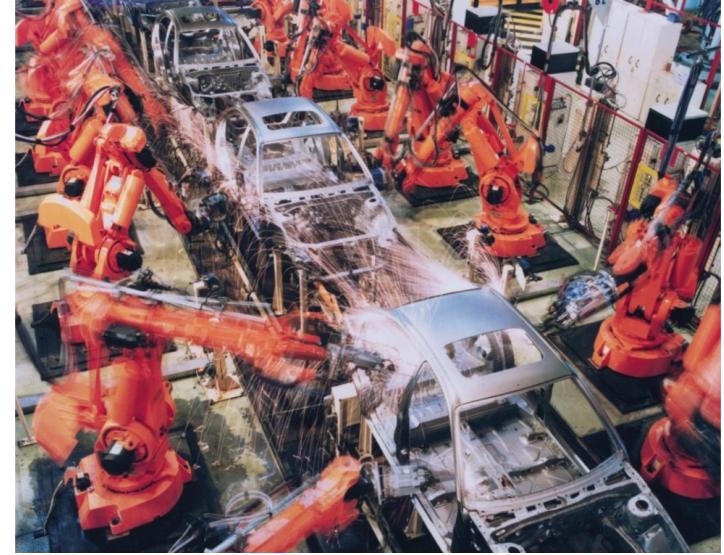
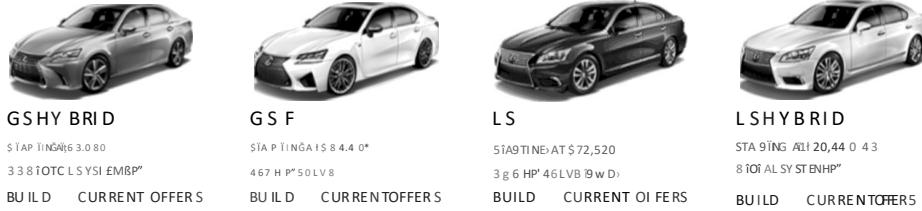
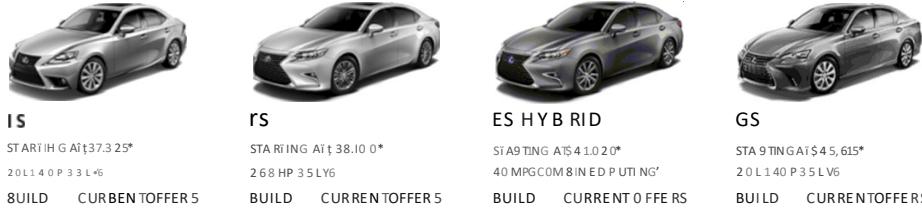


USABILITY

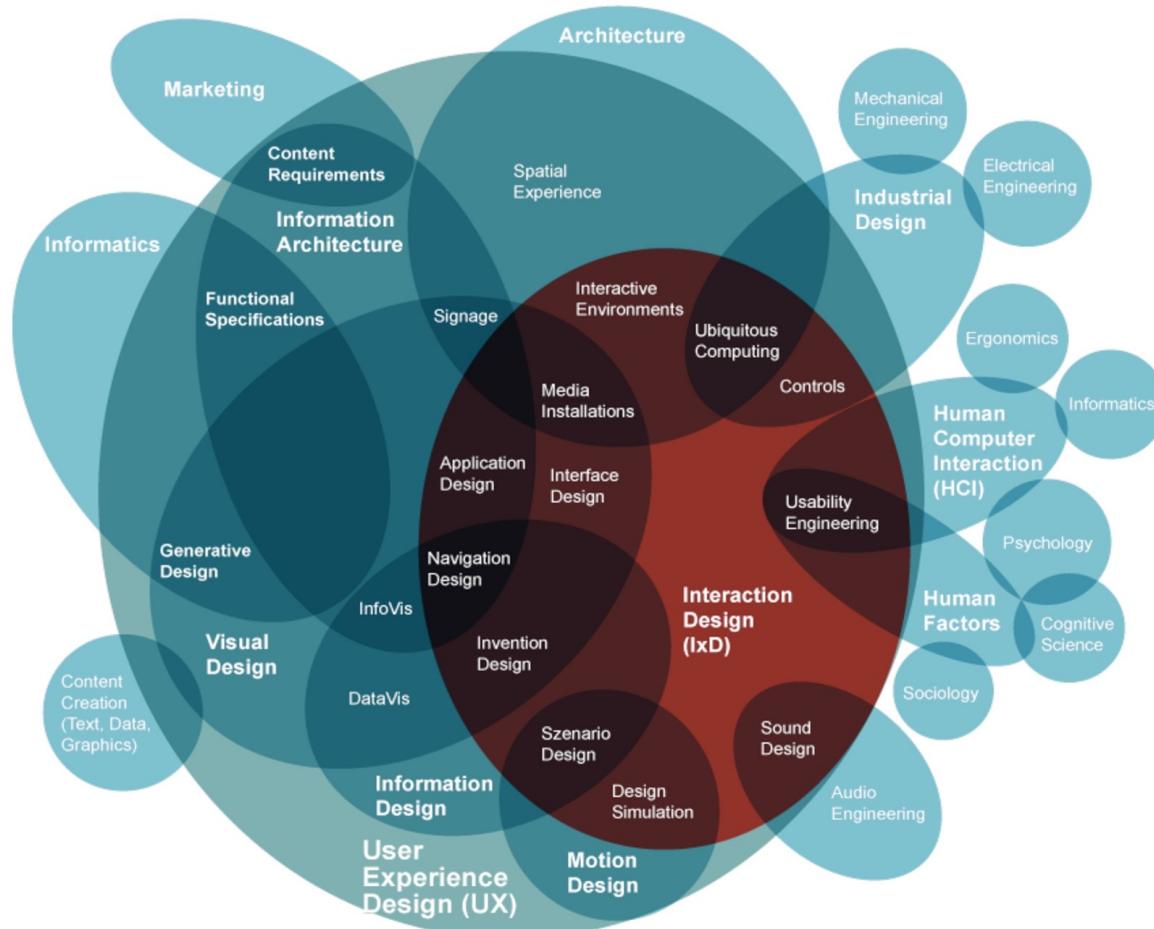
What happens outside (Customer?) and What happened inside (Engineering?)



Different Design Aspects

- Architecture design
 - Division into subsystems and components
 - How these will be connected
 - How they will interact
 - Their interfaces
- Class Design
 - Various features of classes
- User Interface design
- Algorithm design
- Protocol design
 - Design of communication protocol

User Experience Design



Copyright :envis precisely (2009)
based on »The Disciplines of User Experience« by Dan Saffer (2008)
www.kickerstudio.com/blog/2008/12/the-disciplines-of-user-experience

UI Failures



CUSTOMERS ARE
COMPLAINING BECAUSE
OUR USER INTERFACE
IS CONFUSING.



@SCOTTADAMSAYS

DILBERT.COM

FOR EXAMPLE, OUR
MENU CHOICE FOR
DELETING A FILE
IS LABELED "SAVE
FILE."



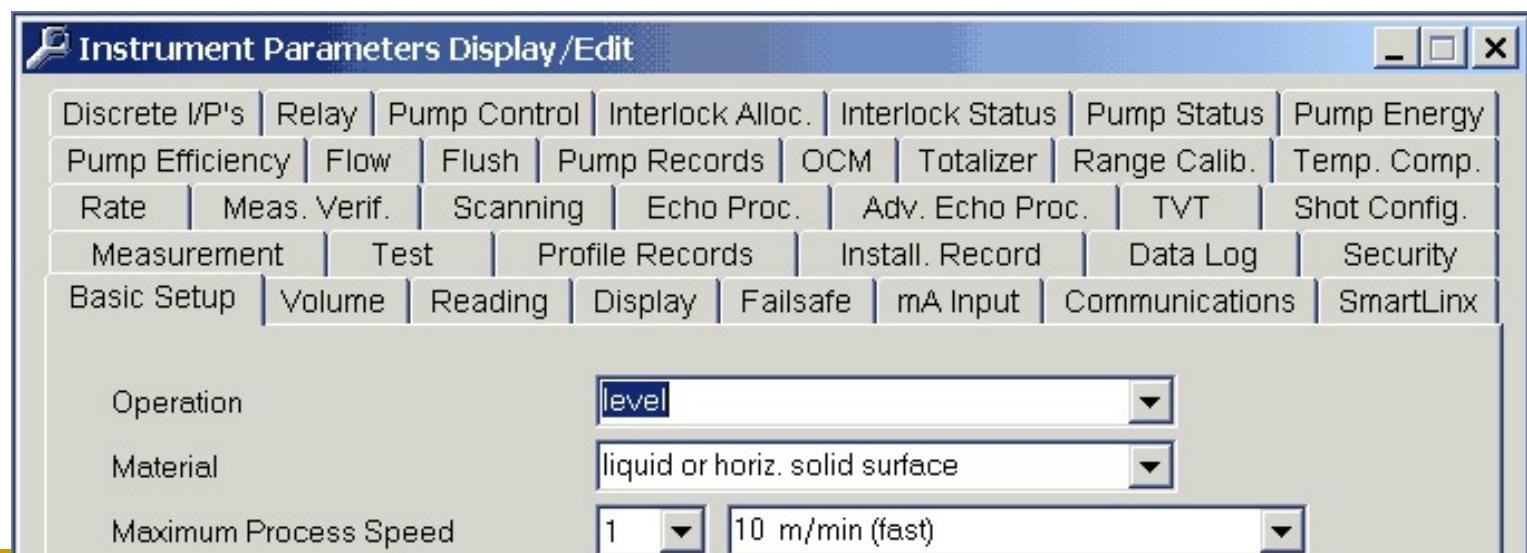
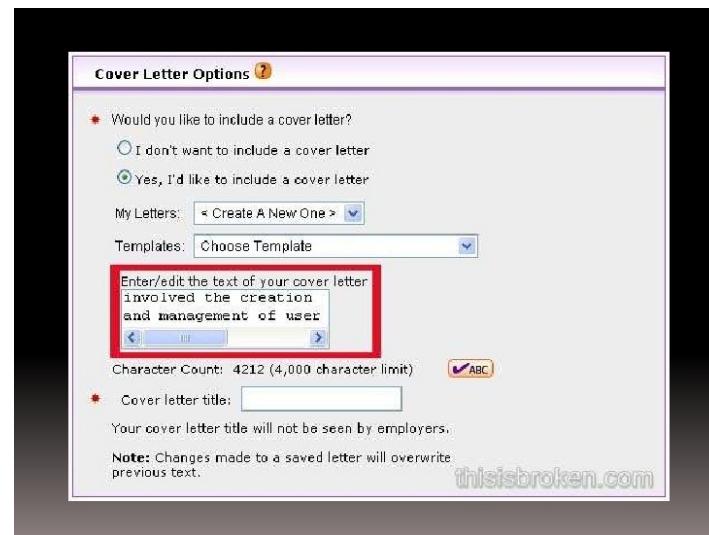
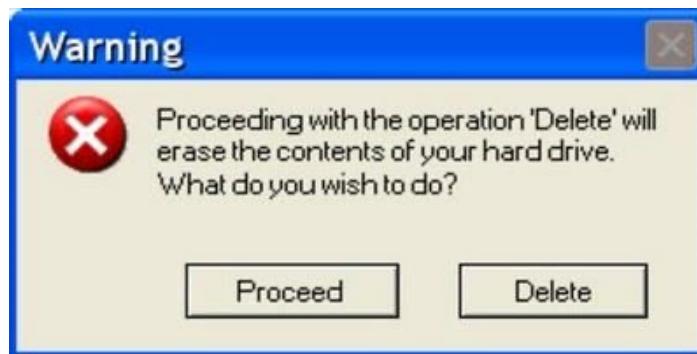
5-2-18 © 2018 Scott Adams, Inc./Dist. by Andrews McMeel

THAT'S
WHY WE
HAVE A
HELP
MENU.

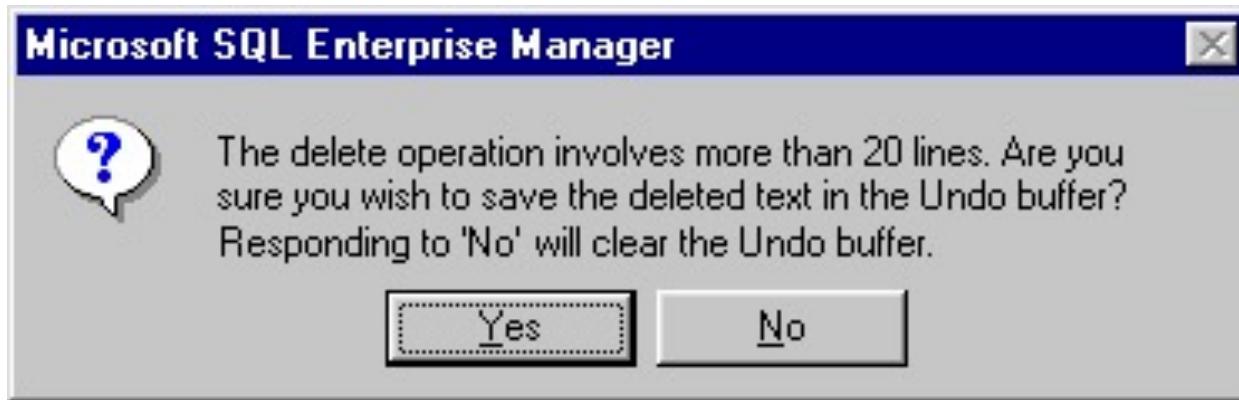


OUR HELP
MENU IS
LABELED
"REFORMAT
HARD
DRIVE."

UI failures contd...



UI failures contd...



8) Age:

9) Female
 Male

Enter your Social Security Number:

 - -
0 0 0 - 0 0 - 0 0 0 0

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Tiers of the NBA Ranking from top to bottom: League + Upon Close Examination No surprises in Chapel Hill: Pearce + Cozen Say, Week 9 Res. B.S. Report + JACKIE MACBRIAN Schilling Not Hiding Scars Cut Schilling opens up about his growing battle with cancer and his beloved company. Columns + FIVE THIRTY EIGHT

NBA Preview: This Warriors are best in the West. Columns + World Series What Royals may come to regret. Columns + ESPN FANTASY GAMES

your win streak ? Order

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VIDEO: HAVE YOU SEEN?

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***** AT&T M-Cell ⌂ 10:15 AM

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#NBA RANK

King's Reign Continues

Expecting someone else? LeBron James takes the NBA's best talents back to Cleveland.

Predictions: Preseason awards

MORE

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NFL

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United app now available for Apple® iPhone®, iPad® and iPod touch® devices (as an iPhone app) and for Android, Windows Phone 8 and BlackBerry 10 devices.

Our app is your travel toolkit. You can book United flights, check flight and upgrade statuses, view your MileagePlus account information, check in and receive a mobile boarding pass and more, directly from your mobile device. Available for iPhone®, iPad® and iPod touch® devices (as an iPhone app) and for Android, Windows Phone 8 and BlackBerry 10 devices, the United app offers convenient access to your travel information.

Key features include:

- Flight booking** – Book flights on United, including award travel, directly from the app on your mobile device
- Check-in and mobile boarding pass** – Store your mobile boarding pass for easy access at security and during boarding
- Passport scanning (iPhone and Android)** – Use your phone to scan your passport for international check-in
- Flight status** – Check your upgrade status and view inflight amenities, departure gates and more
- Flight reminders** – Receive automatic updates on your mobile device for selected flights
- Seat maps** – Select seats and choose Economy Plus® seating

Usability

- Broadly the above examples can be looked at from
 - Functional Perspective
 - User Perspective

Usability

ISO (ISO/IEC 9126-1:2001) defines usability as

“The extent to which a product can be used by specified users to achieve specified goals with effectiveness, efficiency, and satisfaction in a specified context of use”

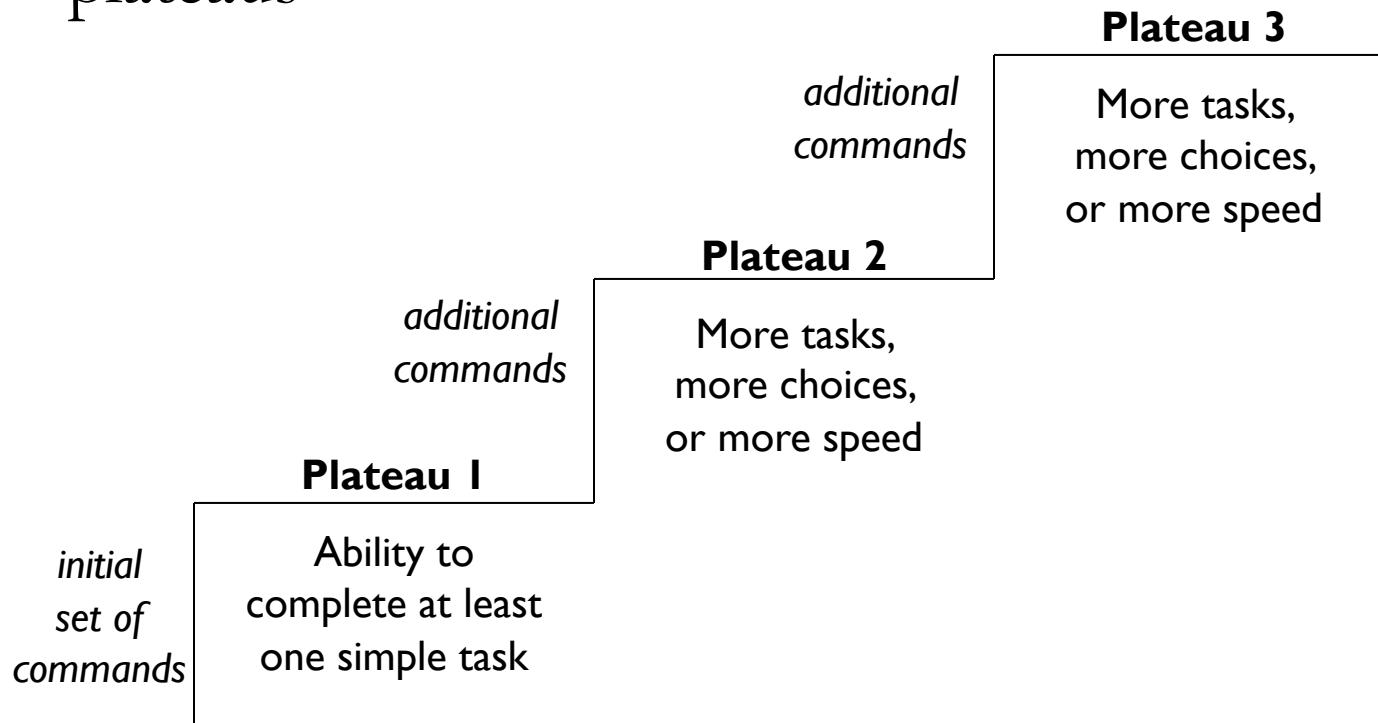
Attributes for Evaluating Usability

- i. Learnability
- ii. Efficiency
- iii. Memorability
- iv. Errors
- V. Satisfaction



1. Time to Learn (Learnability)

- How long it takes to learn how to use an interface
- With complicated interfaces, learning happens in “plateaus”



2. Speed of Performance (Efficiency)

- Speed of user interface, **NOT** software
- Number of characters to type, buttons to press, mouse-clicks, mouse movements, ...
- Speed of performance often directly conflicts with time to learn
 - That is, faster systems are often harder to learn
 - Command lines vs. GUIs

3. Rate of User Errors

- A UI needs to be designed in such a way that user mistakes are less likely
- Affected by factors such as :
 - Consistency
 - Instructions
 - Logical arrangement of screens
- Importance depends on criticality of software

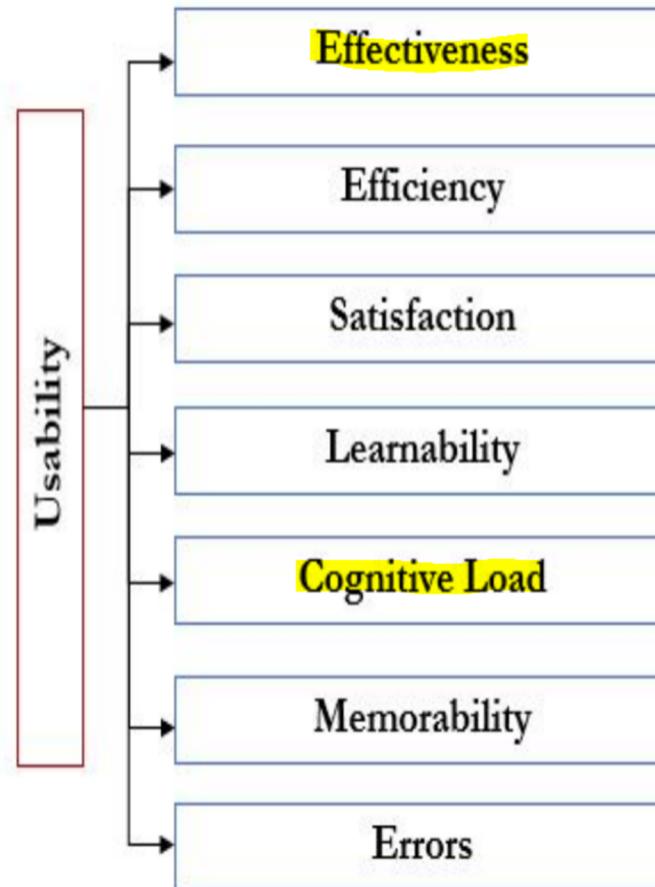
4. Retention of Skills (Memorability)

- We quickly forget how to use some user interfaces, but remember others for life
 - Calculus vs. algebra
 - Airplanes vs. bicycles
- Affected by how closely the syntax of the operations match our understanding
- If learning is very fast, retention may be less important

5. Subjective Satisfaction

- How comfortable the users are with the software
- Previous criteria are very analytical, objective, and measurable
- Subjective satisfaction captures other issues that are more specific to individual taste and background
 - A little harder to measure

People At the Centre of Mobile Application Development (PACMAD)



Design of User Interfaces

- Inside-out design :

Develop a system, then add the interface

- Outside-in design :

Design the interface, then build the system to support it

When decisions are made, either the developer must conform to the user, or the user must conform to the developer.

Traditional CS is entirely inside out

11 Reasons Mobile Apps Fail

The mobile industry is rapidly growing to an endless scope. But increased competition also leads to increased chances of failure.



by Lauren Gilmore · MVB · Jul. 05, 18 · Mobile Zone · Opinion

User Issues

There's nothing more frustrating than a mobile app that constantly crashes or has poor performance. Poor performance - or no performance - is the number one reason why users abandon an app.

6. Bad User Experience

Offering a compelling user experience is crucial for the success of any mobile app. While having a wide range of available features are key, user interface design is a major factor in determining whether an app is user friendly or difficult to use and causes performance issues.

Solution: Designate enough attention to UX/UI best practices and make sure your app is easy to use.

testbytes

Making Quality a Habit

Top 8 Reasons for App Failure and How to Avoid Them

Tuesday August 7, 2018

App Testing

5. Poor User Interface

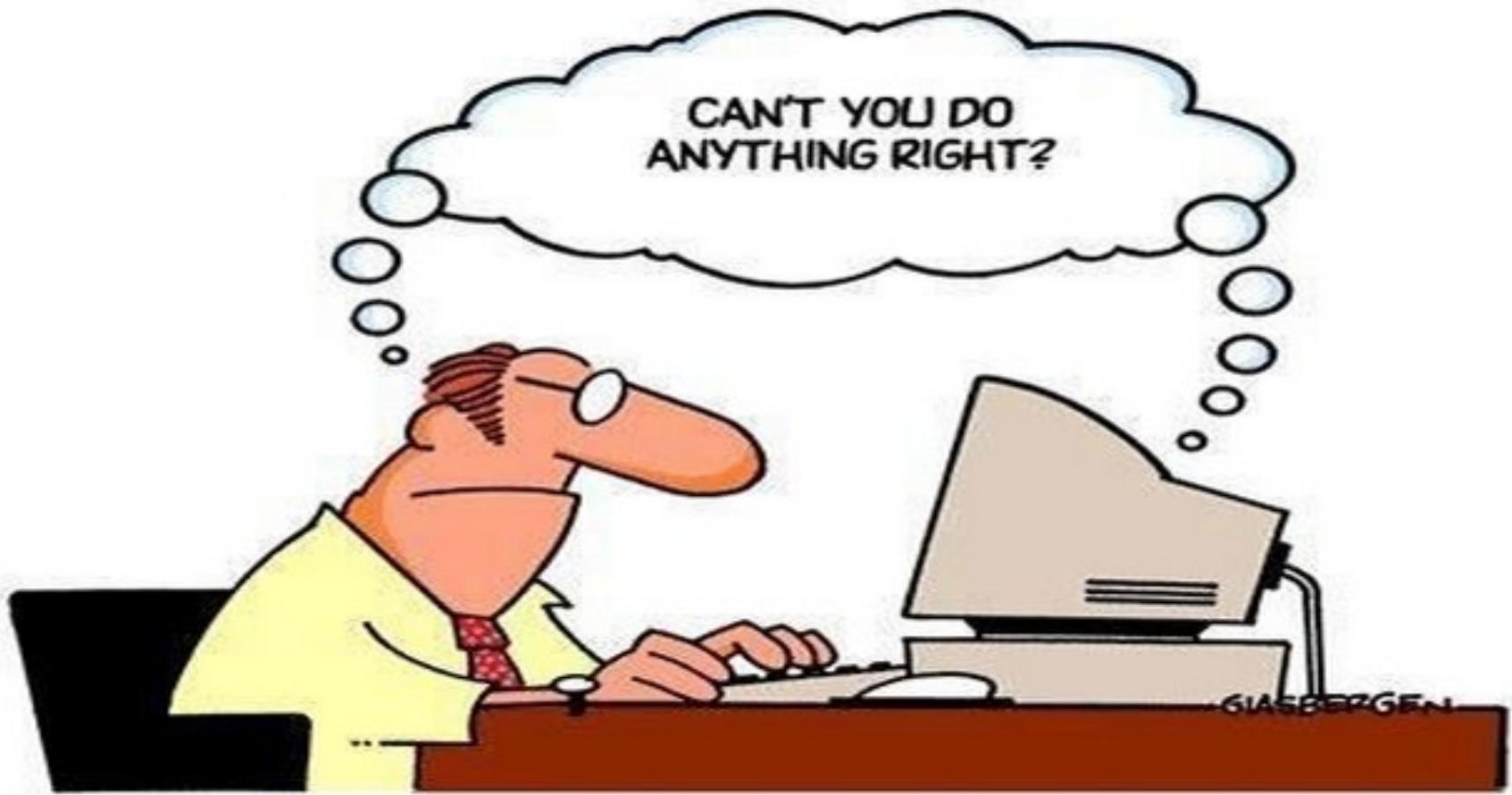
Generally, poor user interface means a poor design. Today, most apps are rejected by users due to their poor user interface. This ultimately leads to their failure due to poor user experience. If the performance of an app is unsatisfactory to the users, they will uninstall it in no time. If users are unable to perform basic functions seamlessly, then it will be very hard for developers to sell their product. There are various reasons how an app can give poor user interface such as:

Why is Designing UIs Hard ?

- Good UIs take time to design
 - Many programmers are lazy
- Designing a good UI requires thinking like the user instead of an engineer
 - Engineers often think they are users
- Different users want different things

Engineers love features

They want to do everything the technology allows!



Why is Designing UIs Hard ?

- Designers are usually experts
 - They view all functions as having equal weight
- Marketing want UIs designed for beginners
 - They sell to beginners
 - Many have only novice semantic knowledge
- Most users are in between—**intermediates !**

Don't weld on training wheels

Understand the Users

- Work experience
- Computer experience
- Age
- Education
- Reading skills
- Language skills
- Work environment
- Task frequency
- ... many more possibilities

**It is important to
know who the user is**

Distribution of Users

Beginners

What does the application do?

What doesn't it do?

How do I print?

Where do I start?

Intermediates

Forgot how

Where is it?

Remind me ...

Can I undo?

More features?

Experts

Automate?

Shortcuts?

Can I change?

Customize?

Keyboard shortcut?

Dangerous?

UI Patterns

<http://ui-patterns.com/patterns>

Shneiderman's Golden Usability Principles

1. Strive for consistency
2. Design usable and discoverable shortcuts
3. Provide appropriate feedback
4. Yield closure
5. Provide appropriate error handling
6. Allow users to reverse (undo) all actions
7. Support internal locus of control
8. Reduce the Short Term Memory (STM) load

Principle (1/8) - Consistency



MacOS menu bar
remains consistent!
1980s to 2019 !

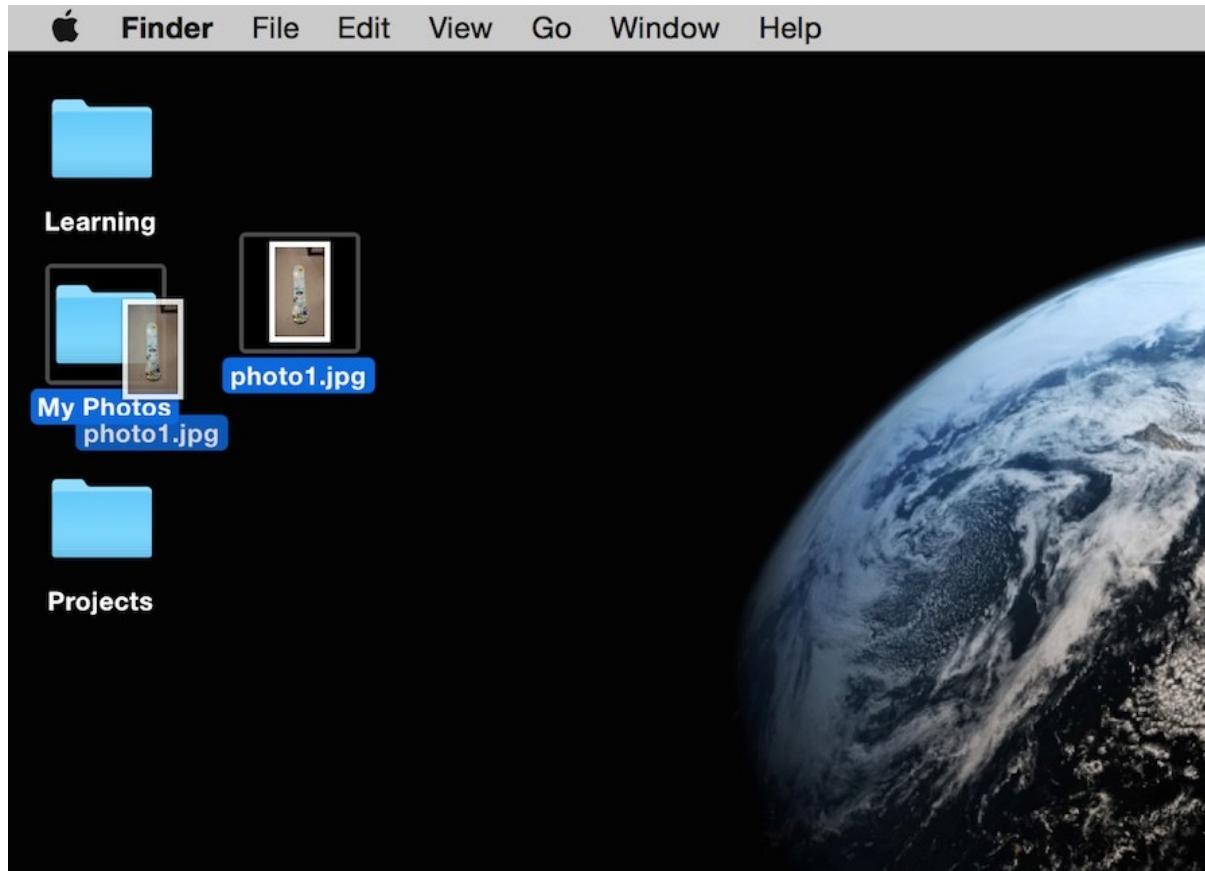
Various aspects of UI Must be consistent ! Changes break Consistency!!

Principle (2/8) – Shortcuts

Design usable and discoverable **shortcuts**

- ❑ Users must be able to find them
 - ❑ Users must be able to remember them
-
- Copy and Paste (Command-C and Command-V)
 - Screenshots (Command-Shift-3)

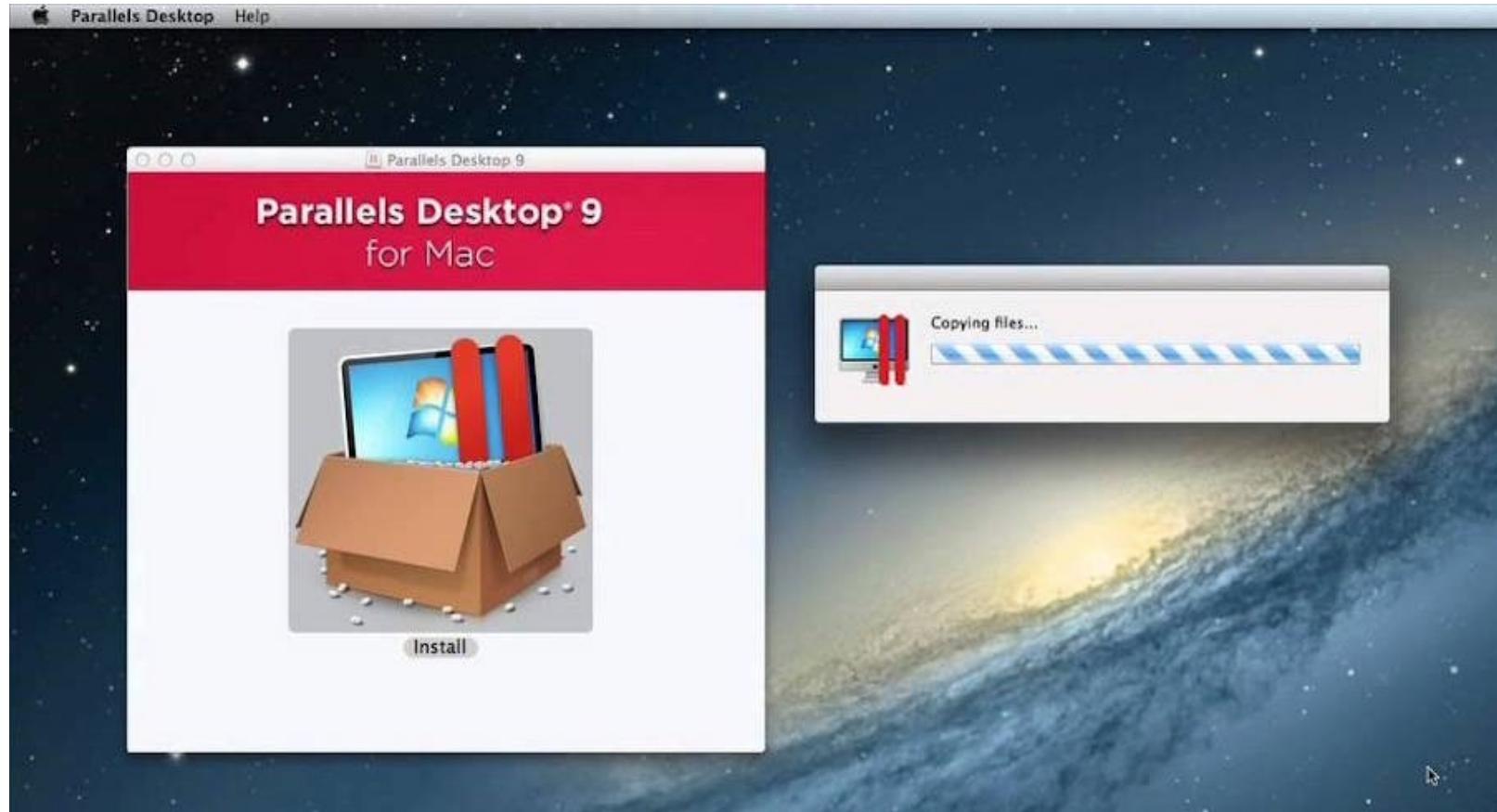
Principle (3/8) - Feedback



Folder is shown to be physically moving during drag and drop

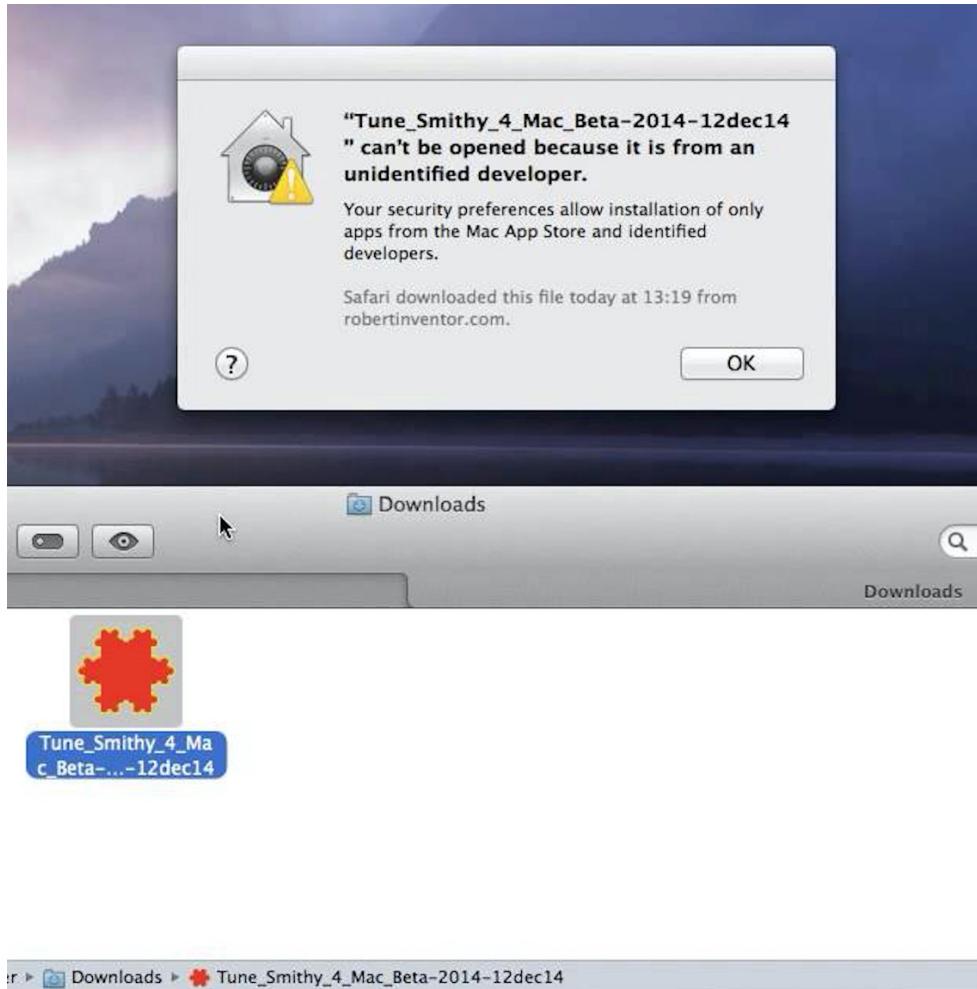
Have a clearly defined end-point in the interaction !

Principle (4/8) – Yield closure



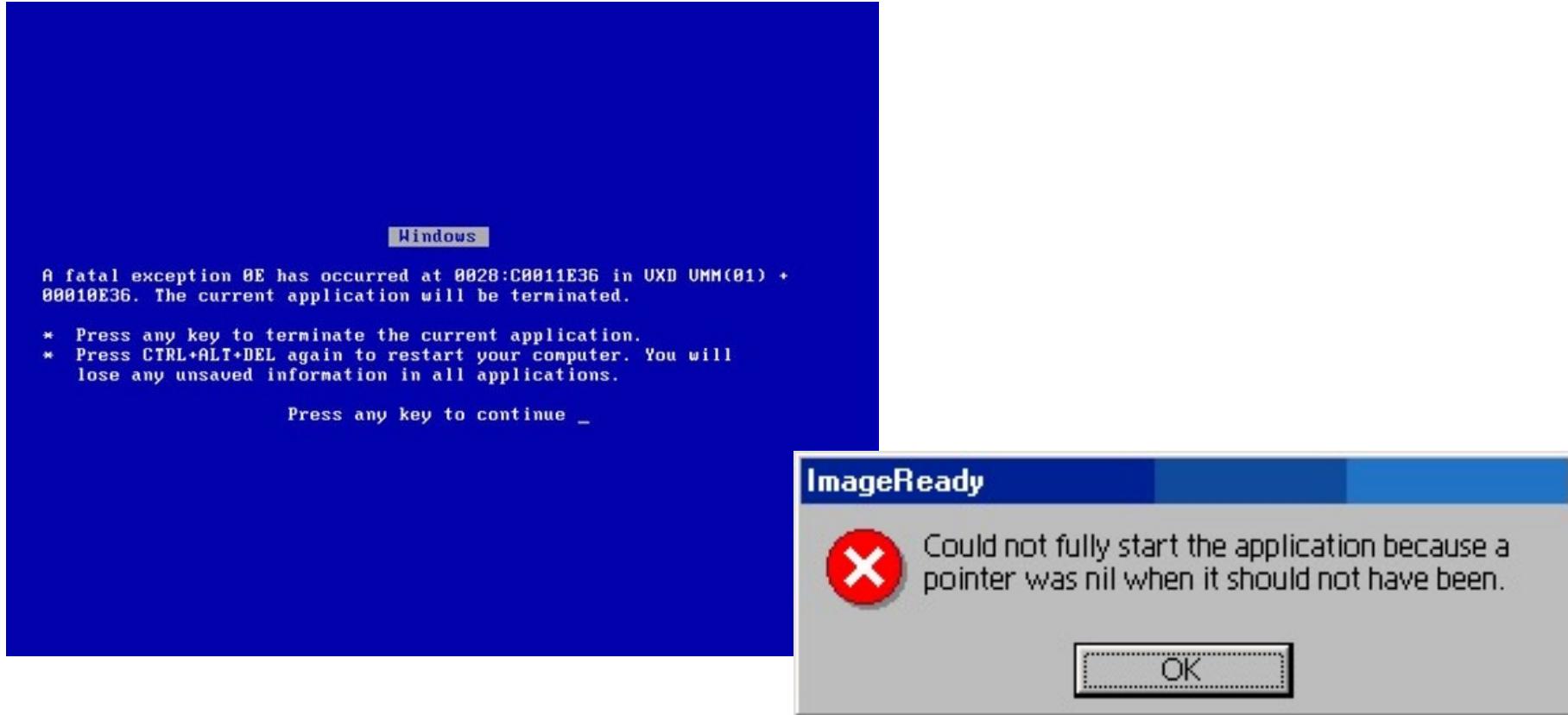
Appropriate feedback must be given (For errors as well as others) !

Principle (5/8) – Error handling

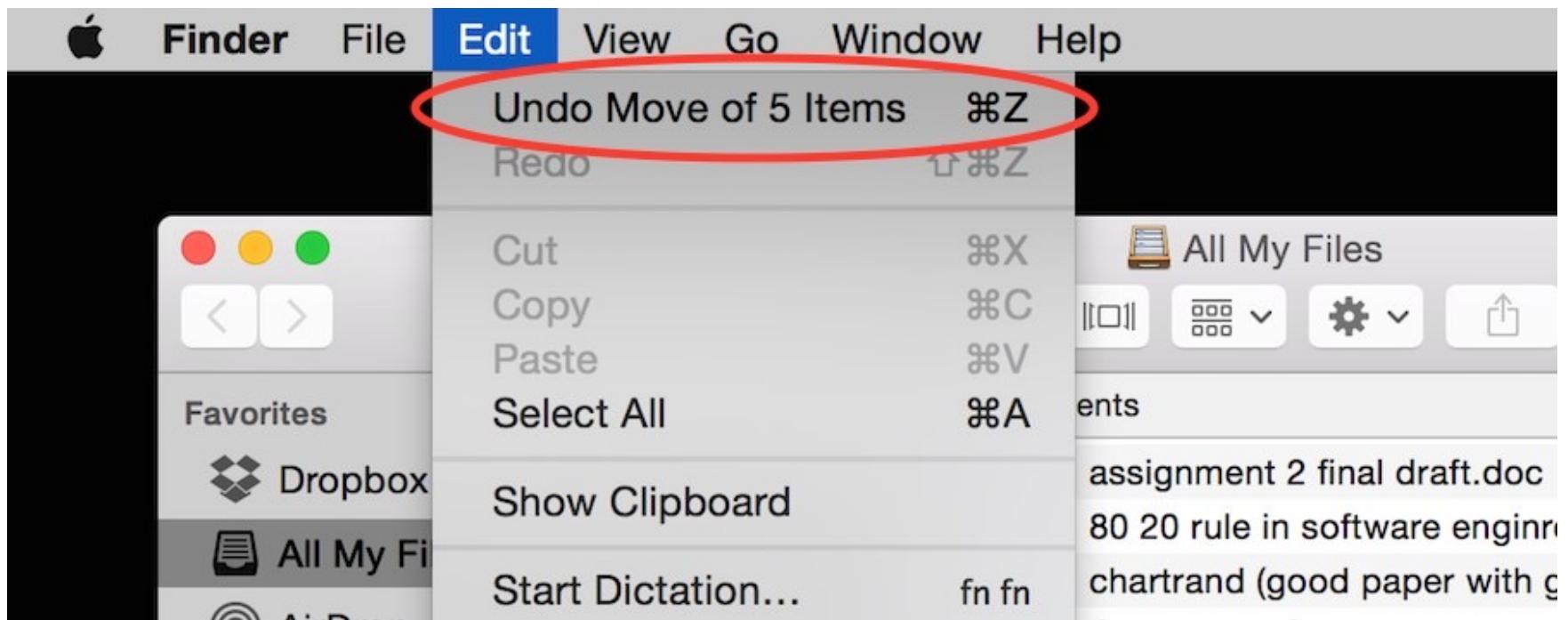


- Clearly tell users what was wrong
- Don't scare the users. Use appropriate language
- Don't just give Error handles or Error codes
 - “404 error” does not really convey much
- Only make users redo the part that was wrong

Principle (5/8) – Error handling

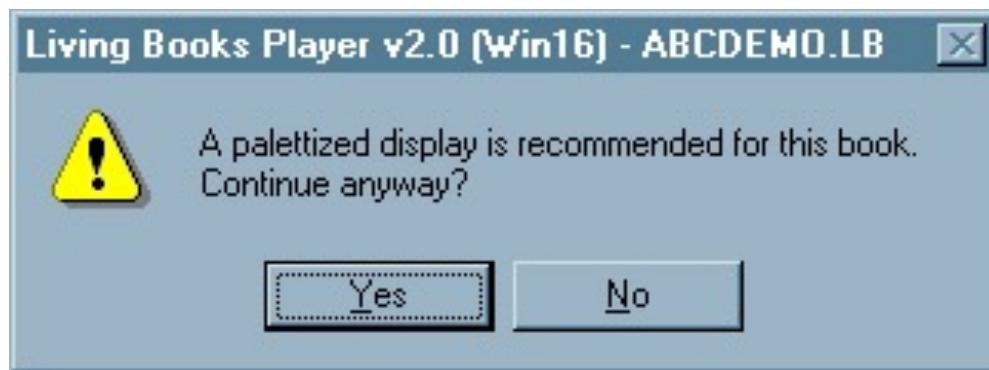
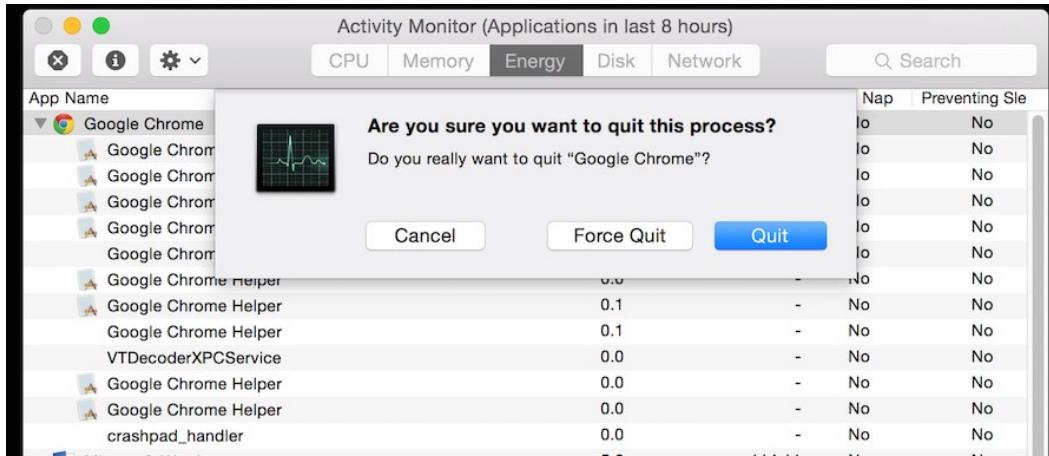


Principle (6/8) - UNDO



Actions must be reversible ! If some actions can't be undone, use “hesitation”

Principle (7/8) – Internal locus of control



- Inexperienced users may be intimidated when the software makes decisions
- Experienced users want to control the flow
- Put the users in-charge (to the extent possible)
 - Hide technical terms
 - Interaction must be customizable (Personalization)

Principle (8/8) – Short term Memory (STM)

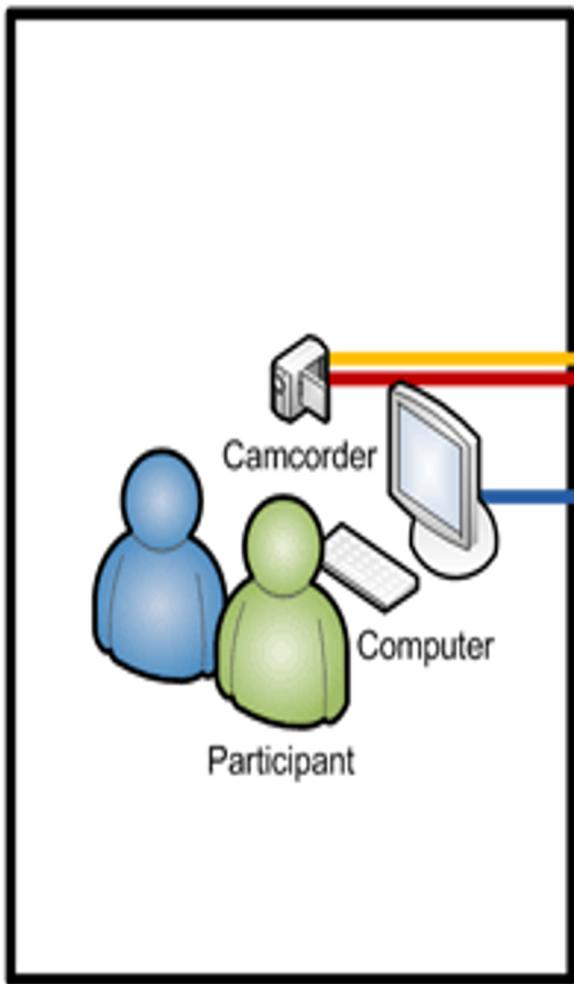


- Remember $7 +/ - 2$
- Apple has only 4 apps in the main menu
- Organizing things hierarchically help reduce STM

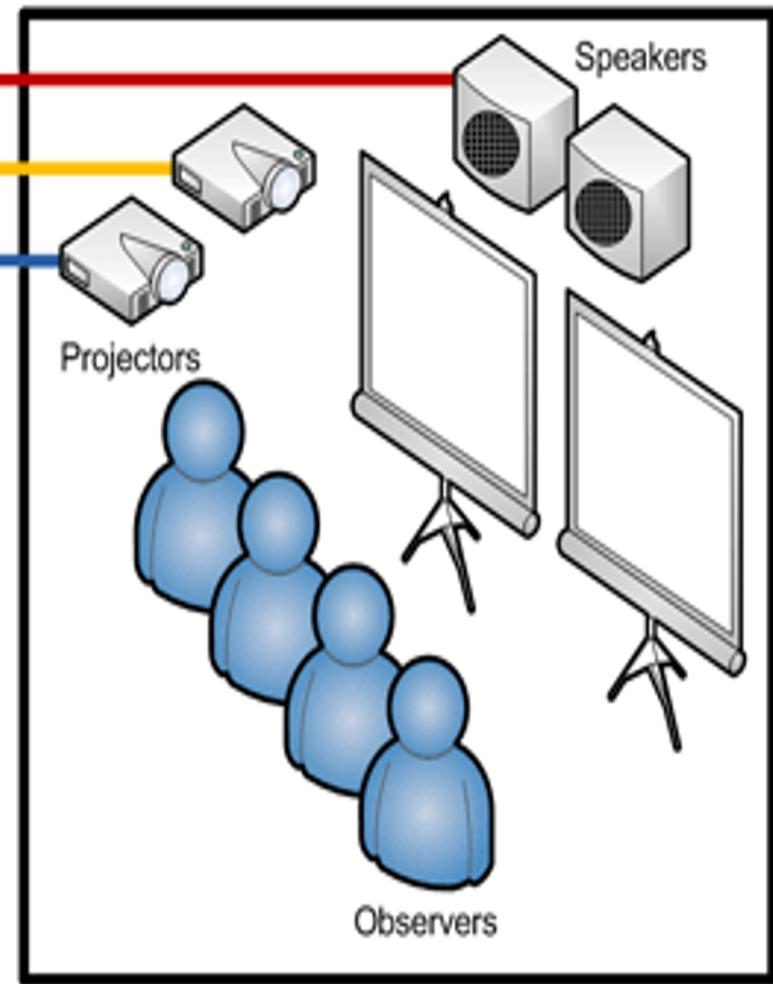
iOS 4

Usability Labs

Testing Room

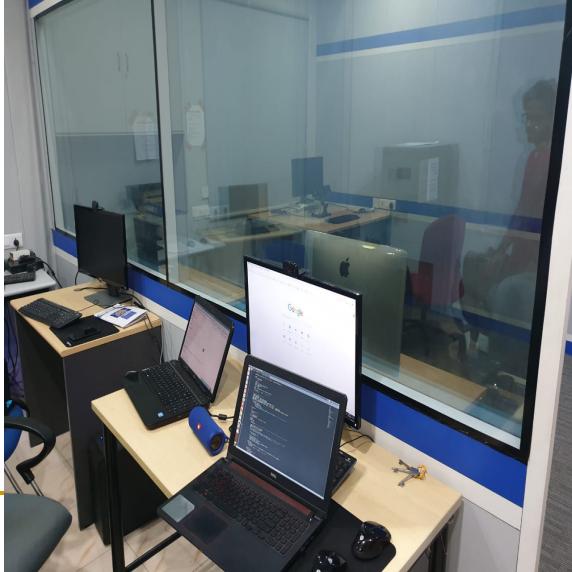
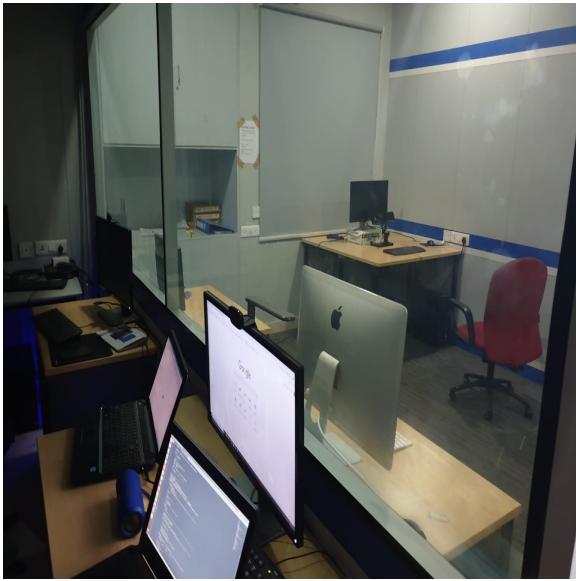


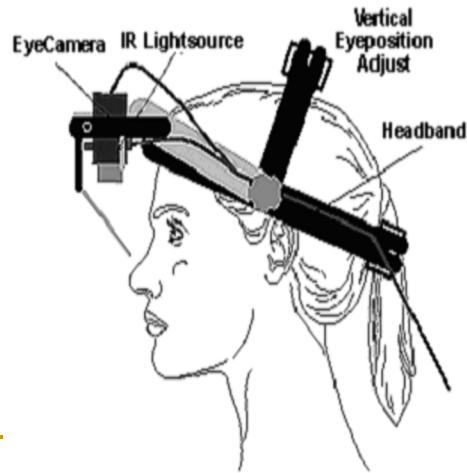
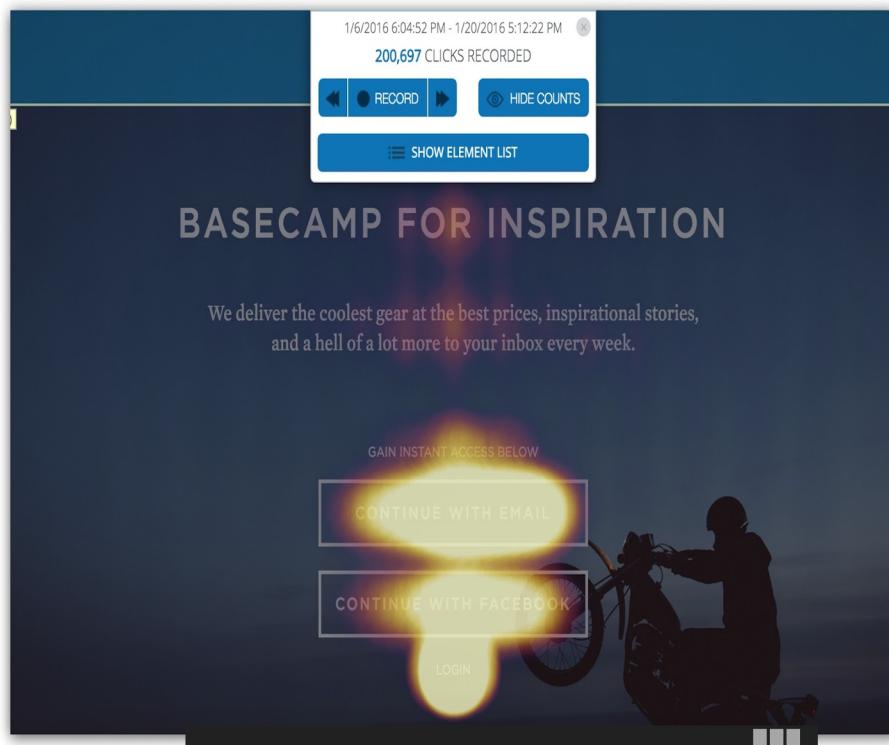
Observation Room





Virtual Human Interaction Lab (@ SERC, IIITH)



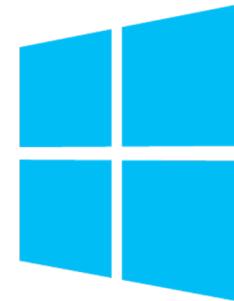


Usability Guidelines

Usability Guidelines are statements by which to determine an action of usefulness. A Usability guideline aims to streamline particular processes according to a set routine or sound practice. By definition, a guideline is never mandatory. Guidelines are not binding and are not enforced.



NN/g



Usability guideline examples

- In a form, telephone number entry is restricted to a dial-pad (i.e. numbers only)
- User can select to reveal or hide password as they type, during signup or sign-in (e.g. by toggling a ‘reveal’ or ‘hide’ control)
- If app requests sign-up, the user can choose to continue as a guest
- First-time user has multiple sign-up options (e.g.,username/password and social sign-up facebook.com, google, twitter)