

User Interface Design

Sommerville, Chapter 16;
Pressman, Chapter 12

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The User Interface

- User interfaces must be designed to **match skills, experience, expectations** of anticipated users
- Users often judge system by interface rather than functionality
- Poor UI design reason why many software systems remain **unused**
- Poor UI can cause **catastrophic errors**

Human Factors in Interface Design

- Limited short-term memory
 - People can instantaneously remember max 7 items
 - Overload → mistakes

- People make mistakes
 - mistakes → systems go wrong → inappropriate alarms & messages
→ increase stress → likely more mistakes

- People are different
 - wide range of physical capabilities
 - Do not design for own capabilities

- People have different interaction preferences
 - Some like pictures, some like text, some...

Pressman's Golden Rules

- Place user in control
- Reduce user's memory load
- Make interface consistent

I - Place User in Control

*No need to learn these items by heart,
but be able to cite examples*

- Do **not force** user into unnecessary or undesired actions
- **flexible** interaction
- Allow user interaction to be **interruptible & undoable**
- Streamline interaction as skills advance, allow **customizing** interaction
- **Hide technical internals** from casual user
- **Direct interaction** with objects on screen

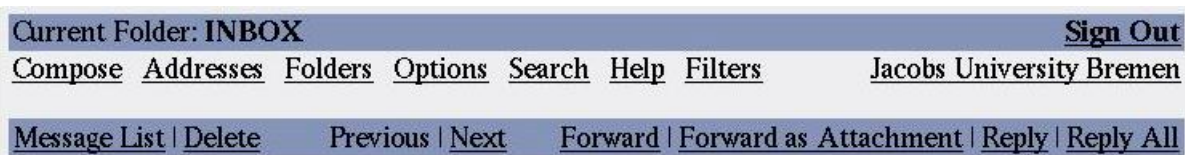
II - Reduce User's Memory Load

- Reduce demand on short-term memory
 - Quick check: Golden rules?
- meaningful defaults
- Intuitive shortcuts
- Visual layout using real world metaphor
 - Ex: in office environments,

talk about:	documents of various types (letter, spreadsheet, ...), folders, ...
<i>instead of:</i>	<i>files with extensions (.doc, .xls, ...), directories, ...</i>
- Disclose information in a progressive fashion

III - Make Interface Consistent

- put current task into **meaningful context**
- Maintain **consistency** across family of applications
- If past interaction has created **expectations**, do not change
 - unless there is very (!) good reason



Anti-Examples

- ssh vs scp port
- Win registry:

My Computer\HKEY_CURRENT_USER\Software\Microsoft\Windows\CurrentVersion\Policies\Explorer

...which rules are violated?

...want to add another rule: **make interface safe** (particularly for casual users)

User Analysis

- If you **don't understand** what users **want to do** with a system, you have **no realistic prospect** of designing an effective interface.
- User analyses have to be described in terms that users and other designers can **understand**.
- Helpful:
 - **Use cases** = let user explain typical **episodes** of use
 - **Ethnography** = **observe** user at work, ask

Ex: Ethnographic Records

[Pressman]

Air traffic control involves a number of control ‘suites’ where the suites controlling adjacent sectors of airspace are physically located next to each other. Flights in a sector are represented by paper strips that are fitted into wooden racks in an order that reflects their position in the sector. If there are not enough slots in the rack (i.e. when the airspace is very busy), controllers spread the strips out on the desk in front of the rack.

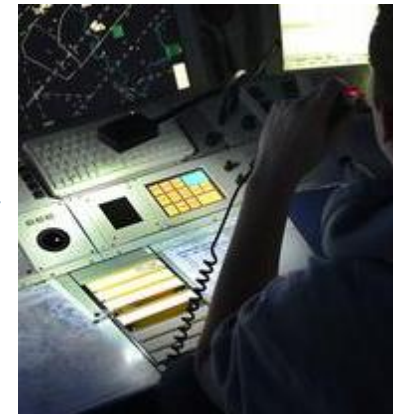


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When we were observing controllers, we noticed that they regularly glanced at the strip racks in the adjacent sector. We pointed this out to them and asked them why they did this. They replied that, if the adjacent controller has strips on their desk, then this meant that they would have a lot of flights entering their sector. They therefore tried to increase the speed of aircraft in the sector to ‘clear space’ for the incoming aircraft.



Insights from Ethnography

- UI to always show **all flights** in a sector
 - No scrolling displays

- UI to tell controllers how many flights in **adjacent** sectors
 - plan workload

UI Wrap-Up

- UI design process involves
 - user **analysis**
 - system **prototyping**
 - prototype **evaluation**
- Create **metaphors**, use them consistently
- UI critical for acceptance or failure of the whole project
 - Prototyping + high customer interaction advisable