Interaction styles

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The optimization problem

![Diagram showing the optimization problem with costs on the y-axis, degree of usability on the x-axis, user and system curves, and an optimum point.]
What is the state-of-the-art?

- **Discrete** interaction styles
  - command language
  - menu
  - desktop
  - direct manipulation
- **Continuous** interaction styles
  - ...

What comes in the future?

- **Continuous** interaction styles
  - speech input/output
  - computer vision based input (e.g., gestures)
  - audio interfaces (e.g., non-speech audio)
  - tactile and force feedback
  - biophysical signals (e.g., retina scanner)
The first dimension

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<td>suitability for the task</td>
<td>suitability (activity adapted)</td>
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<td>self-descriptiveness</td>
<td>feedback about system states</td>
<td>self-descriptiveness</td>
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<td>conformity with user</td>
<td>appropriate format and pace</td>
<td>conformity with user</td>
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<td>flexibility</td>
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transparency

feedback compatibility consistency help support
The second dimension

individualisation

flexibility
individual selection
individual adaptation (programming)

potential degree of freedom (meta-dialog task)

actual degree of freedom

How to measure usability?

global design principles
high level goals
measuring concepts
criteria = metric + extent
control
customization
flexibility
fan degree
The interface architecture

Three different function types

Primary functions
[application manager]

Secondary functions
[dialog manager]

Tertiary functions
[dialog manager]

Application object(s)
The function space

Two dimensions for interaction
How to measure?

\[
\text{interactive directness:} \quad \text{ID} = \left\{ \frac{1}{P} \sum_{p=1}^{P} \log\left(\text{PATH}_p\right) \right\} - 1 \times 100\%
\]

\[
\text{flexibility of the dialog manager:} \quad \text{DFD} = \frac{1}{D} \sum_{d=1}^{D} \left(\text{#DFIP}_d\right)
\]

\[
\text{flexibility of the application manager:} \quad \text{DFA} = \frac{1}{D} \sum_{d=1}^{D} \left(\text{#AFIP}_d\right)
\]

\[
\text{(functional) feedback:} \quad \text{fFB} = \frac{1}{D} \sum_{d=1}^{D} \left(\frac{\text{#PF}_d}{\text{#PF}_d + \text{#HF}_d}\right) \times 100\%
\]

Command language interface

the normal view of MS-DOS

C:>
Command language interaction

Menu interface
Menu interaction style

Direct manipulation interface
Design of user interfaces

Direct manipulation interaction

About HCI in general:

About design principles:

About usability evaluation methods:

About Design: