User Centered Design

Gerald's Lectures in

COMPSCI 705,

SOFTENG 702

Good Web Site Design Can Lead to Healthy Sales, New York Times, 30. August 1999

- *"On IBM's Web site, the most popular feature was the search function, "because people couldn't figure out how to navigate the site," said Carol Moore, IBM's vice president for Internet operations. The second most popular feature was the "help" button, because the search technology was so ineffective."*
- *"IBM's solution was a 10-week effort to redesign the site, which involved more than 100 employees at a cost Ms. Moore estimated "in the millions." As the redesign neared completion in February, IBM consciously held off on promoting the Web site, so it could gauge the effectiveness of the new design. The result: In the first week after the redesign, use of the "help" button decreased 84 percent, while sales increased 400 percent."*
- *"Carol Moore, IBM's vice president for Internet operations, said the company's redesign team reviewed more than one million Web pages."*

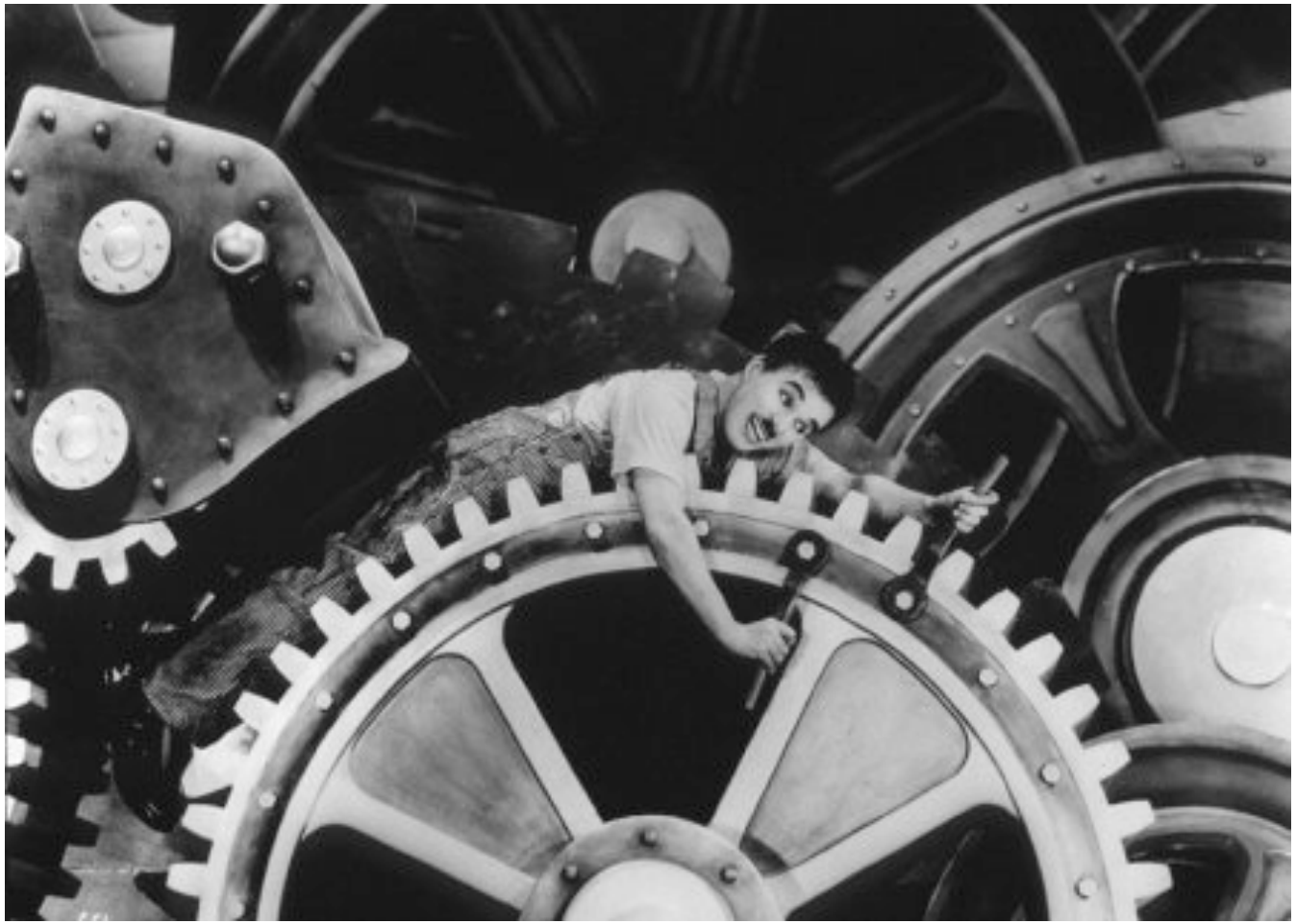
Ergonomics

Ergonomics (or human factors) is the scientific discipline concerned with the understanding of interactions among humans and other elements of a system, and the profession that applies theory, principles, data and methods to design in order to optimize human well-being and overall system performance. […]

Domains of specialization

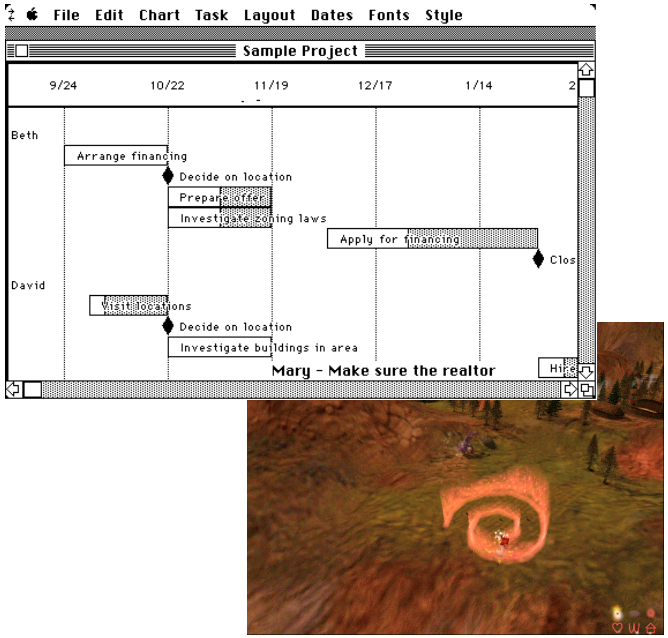
- Derived from the Greek ergon (work) and nomos (laws) to denote the science of work, […] Domains of specialization are broadly the following;
- Physical ergonomics is concerned with human anatomical, anthropometric … characteristics... (…working postures, … workplace layout, safety and health.)
- Cognitive ergonomics is concerned with mental processes, such as perception, memory, reasoning… (Relevant topics include mental workload, decision-making, skilled performance, **human-computer interaction**, ….)
- Organizational ergonomics is concerned with the optimization of sociotechnical systems, … and processes.
- (Relevant topics include … teamwork, …, new work paradigms, virtual organizations, telework, and quality management.)

Source: Website 2007 International Ergonomics Association



Charlie Chaplin, Modern Times 1936

reminder: Engelbarts Mouse



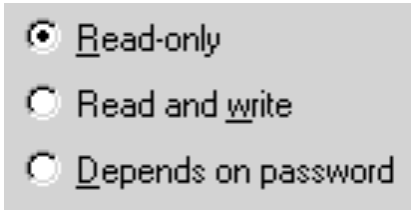
Software-Ergonomics in practice

- Microsoft Windows User Experience -- Official Guidelines for User Interface Developers and Designers, Microsoft Press:
  - msdn.microsoft.com/ui/
- SAP Design Guilde, http://www.sapdesignguild.org/, z.B.:
  - The SAP User-Centered Design (UCD) Process
  - SAP R/3 Icon Style Guide
  - Interaction Design Guide for Internet Application Components
  - SAP Style Guide for PDA Applications
  - SAP R/3 Style Guide
  - SAP Wizard Style Guide

MSDN - User-Centered Design Principles

- **User in Control:** An important principle of user interface design is that the user should always feel in control of the software rather than feeling controlled by the software
- **Directness:** Design your software so that users can directly manipulate software representations of information.
- **Consistency:** Consistency allows users to transfer existing knowledge to new tasks, learn new things more quickly, and focus more attention on tasks.
- **Forgiveness:** Users like to explore an interface and often learn by trial and error.
- **Feedback:** Always provide feedback for a user's actions.
- **Aesthetics:** Visual design is an important part of an application's interface.
- **Simplicity:** An interface should be simple (not simplistic), easy to learn, and easy to use.

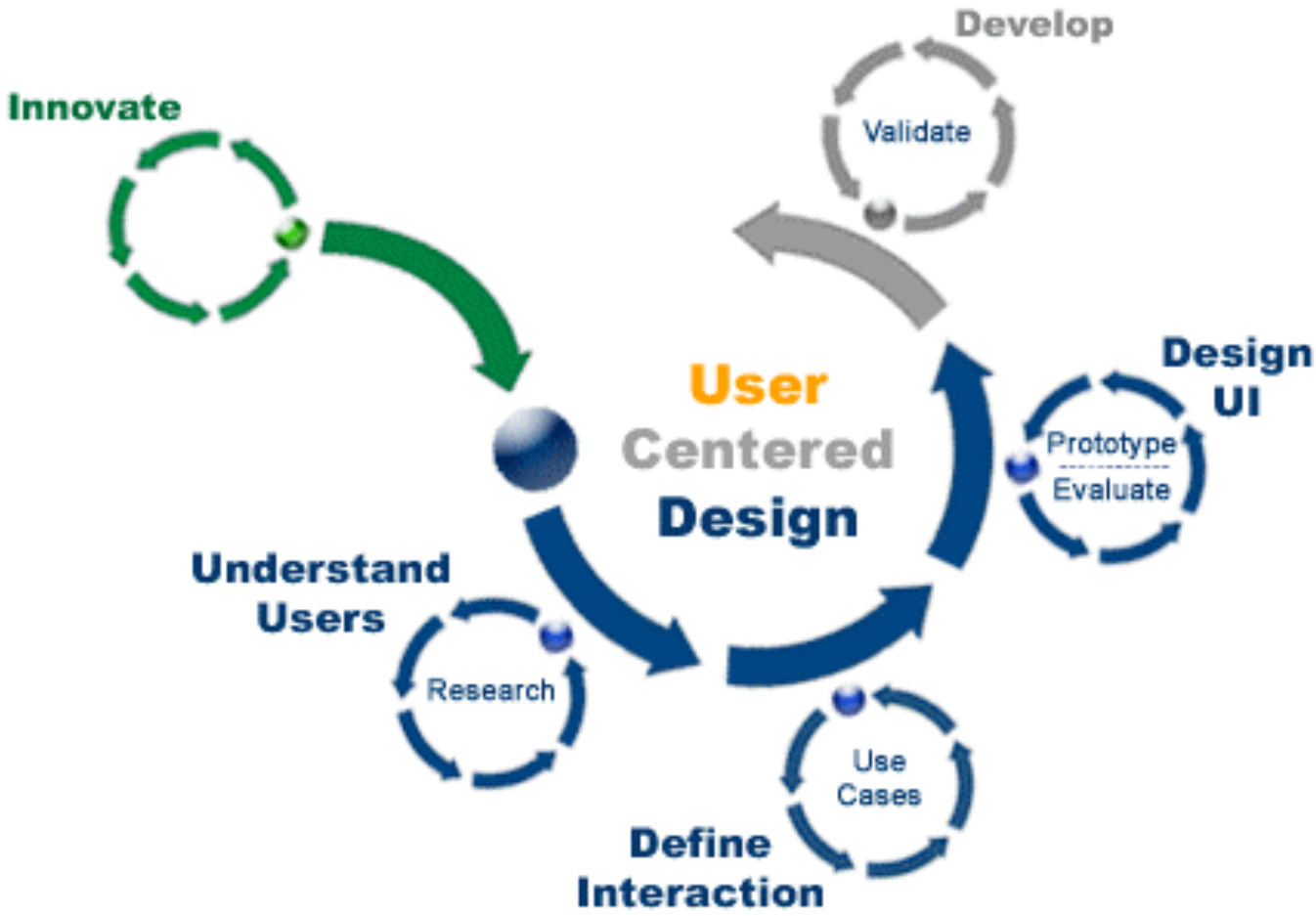
MSDN Style-Guide-Example: Option Buttons



- ... Represents a single choice within a limited set of mutually exclusive choices ...
- ... Avoid using option buttons to start an action other than to set a particular option or value. There is one exception....
- ... an option button requires the user to click the primary mouse button ...
- ... You should also support the TAB or arrow keys to allow the user to navigate to and choose a button. ...
- Label appearance:
  - ... Use sentence-style capitalization, capitalizing the first word in the label and any proper nouns. ...
  - ... Write the label as a phrase, not as a sentence, and use no ending punctuation ...
  - ... If you want to use graphic labels for a group of exclusive choices, consider using toolbar buttons or command buttons instead ...

The SAP User-Centered Design Process

- Quelle: http://www.sapdesignguild.org



Requirement versus Feature (b)

- Definition of Requirement in the IEEE Standard Glossary of Software Engineering Terminology :
  - a condition or capability ***needed by a user*** to solve a problem or achieve an objective
  - a condition or capability that must be met or possessed by a system or system component to satisfy a contract, standard, specification, or other formally imposed documents, or
  - a documented representation of a condition or capability as in (i) or (ii).

Functional versus nonfunctional Requirements (b)

- IEEE SWEBOK Guide Definitionen
  - *Functional* requirements describe the functions that the software is to execute; for example, formatting some text or modulating a signal. They are sometimes known as capabilities.
  - *Nonfunctional* requirements are the ones that act to constrain the solution. Nonfunctional requirements are sometimes known as constraints or quality requirements.

Taxonomy of nonfunctional Requirements according to Ian Sommervile

- Product Requirements
  - Usability Requirements
  - Efficiency Requirements
    - Performance Requirements
    - Space Requirements
  - Reliability Requirements
  - Portability Requirements
- Organizational Requirements
  - Delivery Requirements
  - Implementation Requirements
  - Standards Requirements
- External Requirements
  - Interoperability Requirements
  - Ethical Requirements
  - Legislative Requirements
    - Privacy Requirements
    - Safety Requirements

Topics we will address

- Auckland Layout Model
  - Aesthetics that keep Users in Control
  - Document orientation
- Semantics of interaction
  - What are we doing with the computer?
- Conceptual aspects of User interfaces
  - Example: form-based interfaces
  - Example: direct manipulation
  - Model-based user interface design