Science of Great UI (Part 1)

Efficiency in Thought and Motion

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Summary

- Reading takes time.
  - Average adult reading speed in the US is 300 words a minute.
- Each word, on average, adds about 200ms to your customer consumption time.
- The more words a customer sees, the less likely they are to read it (tl;dr).
- If the customer is on an important path, such as purchasing, use fewer words.
Lessons Learned - Backgrounds

- There will always be a foreground and background
- Foreground and background colors should be distinct
- Patterned backgrounds make it difficult to read text
- Background should not call attention to itself
- A wide background/foreground gap improves communication
- Excessive background saturation makes text harder to read
Guidelines - Backgrounds

- Should be a solid color, low-saturation, ideally white or black

⚠️ If you ignore this guideline:
  - **Gradients:** minimal transition (start and stop colors should be very close)

  ![Like this](example1.png) ![Like this](example2.png) ![NOT this](example3.png) ![NOT this](example4.png)

  ![Like this](example5.png) ![Like this](example6.png) ![NOT this](example7.png) ![NOT this](example8.png)

  ![Like this](example9.png) ![Like this](example10.png) ![NOT this](example11.png) ![NOT this](example12.png)

- **Graphic or texture:** it should be **very low contrast** (e.g., light gray on white)

  ![Like this](example13.png) ![Like this](example14.png) ![NOT this](example15.png) ![NOT this](example16.png)

  ![Like this](example17.png) ![Like this](example18.png) ![NOT this](example19.png) ![NOT this](example20.png)

- **Saturated color:** keep **saturation low**

  ![Like this](example21.png) ![Like this](example22.png) ![NOT this](example23.png) ![NOT this](example24.png)

  ![Like this](example25.png) ![Like this](example26.png) ![NOT this](example27.png) ![NOT this](example28.png)
Noise Takeaways

- Two kinds of noise:
  - Excessive irrelevant information
  - Over-emphasis of unimportant data (visual noise)
- Noise increases cognitive load
- Noise distracts from important details
- Noise is bad
  - Work to identify and suppress it
Weak Signal Takeaways

- Weak signal
  - Under-emphasis of important data
  - The opposite of visual noise
- Weak signal increases cognitive load
- Weak signal makes it hard to see important details
- Weak signal is bad
  - Work to identify and adjust emphasis appropriately
Clarity Is:

- Redundancy = 0
- Noise = 0
- Ambiguity = 0
- Emphasis ≈ Importance
- Consumption occurs with maximum efficiency
  - Cognitive load → 0
Discoverability

- Communicating important information about the user interface:
  - How to use
  - Features/functionality
  - Limits/boundaries
Discoverability is important
Discoverability is often forgotten, or designed with low priority
When discoverability gets verbose, you might have a design issue
Modal discoverability disrupts task flow
Discoverability should be **fluid & in parallel** (avoid modal instruction)
Discoverability should be **close in proximity** to the content of interest
Discoverability content should be **concise** and **clear**
Use **images** (especially when the text can become more concise)
**Live preview** is the best discoverability
When you invent **new UI** (or bypass convention):
  - **Set aside time** in the **schedule** to design and implement a good discoverability solution
Guidelines – Feedback Loop

- Strive for the **tightest** feedback loop possible.
- If response time:
  - **< 140ms**: No additional feedback is needed.
  - **140ms-1 sec**: Additional feedback is usually not needed.
  - **1-5 sec**: Animated indicator (subtle => low contrast, small, smooth).
  - **> 5 sec**: Progress bar, ideally with Cancel capabilities.

- There are significant consequences for straying from these guidelines.
  - Feedback too soon => disruptive to concentration and flow.
  - Feedback too late => cognitive load & negative emotional state go up. (increase risk of pilot induced oscillation)
What We’ve Learned

- It’s all an illusion (umwelt).
- Reading is an act of simplifying a complex array of inputs at different levels.
- Backgrounds should approach white or black and be solid (saturation $\rightarrow 0$).
- Every onscreen element is information. But not every element is equally important.
- Emphasis should match importance.
- Cognitive load limits the breadth of our perception.
- Granularity limits the number of data points we can use on a channel.
- Noise (2 forms) – unneeded data & visual noise (overemphasize the unimportant).
- Weak signal (underemphasize the important).
- Discoverability allows customers learn how to use the interface.
- Feedback loop gives you 140ms to respond. Longer response needs special handling.
More Science of Great UI:

DeviQ

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