

iPhone Specialist Lab

L01: HCI Principles

*Prof. Dr. Jan Borchers, Florian Heller, Jonathan Diehl
Media Computing Group, RWTH Aachen University*

2011

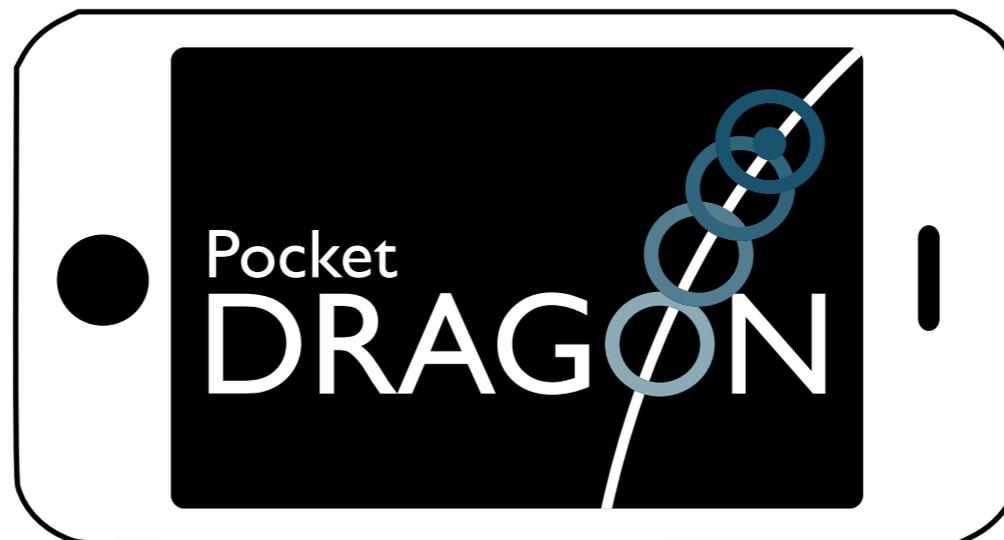
<http://hci.rwth-aachen.de/iphone>



iPhone Programming Team

- Prof. Jan Borchers
- Florian Heller
- Jonathan Diehl





Class Goals

- Learn the basics of user interface design and good usability
- Learn how to develop iOS Apps
- Understand the differences between desktop and mobile development
- Demonstrate your skills in a final project



Class Topics

- User-Centered Design Process and Principles
- Mobile Application Development Principles

- Views, Animation, and Drawing
- Touch, Motion, Location
- Data Persistency
- Networking



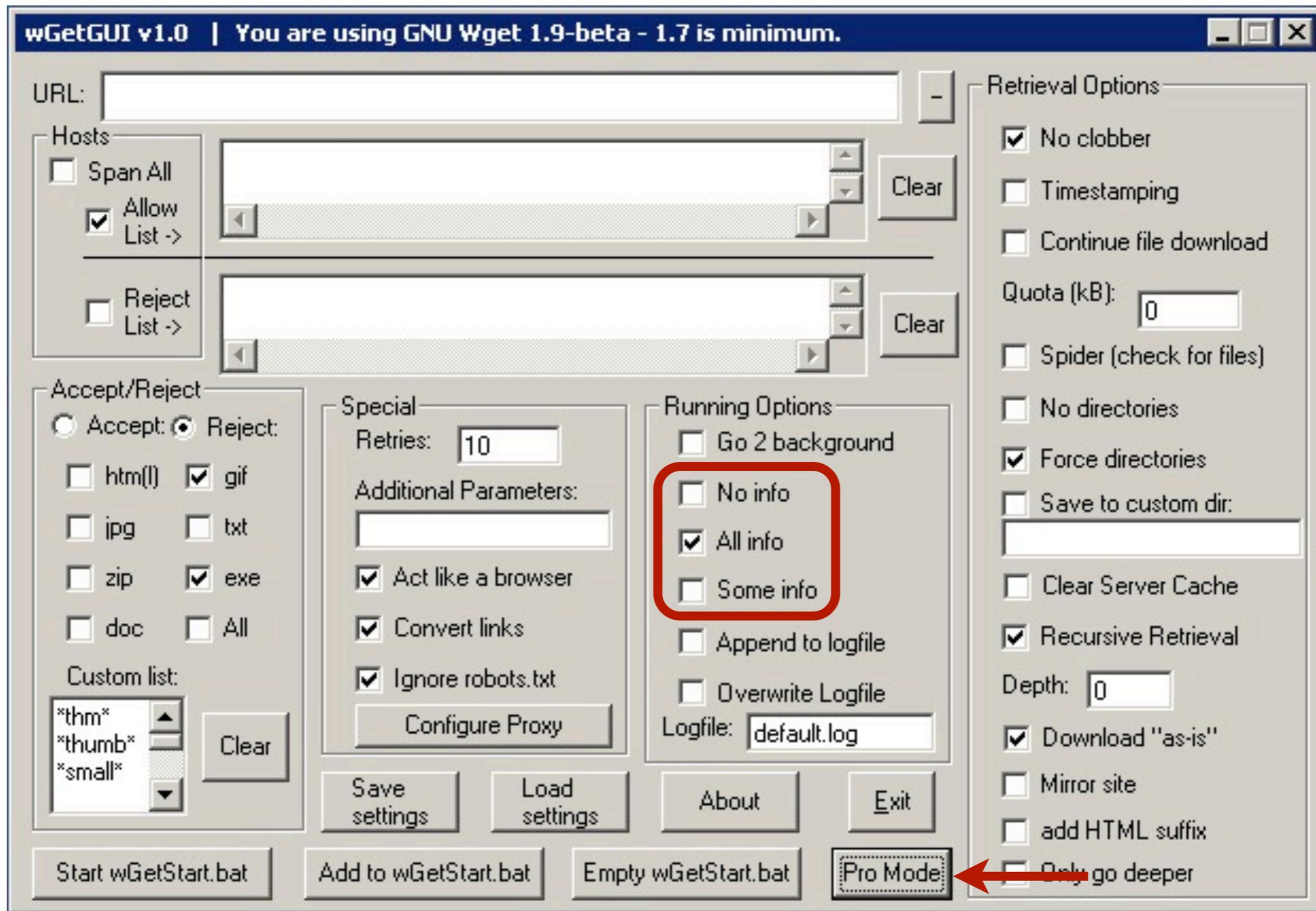
Format

- Room 2U13 and 2010
- Supervised Lab
 - 9:00–12:00: Lecture
 - 14:00–14:45: Questions and Review
- Lab Hours
 - 9:00–18:00



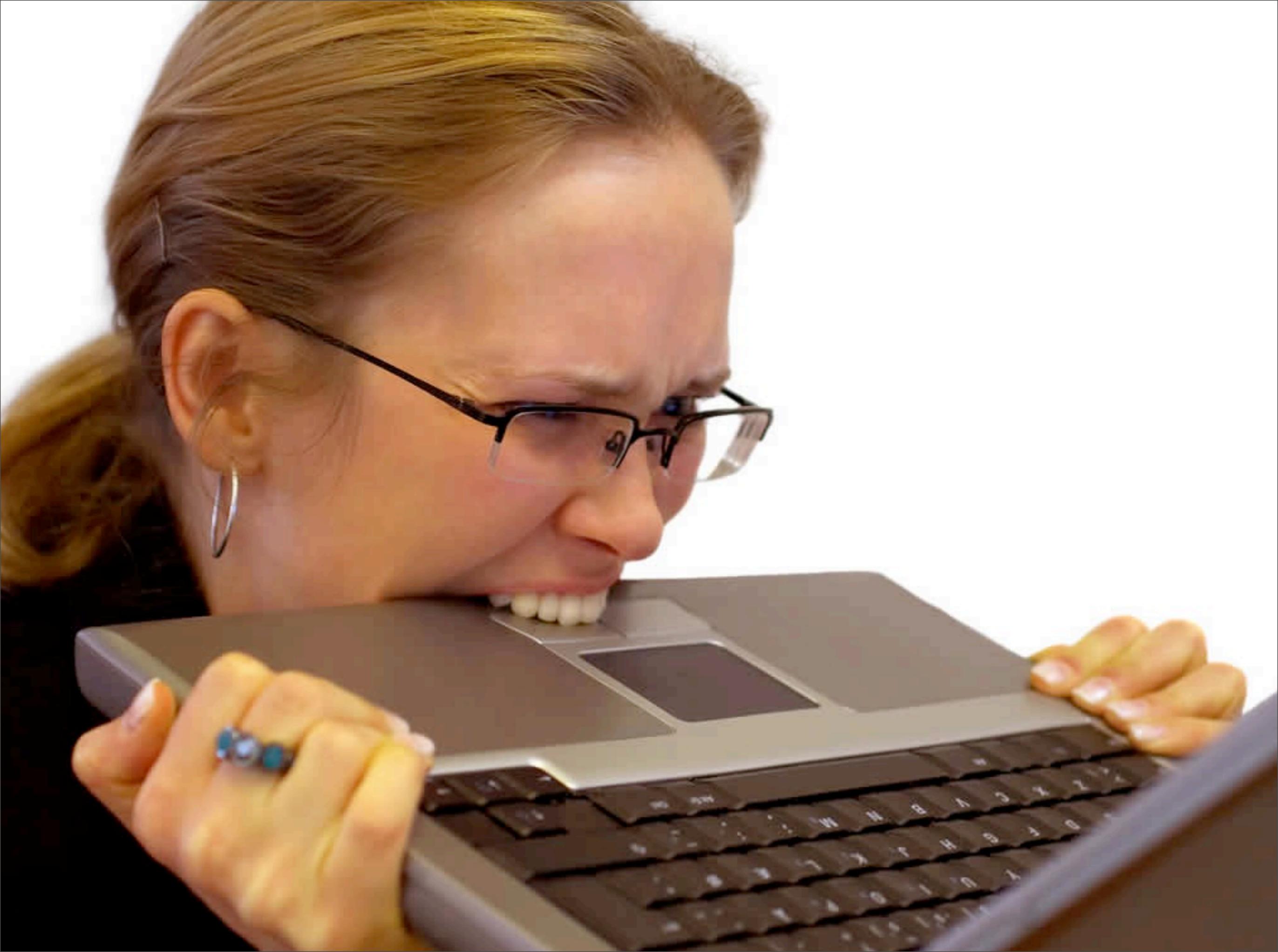
What is Usability?





GNU wGetGUI v1.0





Sales Argument Usability



DVD-Player (1996)



iPhone (1.Q'07)



iPad (1.80T.'10)

Source: CNBC



Gestalt Laws

Fitts' Law

Affordance

Feature
Creep

Paper Prototype

Natural
Mappings

DIA-Cycle

Visibility

Think-Aloud

No Surprises

Persona











**Science Finds;
Industry Applies;
Man Conforms.**

Motto of the Science Fair Chicago 1933

Feature Creep







HOMO LOGICUS





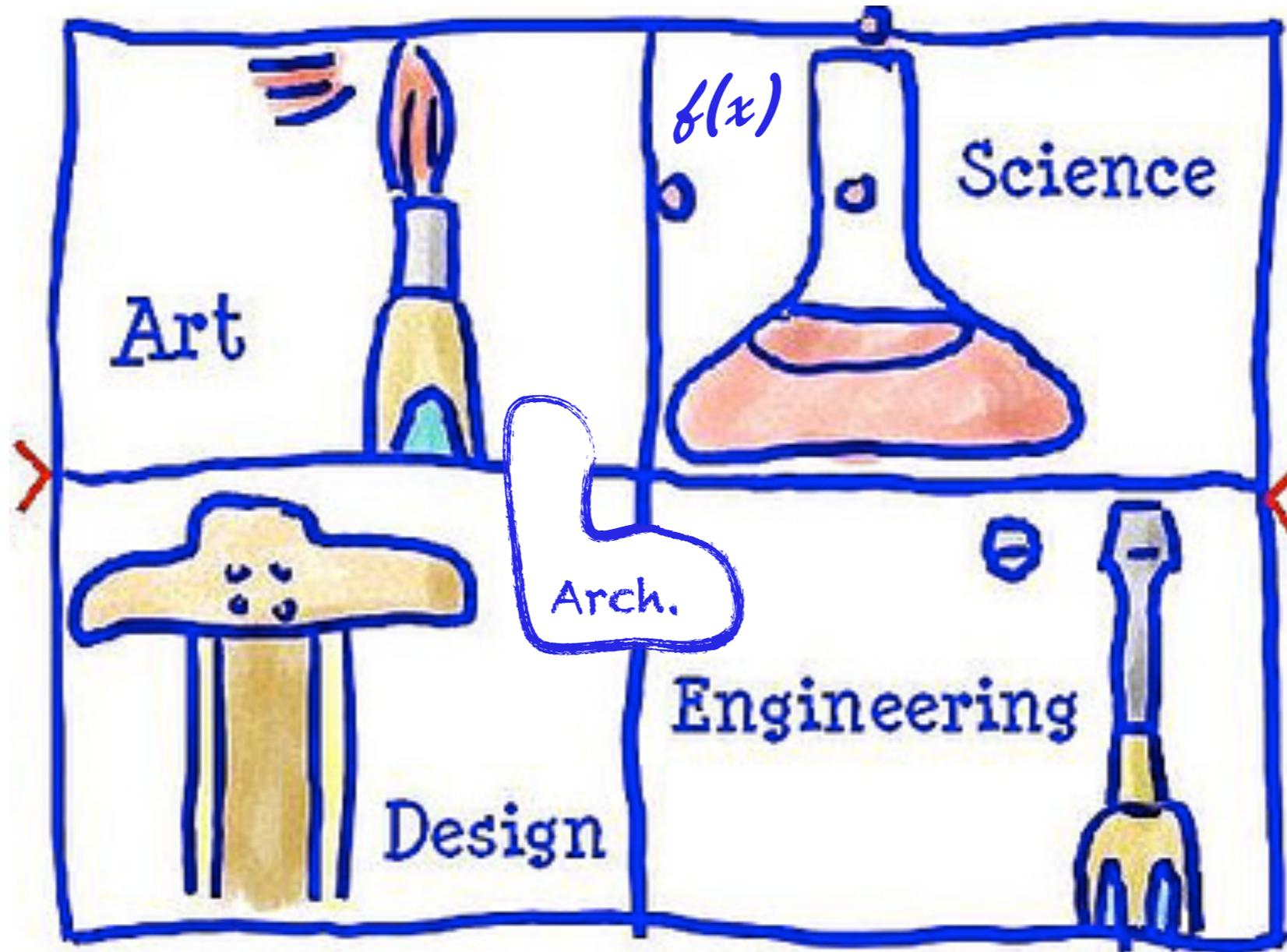
Control — ~~Simplicity~~

Penetration — ~~Success~~

Opportunity — ~~Probability~~



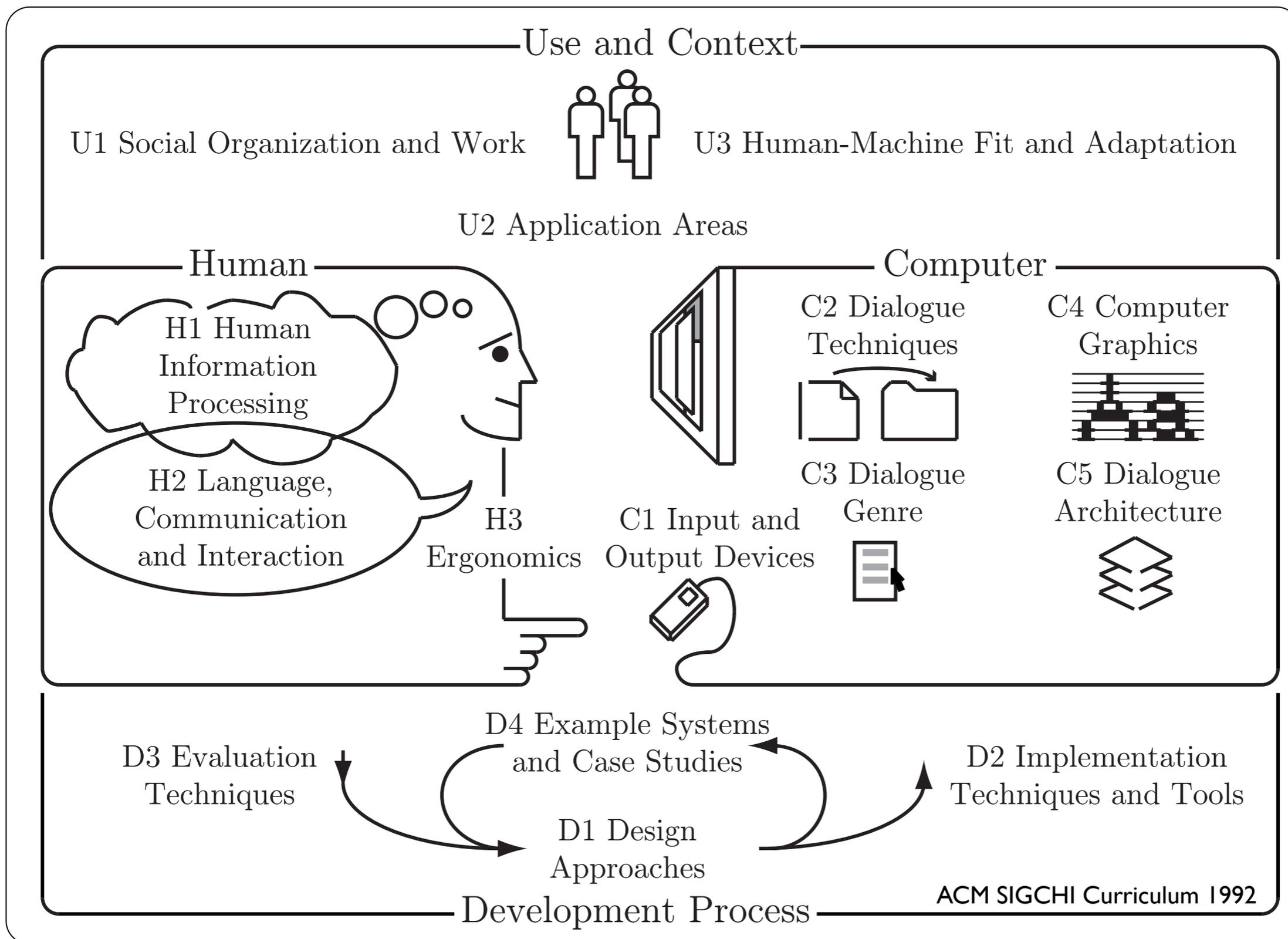
Four Creative Hats



Rich Gold: The Plenitude



What's Human-Computer Interaction?



10 Rules for Good Usability



I. Simplicity

What is the *real* task?



multiple times a day

1. Call contact
2. Receive call
3. Check time

multiple times a week

4. Send and receive short messages
5. Turn on/off ringtone

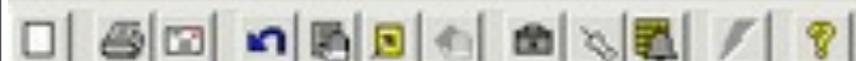


Documents



Letter to Alice London Vacation Packing List





- Alle Personen | Studierende | Interessentenanmeldungen | Bewerber | Soll-Leistungen | Personengruppen | Alle Anmeldungen | Ausbildungsanmeldungen
- Perioden/Semester | NDS | NDSJahrgang | NDK/mod_Kurse | NDKAnlass | Module WB | Modularlässe WB | Alle Ressourcenbelegungen | Personenbelegungen
- Raumbelagungen | Gerätebelegungen | Freie Ressourcen | Alle Ressourcen | Dozierende | Bäume | Geräte | Zusatzinfo | Temporäre Selektion
- Kursanmeldungen | AnmeldeDetails | Alle Anlässe | Anlassgruppen | Kurse | Module | Modularlässe | Studiengänge | Studienjahrgänge/Klassen

Module suchen

Anlass-Nr:

Bez.:

Status:

Leitung:

Veranstalte:

| Anlass-Nr | Bez |
|---------------------|------------|
| DMK-SNM-0302-P | ASC |
| DMK-SNM-0310 | ASC |
| DMK-SNM-0311 | ASC |
| DMK-SNM-0502 | Die |
| DMK-SNM-0305 | Einf |
| DMK-SNM-0315 | Gru |
| DMK-SNM-0303 | Gru |
| DMK-SNM-0306 | Har |
| DMK-SNM-0313 | Info |
| DMK-SNM-0301-P | Info |
| DMK-SNM-0307 | Info |
| DMK-SNM-0304 | Mex |
| DMK-SNM-0308 | Mex |
| DMK-SNM-0309 | Pyth |
| DMK-SNM-0312 | Sch |
| DMK-SNM-0501 | Swi |
| DMK-SNM-0314 | Zeik |

Modul: Grundlagen der Rechnergeschichte und Maschinentheorie III - Seminar

2 benutzerdefinierte Funktionen

Nummer: OE: DMK SNM Neue Medien

Typ: Status:

Kategorie: Veranstalter:

Bezeichnung:

- Anmeldebedingung | Teilnehmende | Rechnungen | Lektionsprofil
- Modul | Modul(2) | Texte Englisch | Texte | Anmeldungen | Codes | Gruppenzugehörigkeiten | AnmeldeDetails

| Thema | Beschreibender Text | (Zoom mit <F2>) |
|-------------------------|--|-----------------|
| Untertitel/Kurzinfo | | |
| Voraussetzungen | abgeschlossenes 1. + 2. Semester | |
| Lehrform/Ablauf | Seminar | |
| Lernziele | | |
| Lerninhalte | Gemeinsames Erarbeiten der Rechner- und Maschinengeschichte des 19. Jahrhunderts | |
| Bibliographie/Literatur | | |
| ECTS Credits | | |
| Termine | Mittwoch Nachmittag: 23.11. / 30.11. / 14.12. / 11.1.06 / 24.1.06 (Di am+pm) | |
| Ort | Studienbereich Neue Medien, Sihlquai 131, 8005 Zürich | |
| Bemerkungen | | |

Nach Nr:

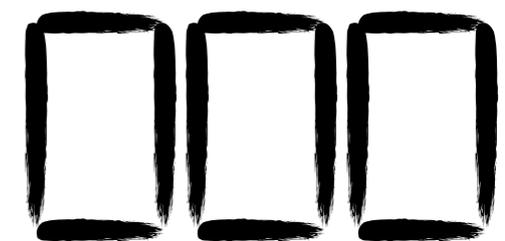
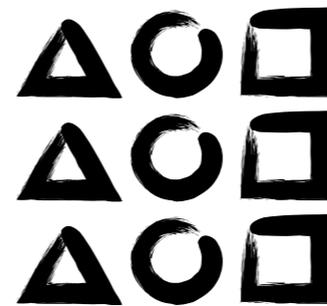
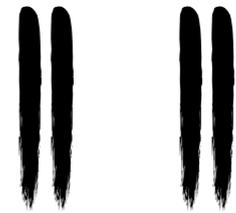
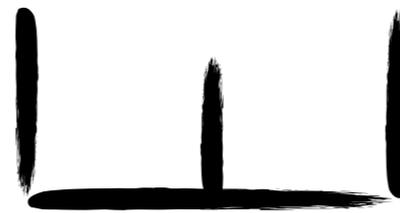
Nach Bezeichnung:

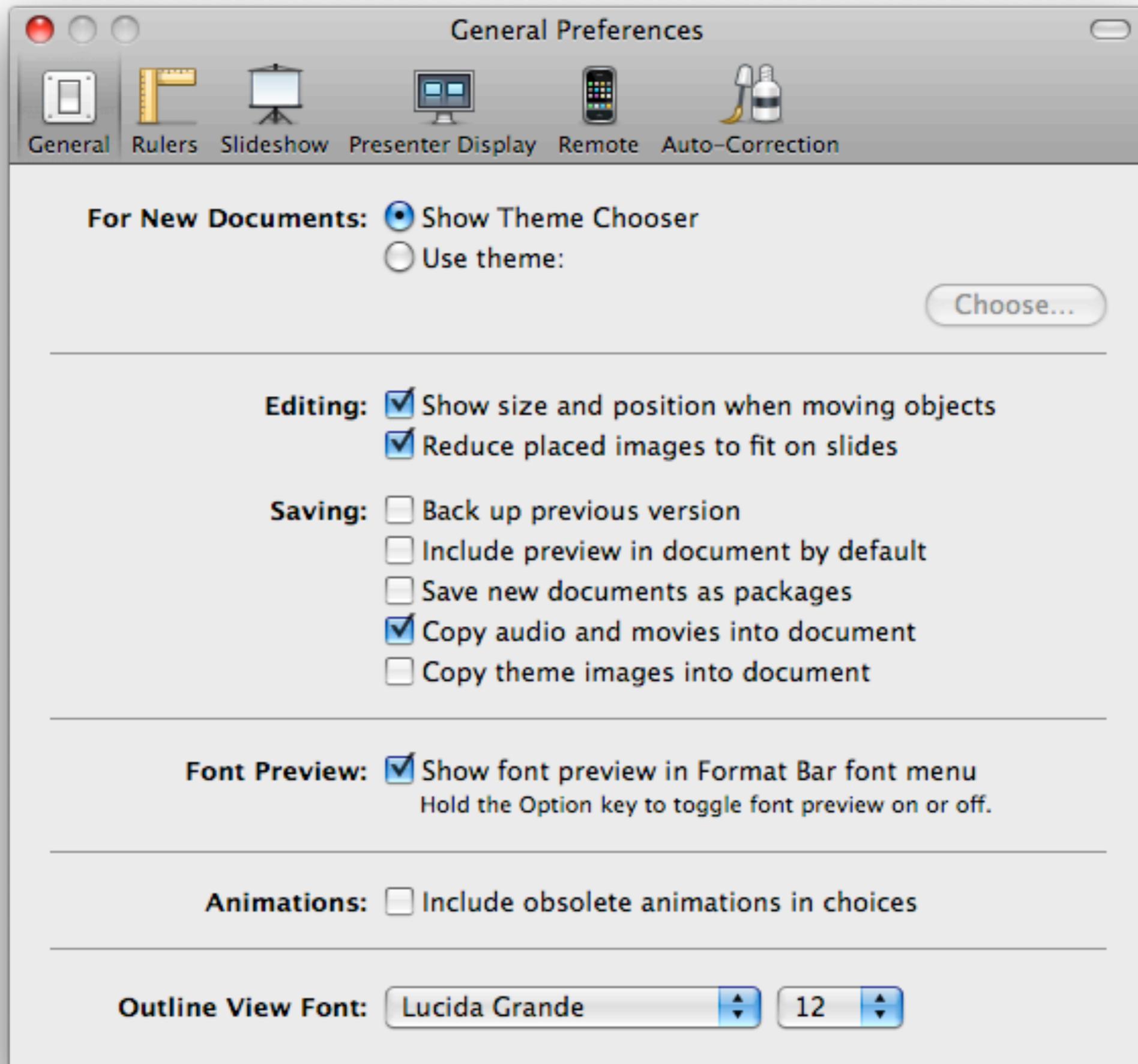
Filter:

| Verknüpf. | Suchbe |
|-----------|--------|
| | |

- Aktueller Kontext
- Gruppenzugehörigkeiten
- Codes

2. Gestalt Laws





3. Visibility and Feedback

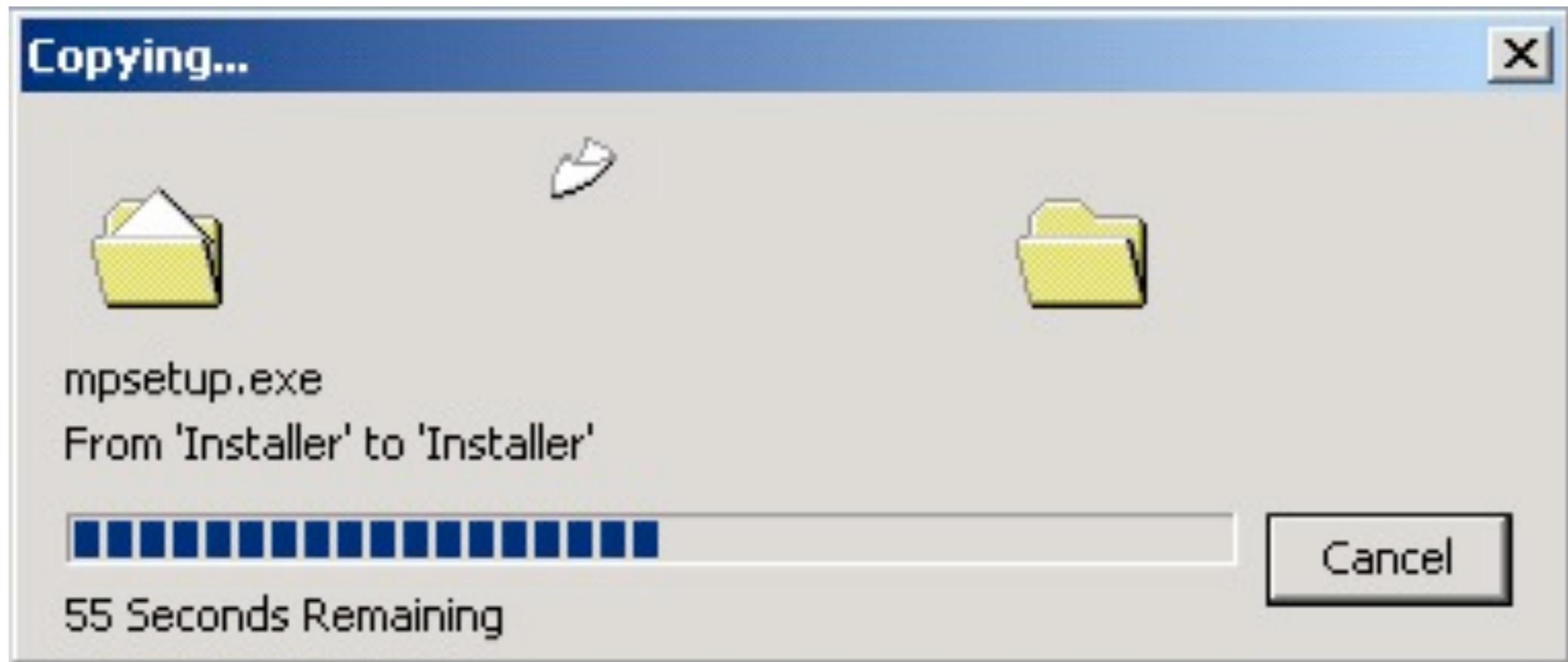






😊?

3. Visibility and Feedback



3. Visibility and Feedback



4. User Language

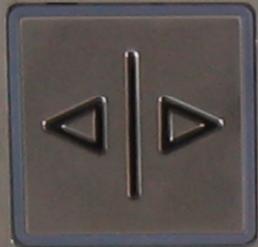


5. Natural Mappings



5. Natural Mappings







5. Natural Mappings



Fitt's Law



The larger and closer a control element,
the faster the user can reach it.

$$T_{pos} \approx 100ms \times \log_2(D/W+1)$$



6. Enough Buttons



6. Enough Buttons



7. Consistency

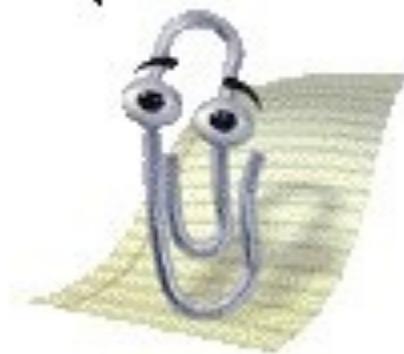
The Principle of Least Surprise

Your battery is completely charged!

Hi! I am Clippy, your office assistant. Would you like some assistance today?

Yes

No



7. Consistency

The Principle of Least Surprise



Timeouts are evil!



8. Dialog instead of Monolog



9. Error Tolerance



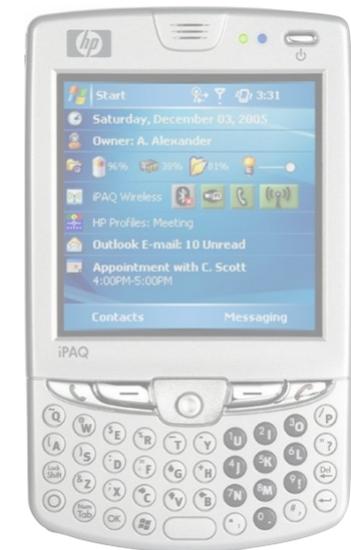
Operation Could not be completed.

client-error-not-possible

OK



10. Visual Design







HOHE QUALITÄT ZUM NIEDRIGSTEN PREIS!

Seit 11.10.

PREISSTURZ!



Conceptual Models

- We are surrounded by innumerable objects (20,000 everyday things)
- How do we cope?
 - Mind aims to make sense of things
 - Affordances support using objects easily



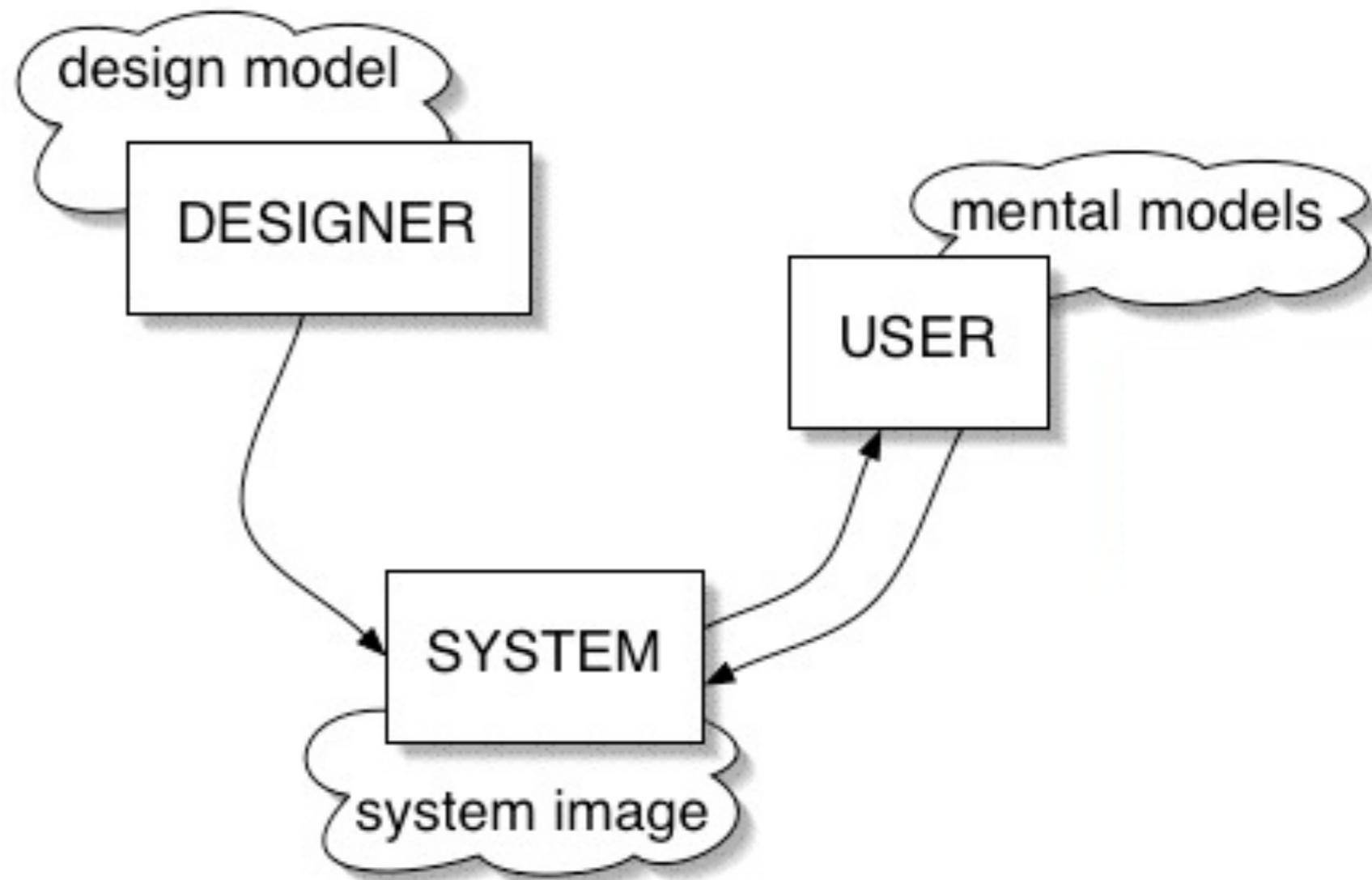
Providing Good Conceptual Models

- Principle of good design
- Allows to predict effects of our actions, and cope with problems
- Conceptual models are mental models of things
 - Other mental models: Of ourselves, others, the environment, ...
 - Formed through experience, training, instruction



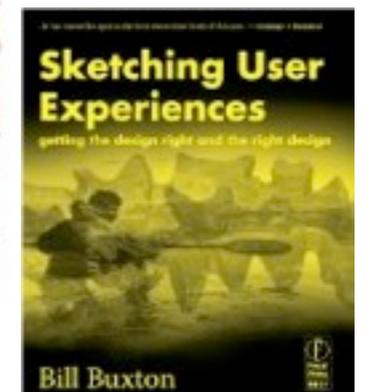
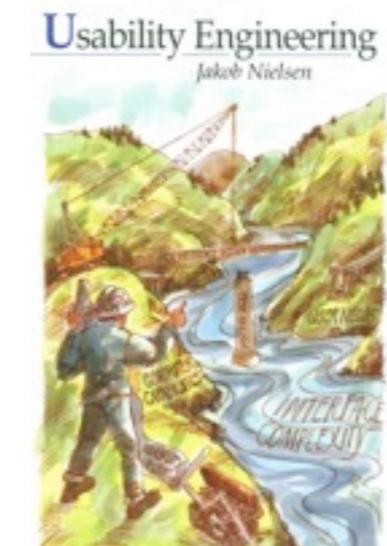
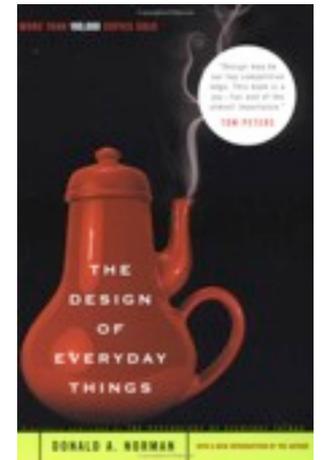
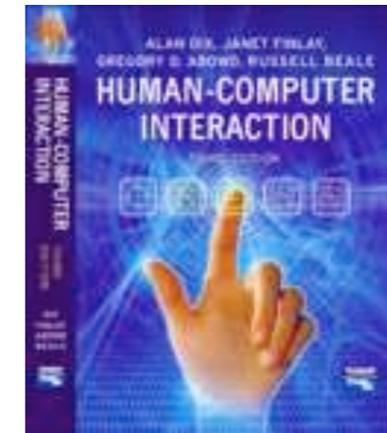
Design Model, System Image, and User's Model

- By carefully crafting the system image, designers can provide a good idea of how a system works
- Problems arise when the designer's conceptual model is different from what emerges as the user's mental model
- Important concept to remember when designing UIs!



HCI Literature Sources: Books

- Norman '02: Design of Everyday Things
 - Affordances, mappings, constraints
- Dix '04: Human-Computer Interaction
 - Very good general textbook
- Shneiderman '09: Designing the U.I.
 - Technology, interviews
- Nielsen '93: Usability Engineering (prototyping)
- Buxton '07: Sketching User Experiences



<http://hci.rwth-aachen.de/hcibooks>



Summary

- Keep hardware restrictions in mind
- Carefully design the user experience

- Reading assignment: iPhone Human Interface Guidelines

