



UI FUNDAMENTALS

DR. ISAAC GRIFFITH

IDAHo STATE UNIVERSITY

An Aside

- I want us to consider the creation of a UI
- Think about your project.
- Ask yourself this question: What are the concerns in our system, and did we follow the “Separation of Concerns” principle in our design?

⌚ Application Layers

CS 2263

Outcomes

After today's lecture you will be able to:

- Understand and describe the general concepts of UI, UX, and User Centric Design
- Understand the ideas and basic methods of UI design
- Understand the general principles of UI Design
- Understand the fundamentals underlying UI Design



What is User Experience? (UX)

- Puts the end user at the center of the universe and defines the system from that perspective
- Usability is finding the best match between a user's needs and a product's use
- While this is a specialty by itself, a computer scientist/developer can grow an appreciation for UX, which affects
 1. Functionality
 2. System Organization and Structure
 3. Interactions and Look and Feel
 4. Access

What is User Interface? (UI)

- **Human-Computer Interaction (HCI)** research is focused on the interfaces between people (users) and computers
- The point of interaction or communication between a computer and another entity, such as a printer or human operator. Information flows in one direction or two.
- The layout of an application's graphic, spoken, touch, or textural controls in conjunction with the way the application responds to user activity.
- UI fulfills two key UX needs:
 3. Interactions and Look and Feel
 4. Access

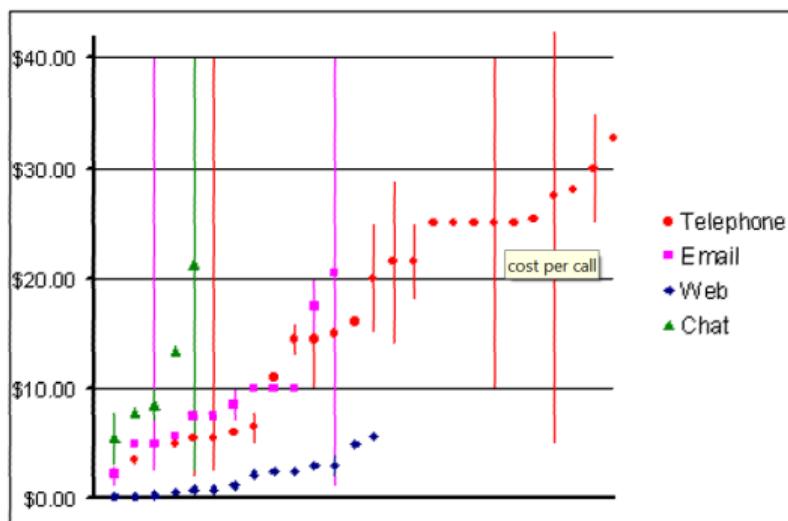


Why Do We Care About UX/UI?

Because it matters

Poor UX means people won't use your product

People will call tech support



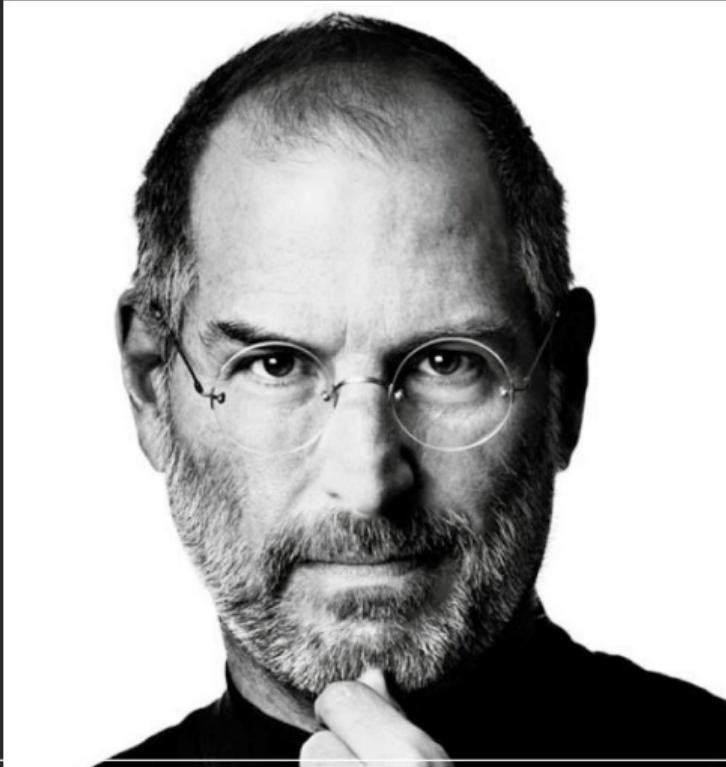
People won't use it even when it works and will return it

- E.g., an ISP had 30% of routers returned as non-working **but they tested fine**

People won't buy your product and worse, will tell their friends not to use it

- Measured by negative impact on Net Promoter Score (NPS)
 - Gauges the loyalty of a firm's customer relationships
 - Is thought to be correlated with revenue growth

What is Design?



"Most people make the mistake of thinking design is what it looks like. People think it's this veneer – that the designers are handed this box and told, 'Make it look good!' That's not what we think design is. It's not just what it looks like and feels like. **Design is how it works**"

Steve Jobs

- Design is hard
- Design is easy to overdo

What is a Good Design?

A solution that **serves the users**
and **satisfies the client**

1. Does what the users need and want
2. Natural to use
3. Helps them avoid trouble

Easy to say, very hard to do well

Puts the end user at the center of the universe and defines the system from that perspective

User Centered Design

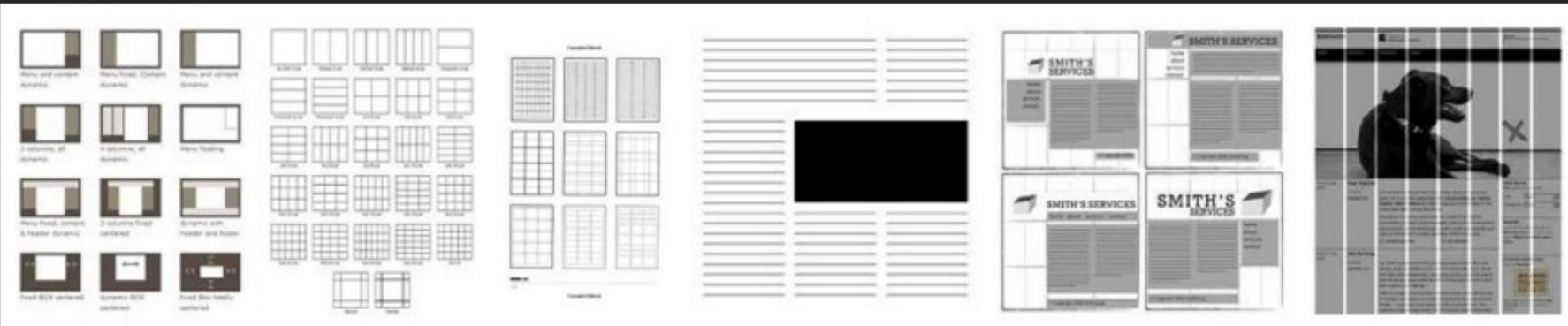
1. Identify who the users are
2. Identify what they want to accomplish
3. Constantly assess (1) and (2)

UI Fundamentals

CS 2263

Grids / Layouts / Structure

- A well-designed UI must be grounded in strong layouts with a grid.
- Grids provide order, regularity, rhythm, and control
- Knowing how to work with grids is a vital interface design skill, which takes years to master



Grids / Layouts / Structure

- Navigational Structure
 - Easy, meaningful path (**taskflow**)
- Informational Structure
 - Sensible grouping of content and actions (**menus and tabs**)
- Visual Structure
 - Attractive, clear organization of a screen's content (**layout**)

Search

Add a filter to refine your search:

Location:
York County, PA

X

COUNTY

X

Property Type:
Office, Retail, Commercial, Shopping Center, Industrial, Vacant Land, Farm/Ranch

Price (Sale Price):
[] to [] dollars

X

Price (Lease Rental Rate):
[] to [] Annual

Size:
[] to [] SF

X

Sale / Lease:
 For Sale or Lease
 For Sale
 For Lease

114 listings returned

Saved Searches/Alerts

Load a saved search by clicking it below:

Birge Siquity

Dennis Kouras

Tsakos

Results

List View

Map View

| 5 listings highlighted: | | View Highlighted | Clear | Compare | Email | Create Report | Add to Catalog | |
|-------------------------------------|---|--|-----------------------|-------------------------|------------------------|-------------------------------|--------------------------------|---------------------------------|
| | | Location | Price | Size | Type | Status | | |
| <input type="checkbox"/> | Memory Lane Plaza | 1201 Memory Ln | York, PA 17403 | \$1.72 - \$14 Per SF | 2,100 - 43,560 SF | Shopping Center | For Lease | |
| <input type="checkbox"/> | 120 W Market Street | 120 W Market Street | York, PA 17403 | \$12 Per SF | See Agent | Office | For Lease | |
| <input type="checkbox"/> | AI Dente | 1211 Hanes Road | York, PA 17402 | \$28.83 Per SF | 5,882 SF | Shopping Center | For Lease | |
| <input type="checkbox"/> | York Calculator | 1240 E Philadelphia Street | York, PA 17403 | See Agent | 1,105 SF | Shopping Center | For Lease | |
| <input type="checkbox"/> | 128 E King Street | 128 E King Street | York, PA 17401 | See Agent | 1,900 SF | Office | For Lease | |
| <input checked="" type="checkbox"/> | 128 E King Street | 128 E King Street | York, PA 17401 | \$74,900 | 1,900 SF | Office | For Sale | |
| <input type="checkbox"/> | West Gate Auto Sales | 1290 Roosevelt Avenue | York, PA 17404 | \$500,000 | 1,680 SF | Shopping Center | For Sale | |
| <input checked="" type="checkbox"/> | Roosevelt Motors | 1290 Roosevelt Avenue | York, PA 17404 | See Agent | 1,680 SF | See Agent | For Lease | |
| | | Property includes three working lifts, state inspections and a diagnostic machine/embossing. Lots holds 30-35 Cont. Space: 1,680 SF Bldg. Area: 1,680 SF Zoning: See Agent | | 1,680 SF | Cont. Space: 1,680 SF | Bldg. Area: 1,680 SF | Zoning: See Agent | Status: Shopping Center General |
| <input type="checkbox"/> | 1317 North George Street | 1317 North George Street | York, PA 17401 | See Agent | 13,338 SF | Shopping Center | For Lease | |
| <input type="checkbox"/> | Grandview Shopping Center | 1440 S Baltimore St | Hanover, PA 17331 | \$1.43 - \$19 Per SF | 1,375 - 107,000 SF | Shopping Center | For Lease | |
| <input type="checkbox"/> | 1451 Spahn Ave | 1451 Spahn Ave | York, PA 17403 | \$7.65 Per SF | 3,450 SF | Industrial | For Lease | |
| <input checked="" type="checkbox"/> | Former Schwartz Furniture | 1504 Broadway | Hanover, PA 17331 | See Agent | \$4,000,000 | See Agent | For Sale | |
| | | Ideal for retail development. Join Walmart, Lowe's, Home Depot, and Kohl's. Property includes 11,300 SF building with new modine heaters, 1 overhead ... | | 4.94 Acres | Gross Land: 4.94 Acres | Zoning: See Agent | Subtypes: Other | Type: Vacant Land Retail |
| <input type="checkbox"/> | 155 Emig Rd | 155 Emig Rd | Emigsville, PA 17318 | \$3.28 Per SF | 2,284 SF | Industrial | For Lease | |
| <input type="checkbox"/> | Stambaugh's Auto | 1636 W Market Street | York, PA 17404 | See Agent | 1,196 SF | Shopping Center | For Lease | |
| <input type="checkbox"/> | 1700 E Market Street & Belmont Street | 1700 E Market Street & Belmont Street | York, PA 17403 | \$1,540,000 | 1.35 Acres | Vacant Land | For Sale | |
| <input type="checkbox"/> | Former Giant Foods | 1750 Leucks Rd | York, PA 17404 | \$10 Per SF | 56,600 SF | Shopping Center | For Lease | |

[Search](#)

50 1-50 of 114 results

> Previous

1

2

3

Next <

Typography

- Type is about tone of **voice**, readability, legibility.
- Diligently crafted type is paramount for effective **communication**



Typography

- Most design problems are simply type issues.
 - As a good rule, start your design with **three fonts**
 - A font is any variation of:
 - typeface
 - size
 - weight
 - style
 - color
 - etc.





financial services

Search

Advanced Search
PreferencesPersonalized based on your web history. [More details](#)

Web Books

Results 1 - 10 of about 155,000,000 for **financial services**. (0.23 seconds)**Financial Services**www.BankofAmerica.com Learn More About Your Financial & Retirement Options. Get Started.

Sponsored Links

Financial Serviceswww.JohnHancock.com All the **financial services** you need from a trusted name. Learn more now

Sponsored Links

Freedom Equity Groupwww.LocalAdLink.com Financial strategies to protect your assets from potential losses**TD AMERITRADE**

Commission free trades for 30 days.
No maintenance fees. Sign up now.
TDAMERITRADE.com

House Financial Services Committee

Considers measures on banks and banking, economic stabilization, insurance, international finance, and securities. Membership, schedule, bills and summaries ...

financialservices.house.gov/ - 16k - [Cached](#) - [Similar pages](#) -

Financial services - Wikipedia, the free encyclopedia

Nov 30, 2007 ... As of 2004, the **financial services** industry represented 20% of the market capitalization of the S&P 500 in the United States. [1] ...
en.wikipedia.org/wiki/Financial_services - 75k - [Cached](#) - [Similar pages](#) -

Primerica Financial Services

Primerica is in the business of changing lives. Our mission is to help families become debt free and financially independent.

www.primerica.com/ - 13k - [Cached](#) - [Similar pages](#) -

Google Directory - Business > Financial Services

Global **financial services** firm with investment, research, banking, finance, insurance, and other businesses. Governance, investor relations, cultural ...
www.google.com/Top/Business/Financial_Services - 40k - [Cached](#) - [Similar pages](#) -

ING Financial Services | Financial Planning Services & Information

ING is a world class leader in providing to its customers across the globe.
www.ing-usa.com/ - 49k - [Cached](#) - [Similar pages](#) -

Career Voyages - Financial Services Jobs - Financial Services

This web site is the result of a collaboration between the US Department of Labor and the US Department of Education. It is designed to provide information ...
www.careervoyages.gov/financial-main.cfm - 49k - [Cached](#) - [Similar pages](#) -

Open Directory - Business: Financial Services

Nov 2, 2008 ... AOL City Guide: Money & Finance - **Financial services** for individuals and

Financial management

Unbiased wealth and life strategy and **services** for individuals
www.AdvisoryGroupSF.com
San Francisco-Oakland-San Jose, CA

Capital One Savings

Earn 3.25% APY on \$10,000 balances.
No fees. FDIC Insured.
www.CapitalOne.com/DirectBanking

Greater Reading, PA

Hub for finance, food, biotech, medical device, & manufacturing!
www.GreaterReading.com
California

Financial Services

Improve Accountability, Profits & Cash Flow. Reduce Accounting Costs.
www.E-Countant.com

Friedman & Associates

Personalized Wealth Management
Caring for your Wealth & Well-being
www.FriedmanAssociates.com
California

Solve Your Finance Issues

Find Financial Planners in San Jose
Offering The Right Financial Plans
Financial-Planners.respond.com
San Francisco-Oakland-San Jose, CA

Your Company

Jim Caldwell My Info Logout Help

\$ Cash Flow Reports Companies Settings Users Account

Cash Flow

Add Income Add Expense Export

View: Month Week List

Apr 09 - Nov 09

| | April | May | June | July | August | September | October | November |
|--------------------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-------------------------------------|
| CASH ON HAND | 33,490.00 | 37,370.00 | 30,550.00 | 51,730.00 | 41,510.00 | 53,190.00 | 47,570.00 | 38,650.00 |
| INCOME | 21,500.00 | 11,500.00 | 39,500.00 | 8,500.00 | 30,000.00 | 13,500.00 | 9,000.00 | 34,500.00 |
| ▼ CONSULTING | 4,000.00 | 5,000.00 | 19,000.00 | 4,000.00 | 25,000.00 | 4,000.00 | 4,000.00 | 5,000.00 |
| ► Microsoft | 4,000.00 | 5,000.00 | 4,000.00 | 4,000.00 | 5,000.00 | 4,000.00 | 4,000.00 | 5,000.00 |
| ▼ The Wall Street Journal | | | 15,000.00 | | 20,000.00 | | | |
| Interface Design & Development | | | 15,000.00 | | 20,000.00 | | | <input checked="" type="checkbox"/> |
| ▼ PRODUCTS | 4,500.00 | 5,000.00 | 4,500.00 | 4,500.00 | 5,000.00 | 4,500.00 | 5,000.00 | 4,500.00 |
| Merchandise | 2,000.00 | 2,500.00 | 2,000.00 | 2,000.00 | 2,500.00 | 2,000.00 | 2,500.00 | 2,000.00 |
| ► Web Applications | 2,500.00 | 2,500.00 | 2,500.00 | 2,500.00 | 2,500.00 | 2,500.00 | 2,500.00 | 2,500.00 |
| ► SERVICES | 13,000.00 | 1,500.00 | 16,000.00 | | | 5,000.00 | | 25,000.00 |
| EXPENSES | 17,620.00 | 18,320.00 | 18,320.00 | 18,720.00 | 18,320.00 | 18,720.00 | 18,320.00 | 18,320.00 |
| ► Foxnews.com | 500.00 | | | | | | | |
| ► Microsoft | 400.00 | 1,600.00 | 1,600.00 | 2,000.00 | 1,600.00 | 2,000.00 | 1,600.00 | 1,600.00 |
| Brand Consulting | 400.00 | 1,600.00 | 1,600.00 | 2,000.00 | 1,600.00 | 2,000.00 | 1,600.00 | 1,600.00 |
| ► Web Applications | 600.00 | 600.00 | 600.00 | 600.00 | 600.00 | 600.00 | 600.00 | 600.00 |
| ► INTERNET/TELECOMMUNICATIONS | 420.00 | 420.00 | 420.00 | 420.00 | 420.00 | 420.00 | 420.00 | 420.00 |
| ► PAYROLL | 14,500.00 | 14,500.00 | 14,500.00 | 14,500.00 | 14,500.00 | 14,500.00 | 14,500.00 | 14,500.00 |
| ▼ RENT | 1,200.00 | 1,200.00 | 1,200.00 | 1,200.00 | 1,200.00 | 1,200.00 | 1,200.00 | 1,200.00 |
| Office Space | 1,200.00 | 1,200.00 | 1,200.00 | 1,200.00 | 1,200.00 | 1,200.00 | 1,200.00 | <input checked="" type="checkbox"/> |

Add expense

View your cash flow in a month, week or list view.

View cash on hand at the beginning of each month. View income totals per month.

Quickly make income and expense items inactive or active in your cash flow.

Color

- Color follows the same constraints as type, with the exception that color gets to the core **emotional** impact of the product in a more direct, visceral way that type does not.
- While type speaks, color punctuates



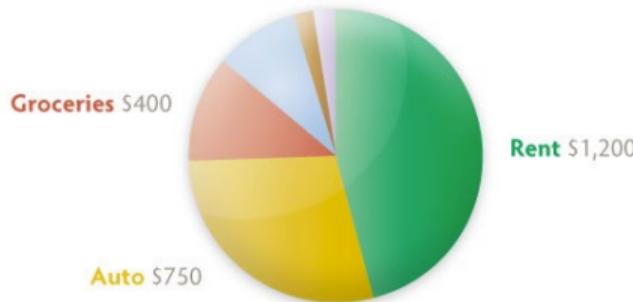
[WHY USE MINT](#) [HOW WE HELP](#) [FIND SAVINGS](#) [BLOG](#) [ABOUT](#)

free the best way to manage your money

"Best budgeting site" KIPLINGER'S MAGAZINE

Editors' Choice Award PC MAGAZINE

"Top pick ★★★★" MONEY MAGAZINE



New! Set, track and
achieve your goals ▶

At-a-glance insights

We download and categorize your balances and transactions automatically every day—making it effortless to see graphs of your spending, income, balances, and net worth.

Free! Get started here ▶

UNDERSTAND
YOUR MONEY

ALL YOUR ACCOUNTS
IN ONE PLACE

SET GOALS
AND BUDGETS

FIND
INSTANT SAVINGS

SAFE AND
SECURE

Why our users love mint

What the press is saying

about [permilink](#) SELECT ALL COUNTRIES AUSTRALIA CHINA FRANCE DEUTSCHLAND INDIA ITALY NEW ZEALAND ESPANA UK

| | | | | | | | |
|--|---|---|--|---|--|--|---|
| Guilty plea in question at Iraq prison abuse trial | Bomber Kills 50 at Iraqi Police Center | Long and Short: Things seem so grim, it must be time to buy stocks | Oil prices fall below \$49 per barrel | US vehicle sales rise skips US firms | Cech disputes Liverpool I winner | Jays send Halladay against Orioles | Hamed on bail after car crash |
| Nuclear Non-Proliferation Treaty Poised to Fall Apart | Bush Calls Berlusconi Over Agent Shooting | Free hostage, Australian foreign minister appeals | Qwest Finally Out Of MCI Bidding | Stocks climb on GM stake offer, oil prices | Time Warner 1st-Qtr Net Unchanged as DVD Sales Gain (Update) | King calls for greater consistency | Dodgers double up Nats |
| Lien Chan urges KMT to boost cross-straits cooperation | Bush: Pakistan Arrest 'Critical Victory' | Two polio cases reported in Indonesia | Suicide Bomber Kills at Least 50 in Northern Iraq | Mandelson comments on WTO members actions | Strong net earnings of GM despite GM's losses | Bonds has third surgery on eye, eyes delayed return | Nadal keeps rolling, wins Rome opener |
| Blair Touts Economic Record on Campaign | HRW Calls on King of Nepal: Remove Bans | Tension Rises Over Possible North Korean Nuclear Test | Iran Bombs Kill at Least 10 in Southern City of Ahvaz (Updated) | Investment predictor for 2005-2006 | Trichet says ECB will not cut rates again (UPDATE) | BAR-Honda to consider legal action | Former big leaguer describes rampant steroid use |
| Togo Calm as Grassingbe Takes Over | Somali blast toll now 14 | New France Might Advance, Confidence In Blair Grows | Both held to 8-8 tie in second round | Higher energy costs | Disney's 'Hitchhiker's Guide' Opens as Top Film With \$21.1 Mln | Timberlake and Diaz May Wed on Saturday | PREP SPORTS Ruling could impact MMA |
| Report: Philistines' Dangerous Piece to be a Journalist | Report: Alcatel-Lucent to Acquire Motorola Avantel | Alcatel-Lucent to Acquire Motorola Avantel | 'Take it slow' with runaway bride, father urges his son | CAFTA Approval in Trouble | Last 'Star Wars' Movie Said Not for Kids | Source: Culkin to testify for Jackson | Next-gen Xbox to be unveiled at E3 show |
| Wednesday May 4, 2005 9:11 | Archived | LIVE NOW | BTK suspect is silent; not guilty plea entered | Potash Nichols Accuses 3rd Man in Bombing | Patient silent for years suddenly gets chatty | ?Idol? Contestant Claims Affair with Abdul | NASA simulates shuttle countdown |
| 00:00 | 01:00 | 02:00 | 03:00 | 04:00 | 05:00 | 06:00 | 07:00 |

LESS THAN 10 MINUTES AGO WORLD HEALTH BUSINESS TECHNOLOGY SPORTS ENTERTAINMENT HEALTH

10-110 MINUTES AGO LIFESTYLE POLITICS SCIENCE & ENVIRONMENT SOCIETY TRAVEL

MORE THAN 1 HOUR AGO CULTURE ECONOMICS ENERGY & INDUSTRY FOOD & DRINK GOVERNMENT & POLITICS HOME & GARDEN INTERNATIONAL LEISURE & RECREATION POP CULTURE SCIENCE & ENVIRONMENT SOCIETY TRAVEL

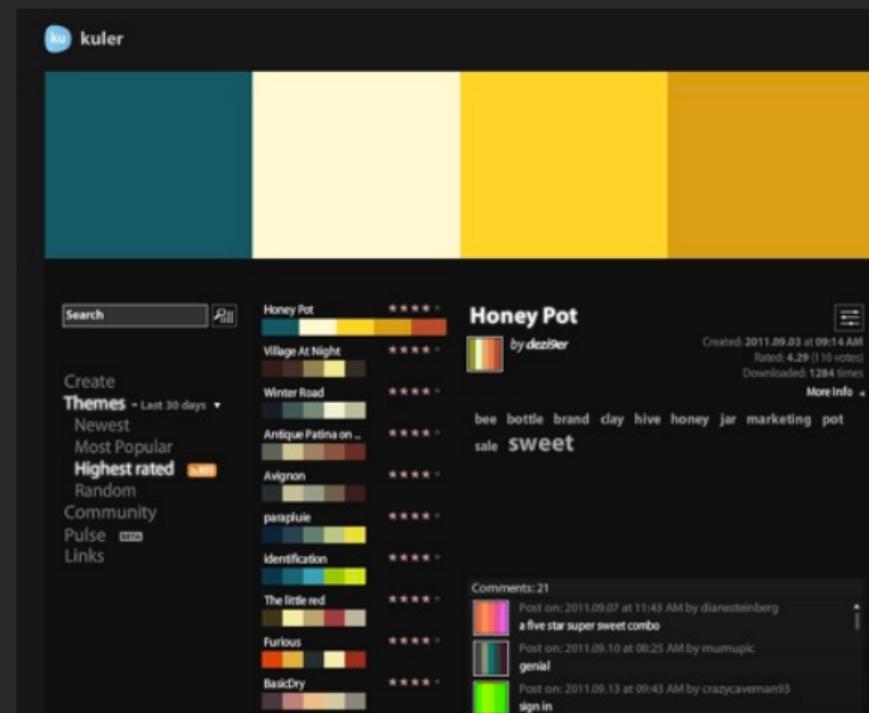
LESS THAN 10 MINUTES AGO WORLD HEALTH BUSINESS TECHNOLOGY SPORTS ENTERTAINMENT HEALTH

10-110 MINUTES AGO LIFESTYLE POLITICS SCIENCE & ENVIRONMENT SOCIETY TRAVEL

MORE THAN 1 HOUR AGO CULTURE ECONOMICS ENERGY & INDUSTRY FOOD & DRINK GOVERNMENT & POLITICS HOME & GARDEN INTERNATIONAL LEISURE & RECREATION POP CULTURE SCIENCE & ENVIRONMENT SOCIETY TRAVEL

Color: where to start

- Pick a color palette of just a few core colors:
 - 1 base
 - 3 complements
 - 1 highlight
 - black/white
- Use the color system to solve functional issues first, then add expressive, emotive, brand qualities



Icons / Imagery

- Icons are visual indicators of
 - status
 - functionality
 - branding
- They should complement the main content, and not contribute to UI clutter or noise
- Just like type and color, should be used judiciously



Metaphors / Models

- A proper mental model drives good design
- Expressed as a metaphor, it **frames** the product properly in your mind
- Intentional & contextual, it shapes understanding of the product's purpose and how to use it

Language

- Many design problems are simply issues of **poor terminology**:
 - button labels
 - menu items
 - feature names
 - etc.
- Generally speaking, product language should be no more complicated than everyday conversation
 - Ask your target audience



Behavior

- A digital product is used to do something
- Interactive behavior, and specifically, the ability to **directly manipulate data** with an input device as an intuitive, seamless extension of the user's hand/mind, are **critical** in that regard
- Affordances, motion, feedback are key

Patterns

- A pattern describes an optimal solution to a common problem within a specific context
- As common problems are tossed around a community and are resolved, common solutions often spontaneously emerge
- Eventually, the best of these rise above & reach the status of a Design Pattern



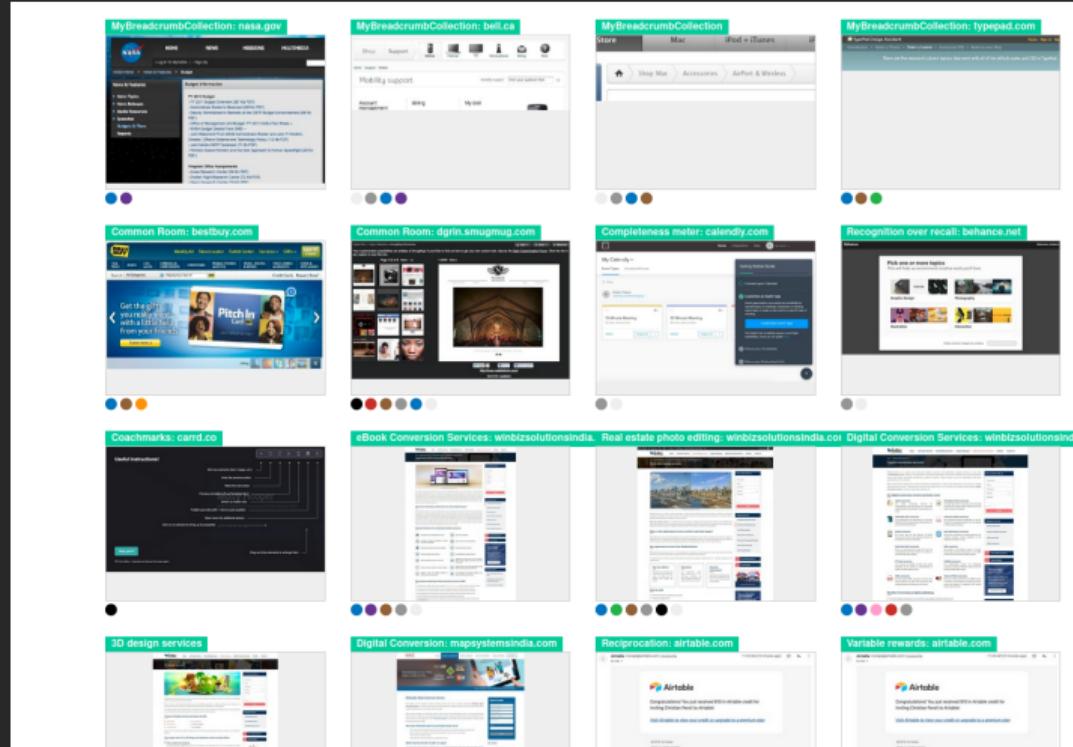
Screenshots ▾

16097

examples found

Featured collections

- Getting input
 - WYSIWYG
 - Password Strength Meter
 - Wizard
 - Vote To Promote
 - Input Feedback
 - Steps Left
 - Flagging & Reporting
 - Calendar Picker
 - Completeness meter
 - Forgiving Format
 - Structured Format
 - Fill in the Blanks
 - Keyboard Shortcuts
 - Captcha
 - Pay To Promote
 - Autosave
 - Rule Builder
 - Rate Content
 - Inplace Editor
 - Settings
 - Drag and drop
 - Expandable Input
 - Preview
 - Undo
 - Morphing Controls
 - Wiki
 - Good Defaults
 - Input Prompt
 - Inline Help Box
- Navigation
 - Vertical Dropdown Menu
 - Pagination
- Dealing with data
 - Autocomplete
 - Slideshow
 - Gallery
 - Search Filters
 - Dashboard
 - Image Zoom
 - Table Filter
 - Frequently Asked Questions
- (FAQ)
 - Accordion Menu
 - Carousel
 - Cards
 - Module Tabs
 - Adaptable View
 - Event Calendar
 - Notifications
 - Progressive Disclosure
 - Categorization
 - Breadcrumbs
 - Article List
 - Shortcut Dropdown
 - Horizontal Dropdown Menu
 - Navigation Tabs
 - Modal
 - Fat Footer
 - Tagging
 - Continuous Scrolling
 - Pull to refresh
 - Archive
 - Home Link
 - Favorites
 - Tag Cloud
 - Thumbnail
- Social
 - Collectible Achievements
 - Leaderboard
 - Activity Stream
 - Auto-sharing
 - Friend list
 - Testimonials
 - Friend
 - Chat
 - Like
 - Reaction
 - Invite friends
 - Follow
- Miscellaneous
 - Product page
 - Subscription
 - Comments
 - Vote To Promote
 - Wizards
 - Account Registration
 - Input Feedback
 - Content Teasers
 - Image Zoom
 - Error pages
 - Calendars
 - Coming soon
 - Displaying data
 - Lists
 - Articles
- Onboarding
 - Lazy Registration
 - Guided Tour
 - Paywall
 - Blank Slate
 - Walkthrough
 - Coachmarks
 - Playthrough
 - Inline Hints
- Tip A Friend
 - Sort By Column
 - Alternating Row Colors
 - Copy Box
- Curiosity
 - Product pages
 - Portfolios
 - Navigation
 - Peak-end rule
 - Login forms
 - Reciprocity
 - Galleries
 - Pricing table
 - Shopping Cart
 - Contact form
 - Filter Search
 - User profile
 - Search
 - Value propositions
 - Newsletter sign up
 - Product lists
 - Pricing Tables
 - Coupon
- Endowment Effect
 - Completion
 - Appropriate challenge
 - Fixed rewards
 - Variable rewards
 - Prolonged play
 - Powers
 - Praise
 - Intentional gaps
 - Unlock features
- Limited duration
 - Curiosity
 - Endowment Effect
 - Limited duration
- Game mechanics
 - Completion
 - Appropriate challenge
 - Fixed rewards
 - Variable rewards
 - Prolonged play
 - Powers
 - Praise
 - Intentional gaps
 - Unlock features
- Perception and memory
 - Chunking
 - Recognition over recall
 - Reduction
 - Anchoring
 - Tunnelling
 - Isolation Effect
 - Serial Positioning Effect
- Feedback
 - Tailoring
 - Kairos
 - Feedback loops
- Social
 - Liking
 - Commitment & consistency
 - Cognitive Dissonance
 - Social proof
 - Reciprocation
- Cognition
 - Loss Aversion
 - Scarcity
 - Peak-end rule



Principles

- Make it direct
- Keep it lightweight
- Stay on the page
- Provide an invitation
- Use transitions
- React immediately
- Focus on human goals
- Make it simple
- Inspire delight
- Exhibit craftsmanship
- Deliver unique value

For Next Time

- Review this lecture





Are there any questions?