the messenger of experience

form and color
the messenger of experience

color

2.744 product design
but first...
a mini quiz!

list 4 steps/levels in a systematic form-giving process

list 3 types of transition or “corner” types, and what qualities they convey
part 1
form-giving process

structure
what it is
 topology
proportions
directionality

surface
feeling
corner treatments types evoke different feelings
consistent use of treatments form a style or brand
working in clay gets your hands really dirty

details/color

graphics
surfaces
form-giving process

precise, structured, dangerous
utility, practical, unrefined
sophisticated, fluid, inviting

C^0 positional continuity
C^1 tangent continuity (first derivative)
C^2 curvature continuity (second derivative)
surfaces
form-giving process
form/corner treatment vocabulary
form-giving process

surface

the feeling

rectangle exercise
form-giving process
expressive rectangles

young
scared
old
sad
happy
calm
angry
form-giving process
expressive rectangles

young
scared
old
sad
happy
calm
angry
form-giving process
expressive rectangles

young

old

young scared
old sad
happy calm
angry
form-giving process
expressive rectangles

scared

young
scared
old
sad
happy
calm
angry
part 2
form-giving process

structure  surface  details/color  graphics
form-giving process
details
structure and surface

sympathetic to the overall structure and surface

proportions/grid

flow and direction

surface corner vocabulary
form-giving process
details
organize elements

- grouping
  - proximity
  - similarity
  - continuation
  - common region
  - connectedness
  - closure
form-giving process

details

add variety and predictability

rhythm between or within groups

- number
- arrangement
- dimension
- shape
- color
form-giving process
details/color

visible electromagnetic spectrum

<table>
<thead>
<tr>
<th>wavelength (nm)</th>
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<tbody>
<tr>
<td>700</td>
</tr>
<tr>
<td>600</td>
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<tr>
<td>500</td>
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<tr>
<td>400</td>
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</table>
form-giving process
details/color

- rod vision
- cone vision

our sensors

sensitivity

wavelength (nm)

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<thead>
<tr>
<th>400</th>
<th>500</th>
<th>600</th>
<th>700</th>
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form-giving process
details/color

rodopsin

sensors: dark adaptation
resolution of night vision < 20/200

rod/cone adaptation

color adaptation

rod/cone adaptation

color adaptation

rodopsin

sensors: dark adaptation
resolution of night vision < 20/200

rod/cone adaptation

color adaptation

form-giving process
details/color

light sensitivity ranges over 9 orders of magnitude!

but we can only sense across 3 orders at a time

at any time, $10^6$ levels of our range are either black or white
form-giving process
details/color
cone pigments

![Diagram](attachment:image.png)

- Short wavelength (400-500 nm)
- Medium wavelength (500-600 nm)
- Long wavelength (600-700 nm)
form-giving process
details/color

object color/reflectance
fruits and vegetables

reflectance
wavelength (nm)

reflectance
wavelength (nm)
form-giving process

details/color

object color/reflectance

- white bond
- 20% gray card
- black paper

reflectance vs. wavelength (nm)
form-giving process
details/color
color and light source

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<th>Intensity</th>
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<th>Reflectance</th>
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form-giving process
details/color

simultaneous contrast  color and context
form-giving process

details/color

simultaneous contrast  color and context
form-giving process
details/color

and so the take-home design message is…?

our perception of color depends on many things
light source, light levels, surrounding context, adaptation

test in use conditions
form-giving process
details/color

**color wheel** (circa 1700)
your tool for understanding what goes with what
form-giving process
details/color

basic color wheel
warm and cool

- warm
- cooler
- cool

Details/color
form-giving process
details/color

all contain red
basic color wheel
colors in common
form-giving process
details/color

basic color wheel
colors in common

all contain blue
form-giving process

details/color

basic color wheel

colors in common

all contain yellow
form-giving process

details/color

basic color wheel
your tool for understanding what goes with what

discussion of pure hue
form-giving process
details/color

color dimensions

- lightness/value
- hue
- saturation/purity
  (blend to center)

Wavelength (nm)
form-giving process
details/color

Color dimensions
- paint speak
- tint (add white)
- shade (add black)
form-giving process
details/color

color schemes
one point

vivid focus, often used in products
form-giving process
details/color

color schemes
contrasting or harsh

strong patterns, children’s products
form-giving process

details/color

color schemes

similar

quiet, calm, homey
form-giving process

details/color

color schemes

separation

accents differences or tones down
details/

form-giving process

- color schemes
  - primary
  - secondary
  - tertiary
  - complementary
    - separation
    - accents differences or tones down
form-giving process
details/color
color and emotions
warm palette
intense, danger, secure
form-giving process
details/color
color and emotions
cool palette
calm, relaxed, unprovocative
form-giving process
details/color

color and emotions
mixed emotions

unsettling (yuk)
form-giving process

details/color

color and emotions
value and saturation

tranquil, weak, inexpensive
**form-giving process**

details/color

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**color blindness**

design considerations

- monochromatism: 0.001% of population
- protanopia: 1% males, 0.02% females (red/green)
- dueteranopia: 1% males, 0.01% females (red/green)
- tritanopia: 0.002% males, 0.001% females (blue/yellow)

value (lightness) based schemes
form-giving process
details/color

color setting process

i) product goals, image, function
ii) value/lightness, temperature
iii) background color (receding)
iv) accents (color scheme)
v) limit your pallet (typically 3 or fewer)
form-giving process

color challenge

give a feeling/emotion through color only

look inside your name card
download photoshop file and references
set color palette
use only colors in palette
only change colors

name feeling_username.psd
upload using website link
a structured approach

form-giving process

structure  
surface  
details/color  
graphics

Tuesday
bring your laptop and software you are comfortable using (ppt, keynote, illustrator, photoshop, etc)
learn how to put text on a baseline