- See Kindle (6" screen)

**amazon kindle**

**What Other Customers Are Looking At Right Now**

- Wii for Nintendo Wii **\$199.99**
- Xbox 360 12 Month Live Gold Card for Xbox 360 **\$49.99 \$34.99**
- Invicta Men's Pro Diver Stainless Steel Watch **\$326.00 \$59.99**

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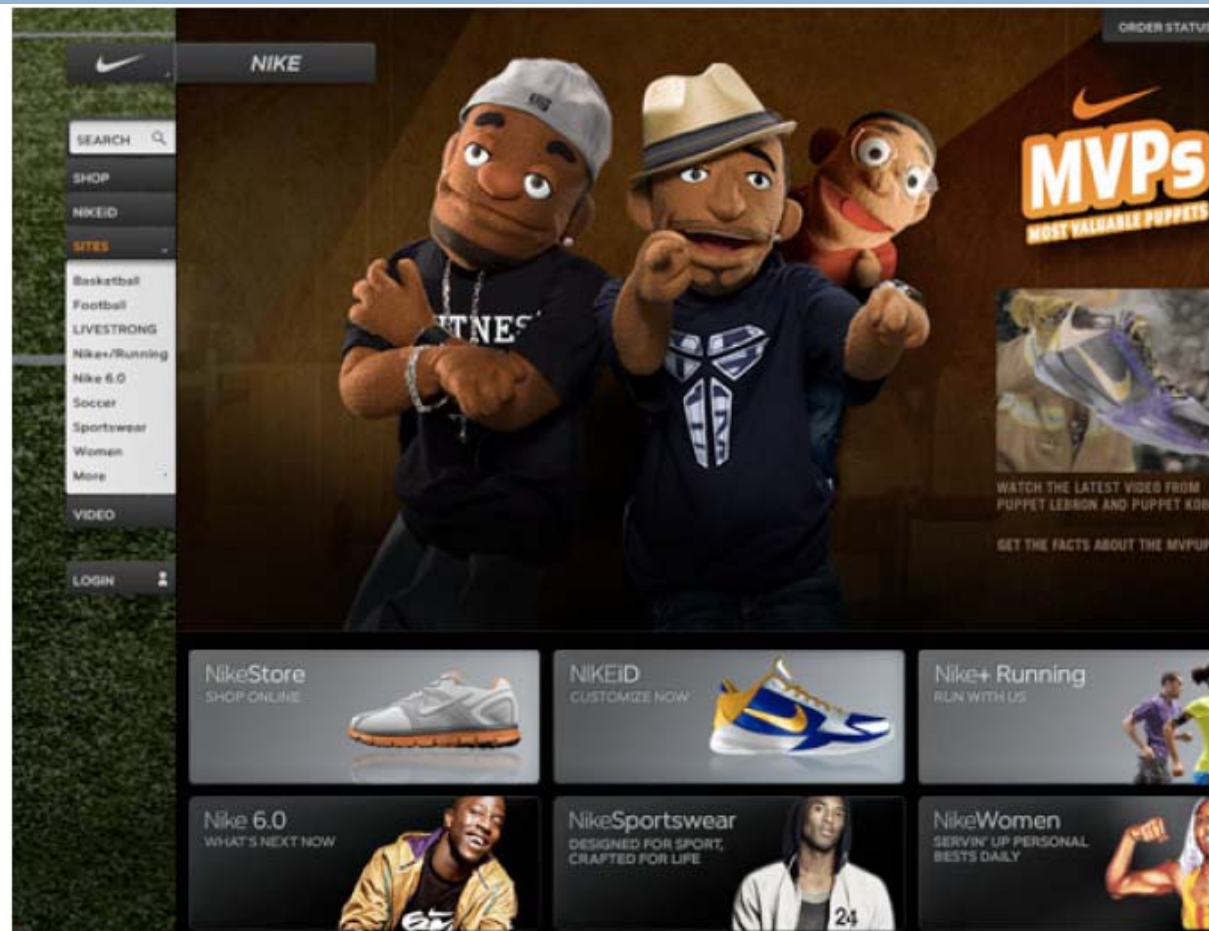
**Sprint**

TREES BEING PLANTED

09

**AS featured**

Amazon's site is mostly white, which is the best color to use for contrast and readability. It also shows cleanliness and helps users navigate the site freely. There are orange and blue accents to help people feel at ease when on the site, as well as excited and hopeful to find their perfect purchase.




Nike changes their site often, but it is usually dark with mostly black and grey hues. The black shows the power in their product, giving the impression that they sell quality products to sporty people.

# Color Blindness

136

- **Inability or decreased ability** to see colors or to **perceive** color differences, under normal lighting conditions
- What does a color-blind person see?
  - ▣ A person with color-blindness has trouble seeing **red**, **green**, **blue**, or mixtures of these colors.
  - ▣ The most common type is **red-green color-blindness**, where red and green are seen as the same color.



	
<p>The colors of the rainbow Normal color vision</p>	<p>The colors of the rainbow Deuteranope (simulation) <i>Absence of green retinal photoreceptors</i></p>
	
<p>The colors of the rainbow Protanope (simulation) <i>Absence of red retinal photoreceptors.</i></p>	<p>The colors of the rainbow Tritanope (simulation) <i>Absence of blue retinal receptors</i></p>

# Color Blindness

138

□ [www.vischeck.com](http://www.vischeck.com)



original image  
normal vision: 85.5%



dichromacy  
2.4% males, 0.03%  
females

# How to design for Color blind

139

- Don't use only **color to indicate something specific** on your page.
  - ▣ For example, if you have a form with required fields, **making the text red might not be a big enough distinction for a color blind person**. Add another cue, such as an icon or other element to indicate that the field is required.
- **Desaturate** your images to see if they still have impact.
  - ▣ Desaturating the images removes all the color from the image".
- Try to **avoid placing red and green together**.
  - ▣ Especially on items like navigation buttons, the text can actually blend into the background, making it very hard to read.
- If you can, **find a color blind friend or relative to look at your site**.
- Choose your **colors with awareness**.
  - ▣ It's perfectly fine to make a design choice that negatively impacts **color blind people, but do it deliberately**. And preferably, come up with an alternative for them as well.

<http://wearecolorblind.com/>

# Accessibility and quality models

140

- **ISO/IEC 9126** : Information technology - Software Product Evaluation - Quality characteristics and guidelines for their use
- **W3C Recommendation** - Web Content Accessibility Guidelines WCAG 1.0 (1999)

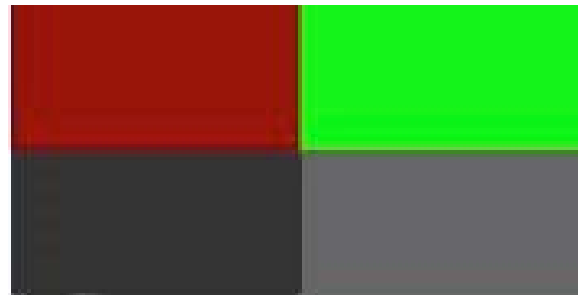
# Example of guideline

141

- WCAG 1.0 - Guideline 2.2: Ensure that foreground and background color combinations provide sufficient **contrast** when viewed by someone having color deficits or when viewed on a black and white screen



Tone difference



Brightness difference

# W3C Algorithmic

142

- To check the differences in brightness and colors between the text and the background

- **Brightness value:**

$$((\text{Red} * 299) + (\text{Green} * 587) + (\text{Blue} * 114)) / 1000 > 125$$

- **Color difference :**

$$[\text{Max}(\text{Red1}, \text{Red2}) - \text{Min}(\text{Red1}, \text{Red2})] + [\text{Max}(\text{Green1}, \text{Green2}) - \text{Min}(\text{Green1}, \text{Green2})] + [\text{Max}(\text{Blue1}, \text{Blue2}) - \text{Min}(\text{Blue1}, \text{Blue2})] > 50$$

# W3C Algorithmic: pro and cons

143

## □ Pro:

- ▣ It is a good indication about the **contents accessibility**

## □ Cons:

- ▣ Some **contrasts of colors** that are considered valid according to these formulas appear less readable than others considered not valid.
- ▣ In the formulas, the **brightness** is not correlated with the attributes that characterize the human perception [1,2]
- ▣ The algorithm is based on an old NTSC RGB standard video and it does not represent well the **display of the modern monitors**

1. S. Zuffi, C. Brambilla, G. Beretta, P. Scala, "Human Computer Interaction: Legibility and Contrast". 14th International Conference on Image Analysis and Processing (ICIAP 2007), 2007, pp. 241-246.
2. S. Zuffi, G.B. Beretta, C. Brambilla, "A color selection tool for the readability of textual information on web pages". In Internet Imaging VII. Proc. SPIE Vol. 6061. San Jose 2006/01/18

# But... Is Your Computer Color Blind?

144

- You could say that most computers are color blind on the World Wide Web.
  - ▣ → **No one is seeing the same colors**
- **Color accuracy** poses a real challenge.
- There are four tests that you can take to see how your **computer color vision rates**.



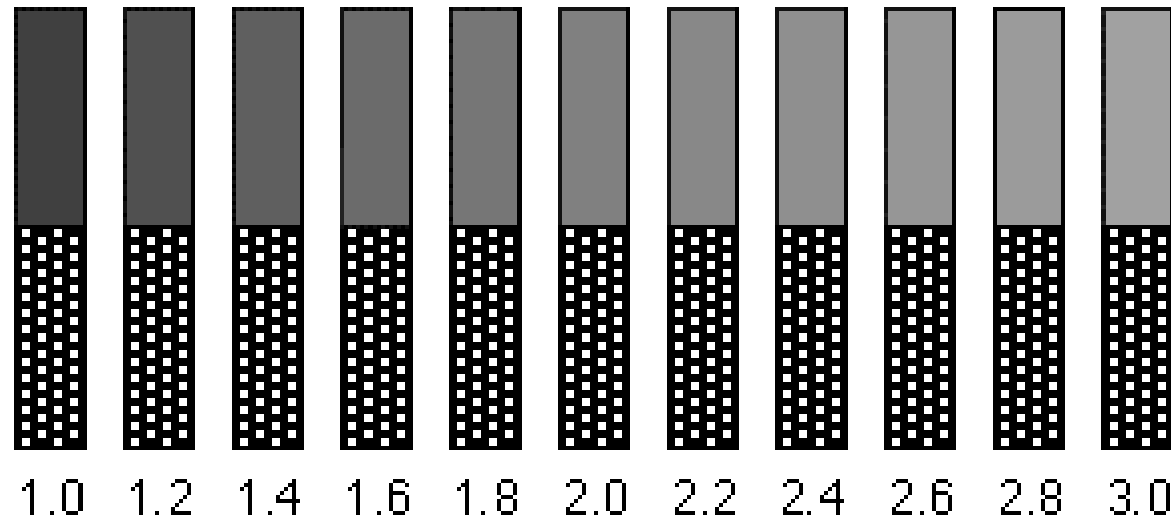
# A test for a pure white pixel

145

- Hold a piece of **pure white paper perpendicular to your monitor screen.**
- Do not place it flush against the screen.
- Hold it on an angle. Open a website which **background is pure white.**
- If you are seeing a very **pale greyish** or **bluish color**, your computer does not view colors accurately. If you do not have a pure white, every **color is affected.**
- You have the "**Sunglass Syndrome**".

# A test for gamma

146



- Stand about 6 feet away and decide which column of the image comes **closest to having equal brightness** in the top and bottom halves. The number under this column is the gamma of your display system.

# A test for a good range of lightness and darkness of colors

147

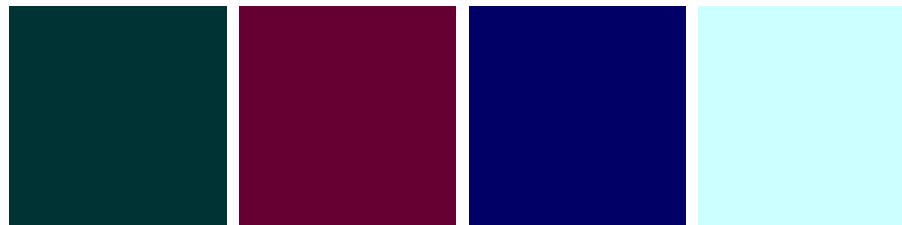


- Do some of the squares look the same?
  - ▣ Each square represents a **ten percent change**.
  - ▣ Even though the **greyscale image** is black and white, it represents the range of any given color on you may see on your monitor.
  - ▣ If you can't see a wide range of greys, you will not be able to see a wide range of **different reds, blues or any other color**

# A color test

148

- These squares are based on the 216 **web-safe color palette**



- If any of the first three squares (reading from left to right) looks **almost black**, you need a better monitor and/or you need to correct your gamma

# How to Improve Your Computer Colors

149

- 75% of all computers have some degree of **color blindness** and very few people **are aware of it**. However, there are a number of things you can do to help you see better colors.
- **Adjust** your brightness and intensity controls on your monitor.
- Set your control panels are to the **maximum number of colors possible**
- For those who have good video cards (16 or 24 bit capable), check to see that set them to the **maximum number of colors for color accuracy**.
- A good monitor can improve the colors. Color **will be brighter** and you will lessen the "sunglasses" effect common to PCs.
- Avoid **anti-glare screens** and compensate for glare in other ways.
- Get a computer that has **built-in gamma correction** and **built-in compatibility** between all elements.
- Purchase not only for the best components, but components that **work together and give the most accurate result**. If you're considering a graphics or video card, make sure it will work with your system and your monitor.
  - ▣ Some cards may work only for games.

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- For materials and slides special thanks to:
  - **Color Matters Website:** <http://colormatters.com/>
  - **Dr. Sabin Buraga:** *Human Computer Integration*. Faculty of Computer Science “A.I. Cuza” University of Iasi, Romania
  - **Jonathan LeBlanc,** *Developer Evangelist (PayPal):* Emotional Design
  - **Erin Daniels,** *User-centric experience design:* Drive users with “touchable” emotional design
  - **Thomas Fogarasy,** *Designer, Interaction Design Instructor:* Emotion design Brand & UI
  - **Flin Nortier,** *SODA Studio:* Emotional design: Design for emotions in the end user
  - **Cameron Chapman,** *The Smashing Magazine:* Color Theory for Designers (Published on January 28<sup>th</sup> 2010)
  - **Shannon Noack,** *sixrevisions.com:* A Look into Color Theory in Web Design (Published on Mar 8<sup>th</sup>, 2010)

# References

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- Some examples are taken from:
  - ▣ Donald A. Norman, *Emotional Design: Why We Love (or Hate) Everyday Things*, Basic Books; 1 edition (December 23, 2003)
  - ▣ Malcom Gladwell, *The power of Thinking Without Thinking*, Little, Brown and Company; 1 edition (January 11, 2005)
  - ▣ William Lidwell, Kritina Holden, Jill Butler, *Universal Principles of Design*, Rockport Publishers (October 1, 2003)

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