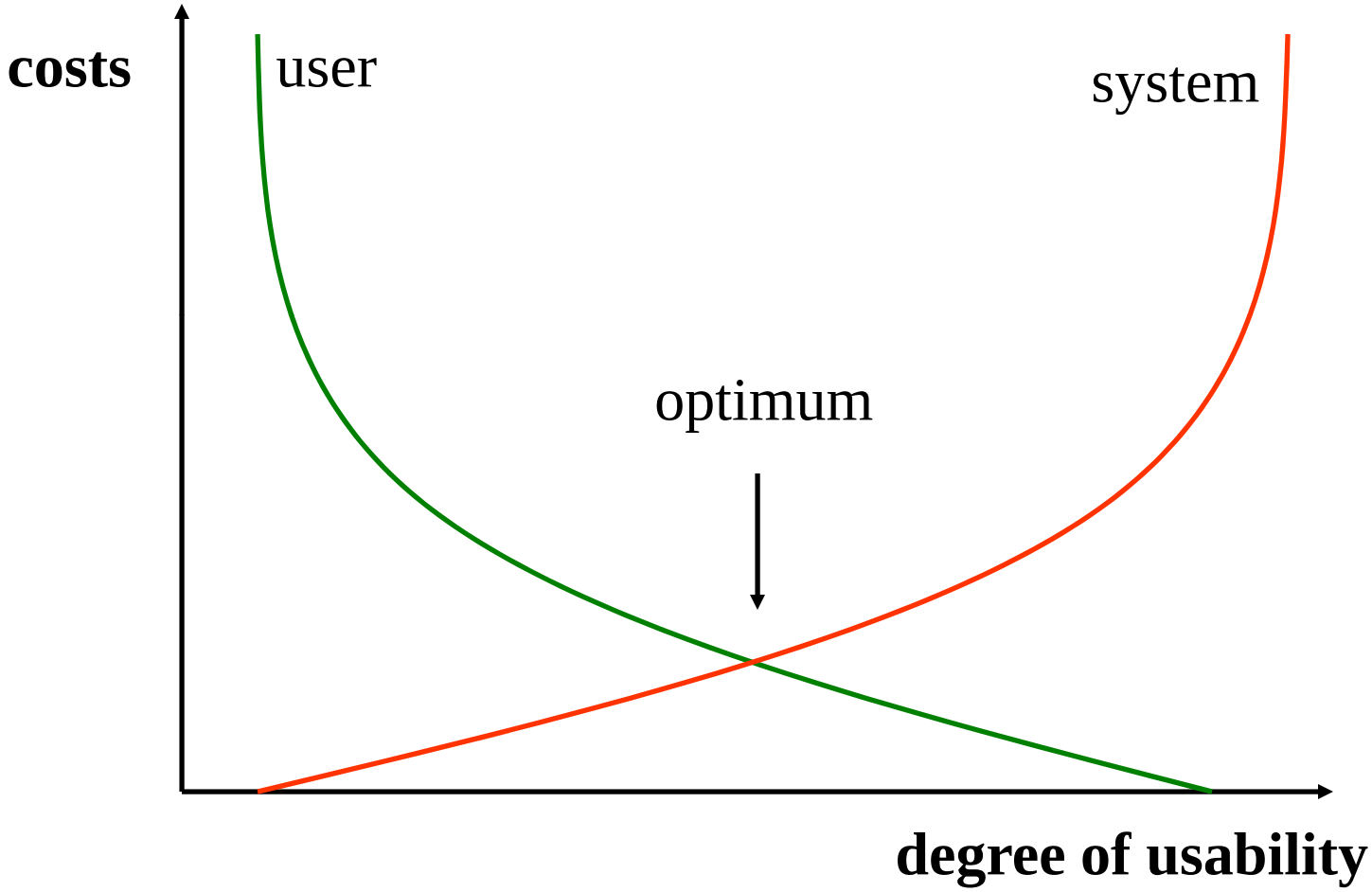
# Interaction styles

P.VISWANATHAN

pviswanathan@vit.ac.in

# The optimization problem



# What is the state-of-the-art?

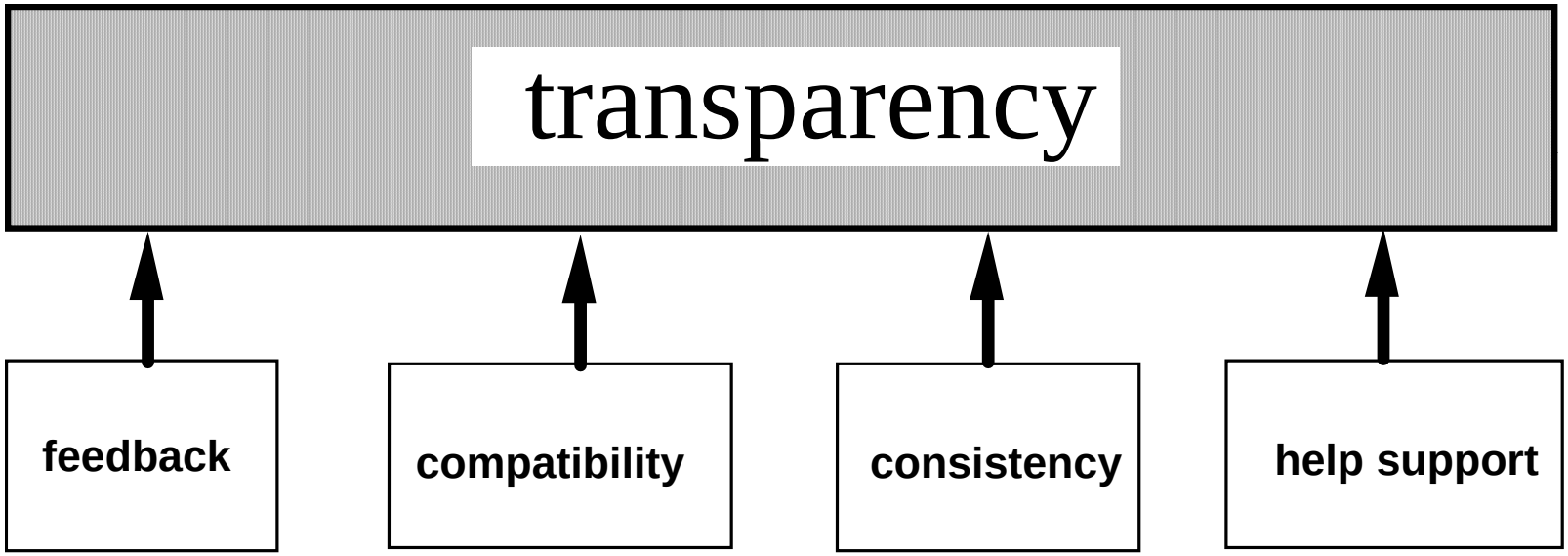
- **Known interaction styles**
  - command language
  - menu
  - desktop
  - direct manipulation

# What comes in the future?

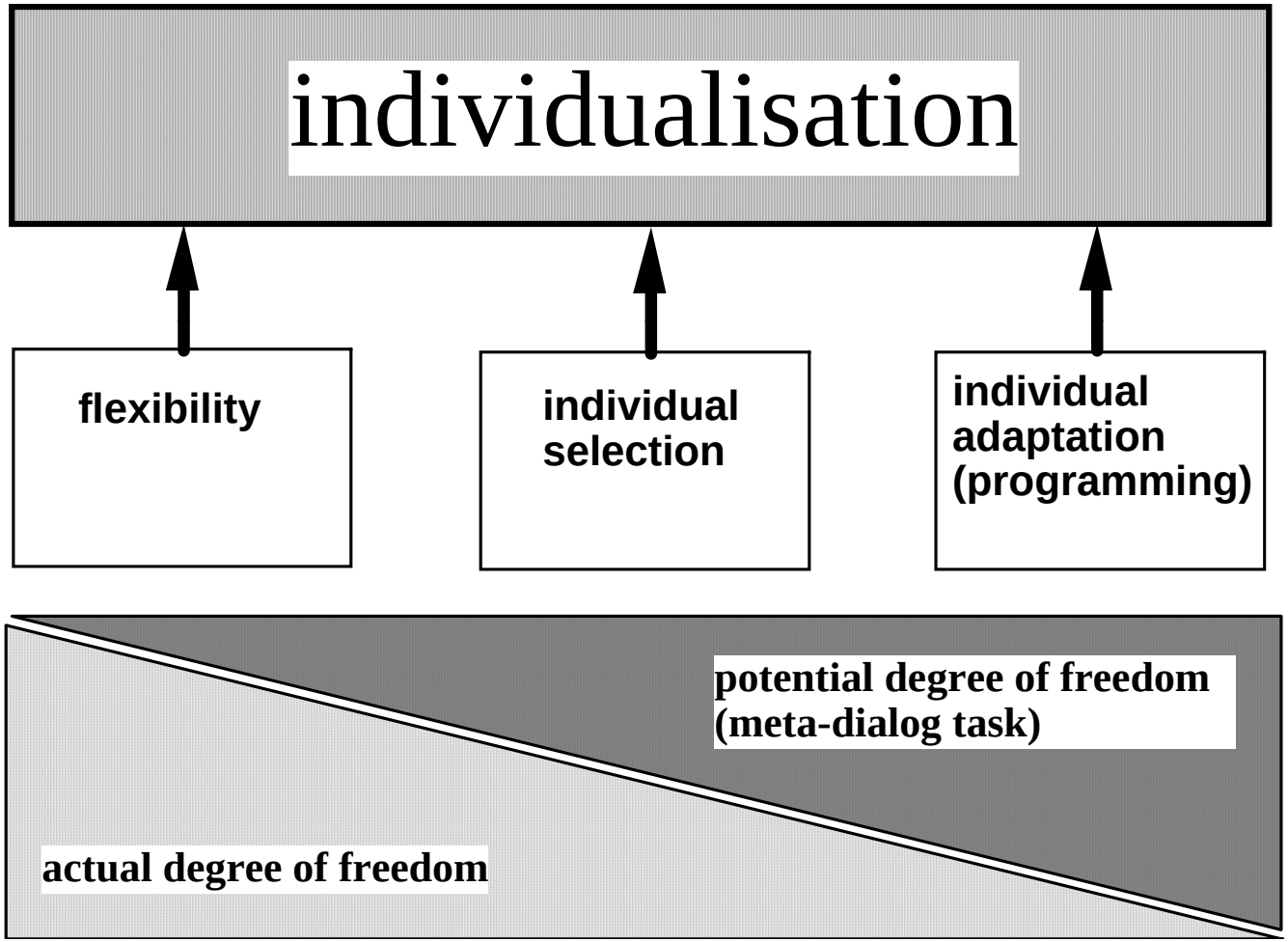
- **New interaction styles**
  - speech input/output
  - computer vision based input (e.g., gestures)
  - audio interfaces (e.g., non-speech audio)
  - tactile and force feedback
  - biophysical signals (e.g., retina scanner)

| DIN 66 234 part 8 (1988) | EC directive 90/270/EEC (1990) | ISO 9241 part 10 (1996) | Ulich (1991) |
|---|---|---|---|
| suitability for the task | suitability (activity adapted) | suitability for the task | task orientation |
| self-descriptiveness | feeback about system states | self-descriptiveness | transparency |
| | appropriate format and pace of information presentation | | feedback |
| conformity with user expectations | | conformitity with user expectations | compatibility |
| | | | consistency |
| | information and instruction of user | suitability for learning | support |
| | ease of use applicable to skill level | suitability for individualization | selection possibilities user definability |
| | hearing and participation of users | | participation |
| controllability | | controllability | flexibility |
| error robustness | | error tolerance | |

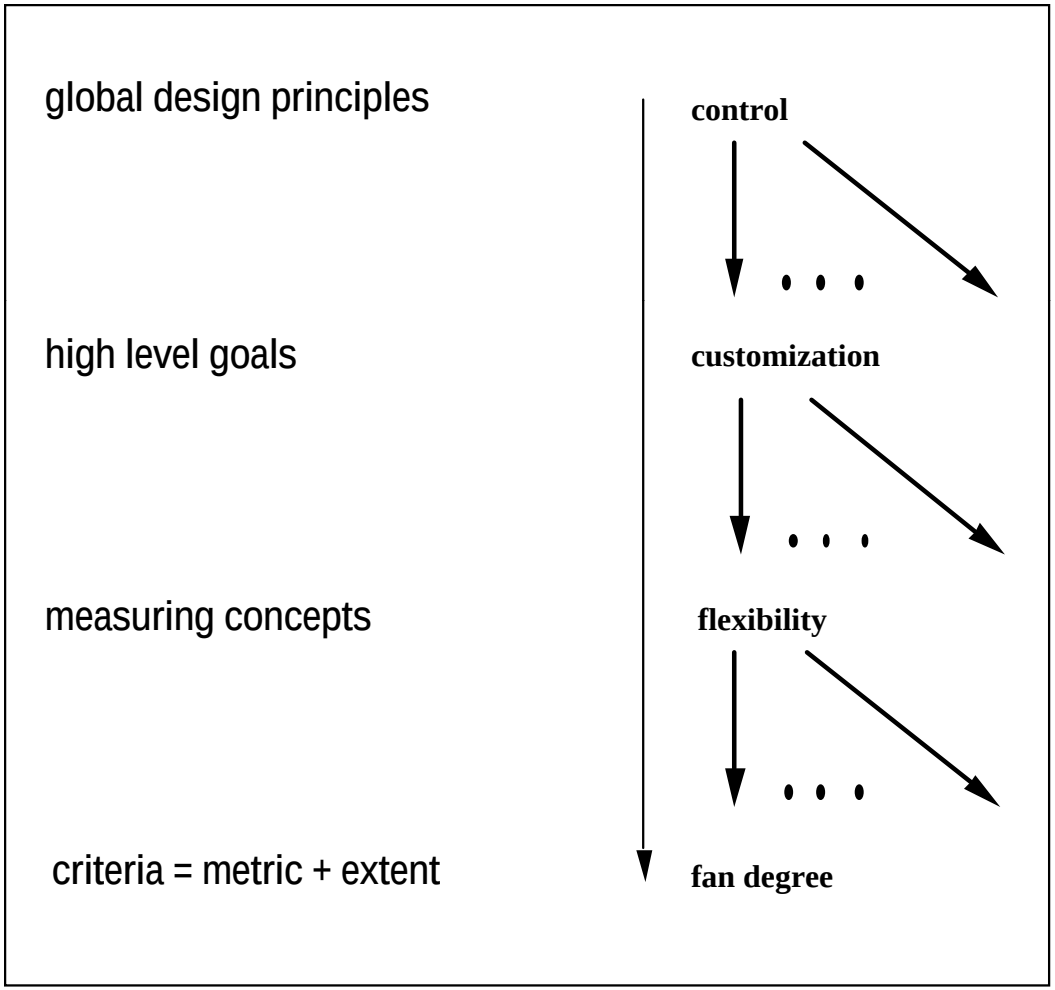
# The first dimension



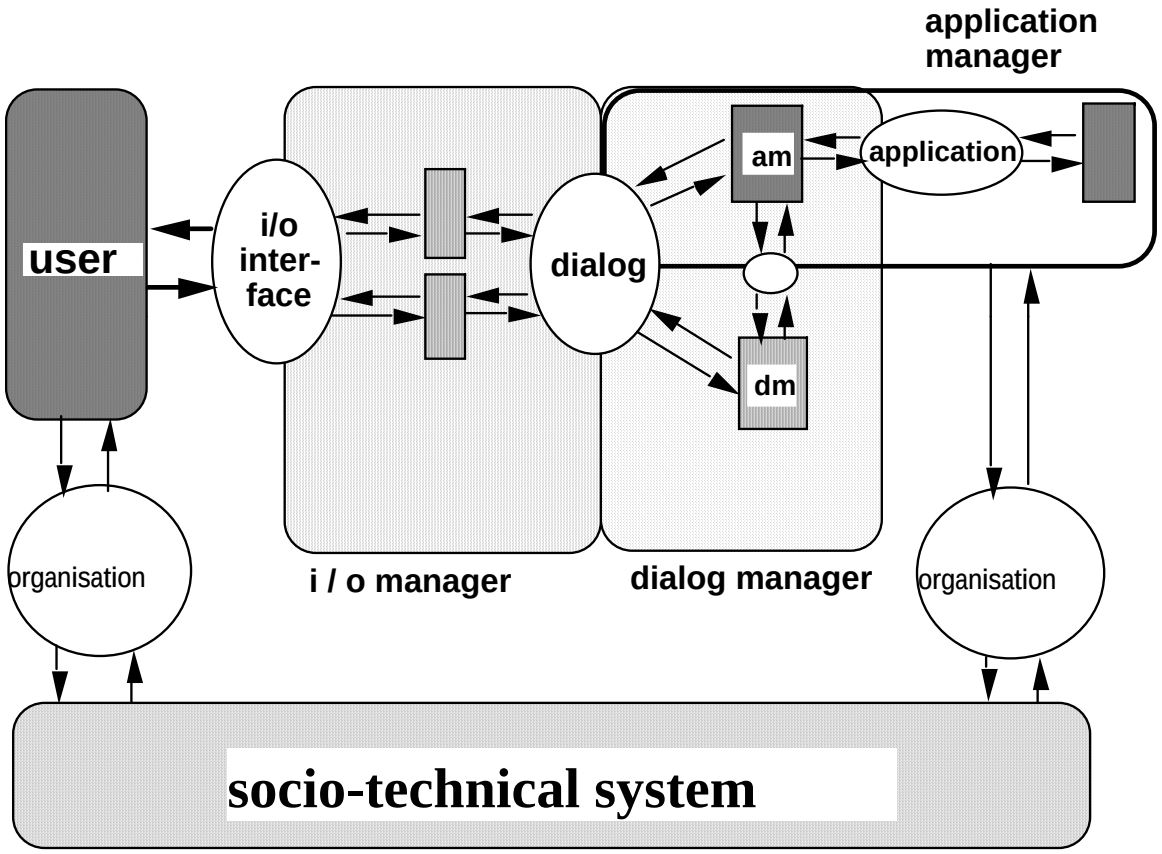
# The second dimension



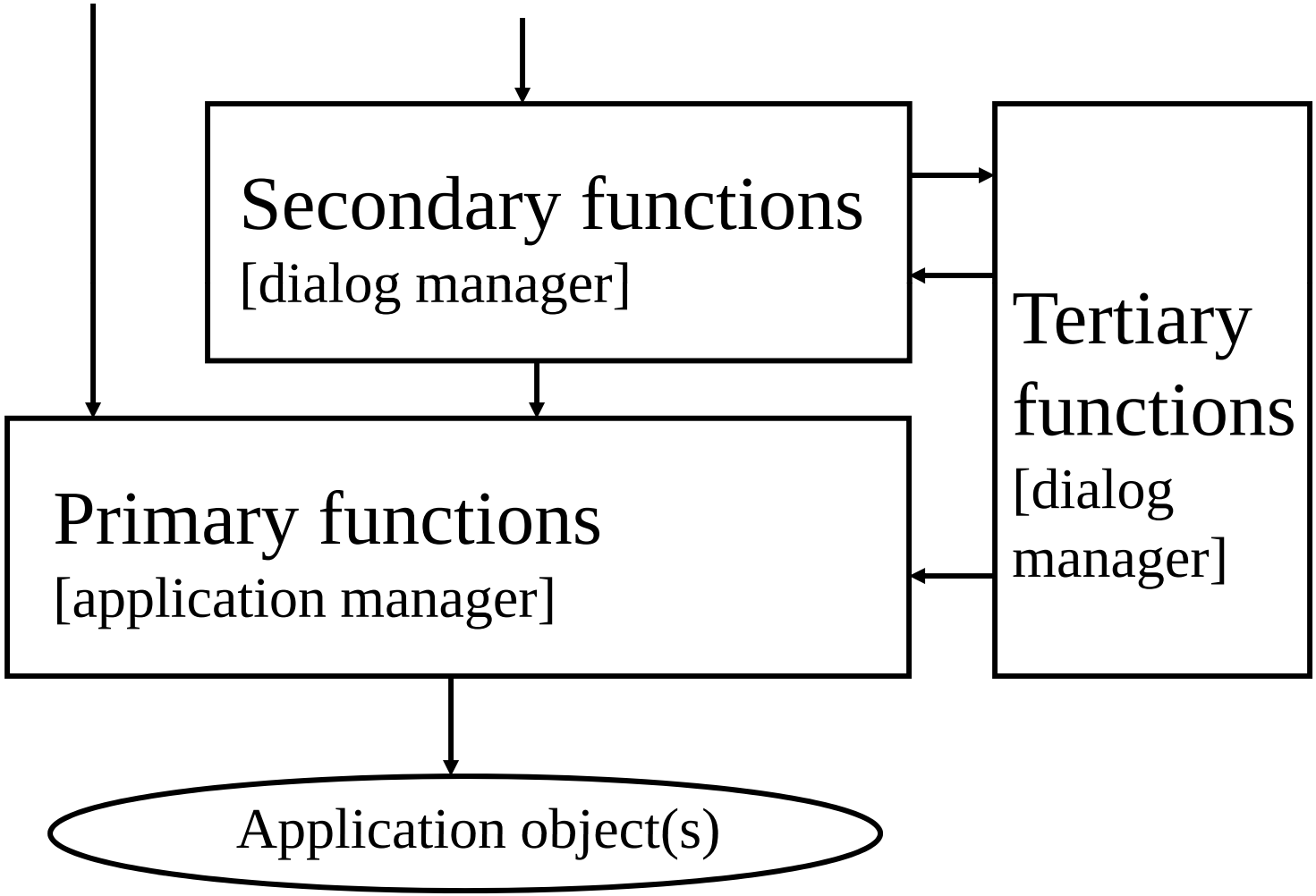
# How to measure usability?



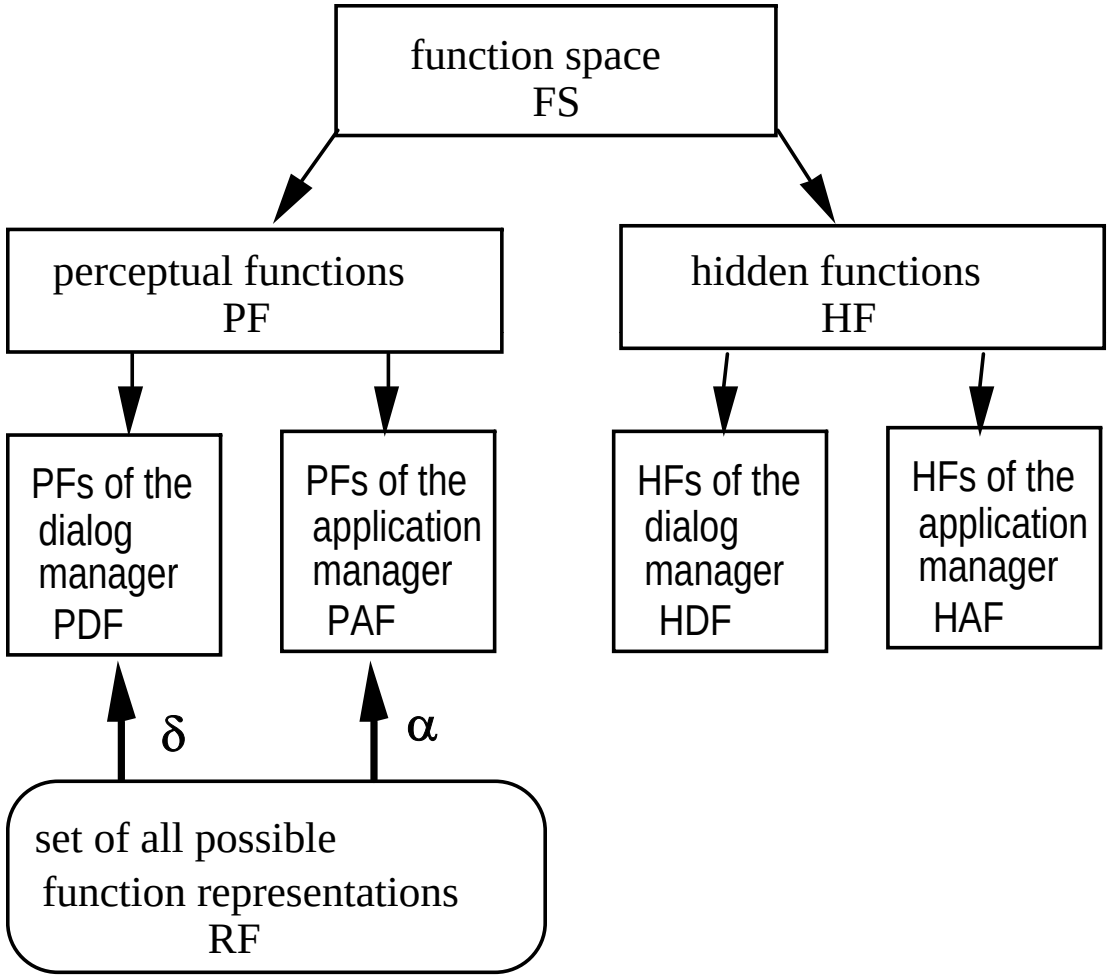
# The interface architecture



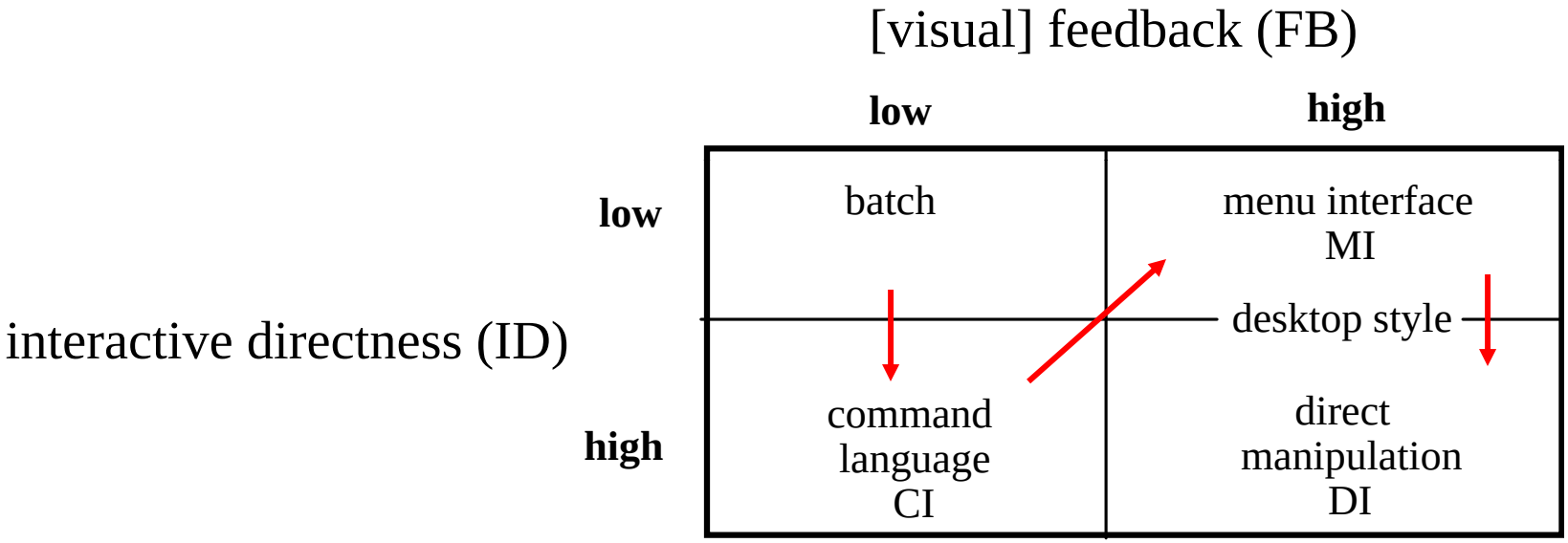
# Three different function types



# The function space



# Two dimensions for interaction



# How to measure?

**(functional) feedback**

$$fFB = 1/D \sum_{d=1}^{D} (\#PF_d / \#HF_d) * 100\%$$

**flexibility of the dialog manager**

$$DFD = 1/D \sum_{d=1}^{D} (\#DFIP_d)$$

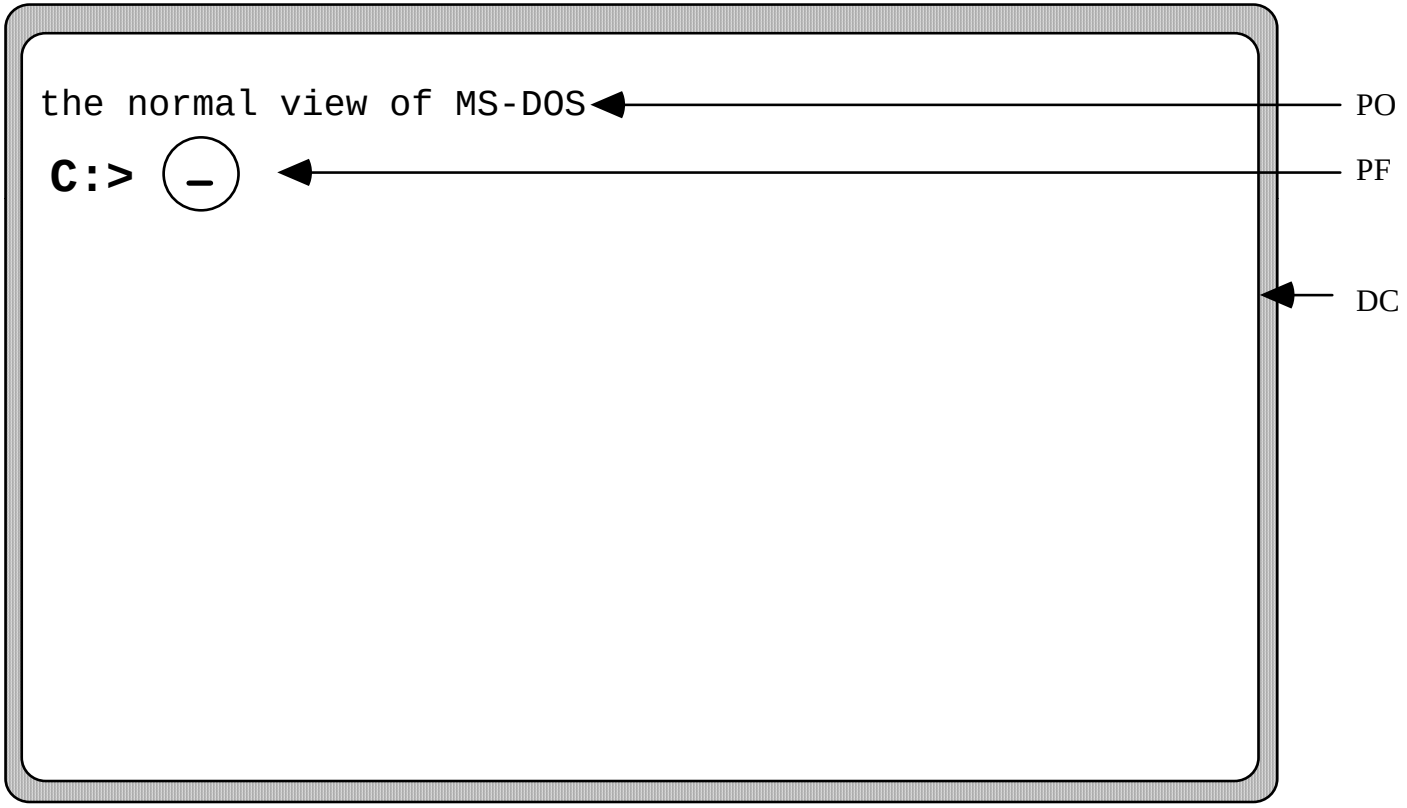
**interactive directness**

$$ID = \left\{ 1/P \sum_{p=1}^{P} lng(PATHp) \right\}^{-1} * 100\%$$

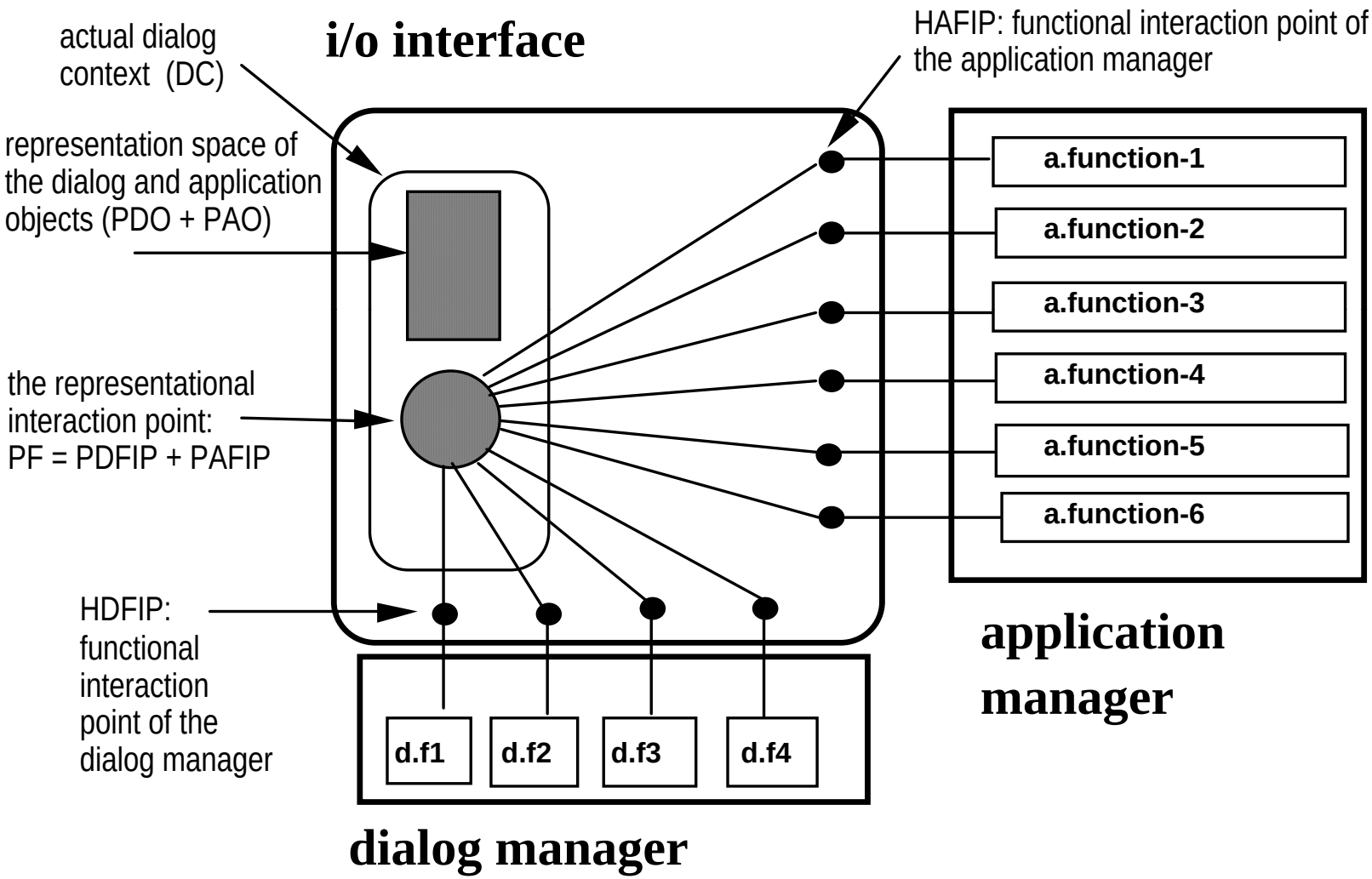
**flexibility of the application manager**

$$DFA = 1/D \sum_{d=1}^{D} (\#AFIP_d)$$

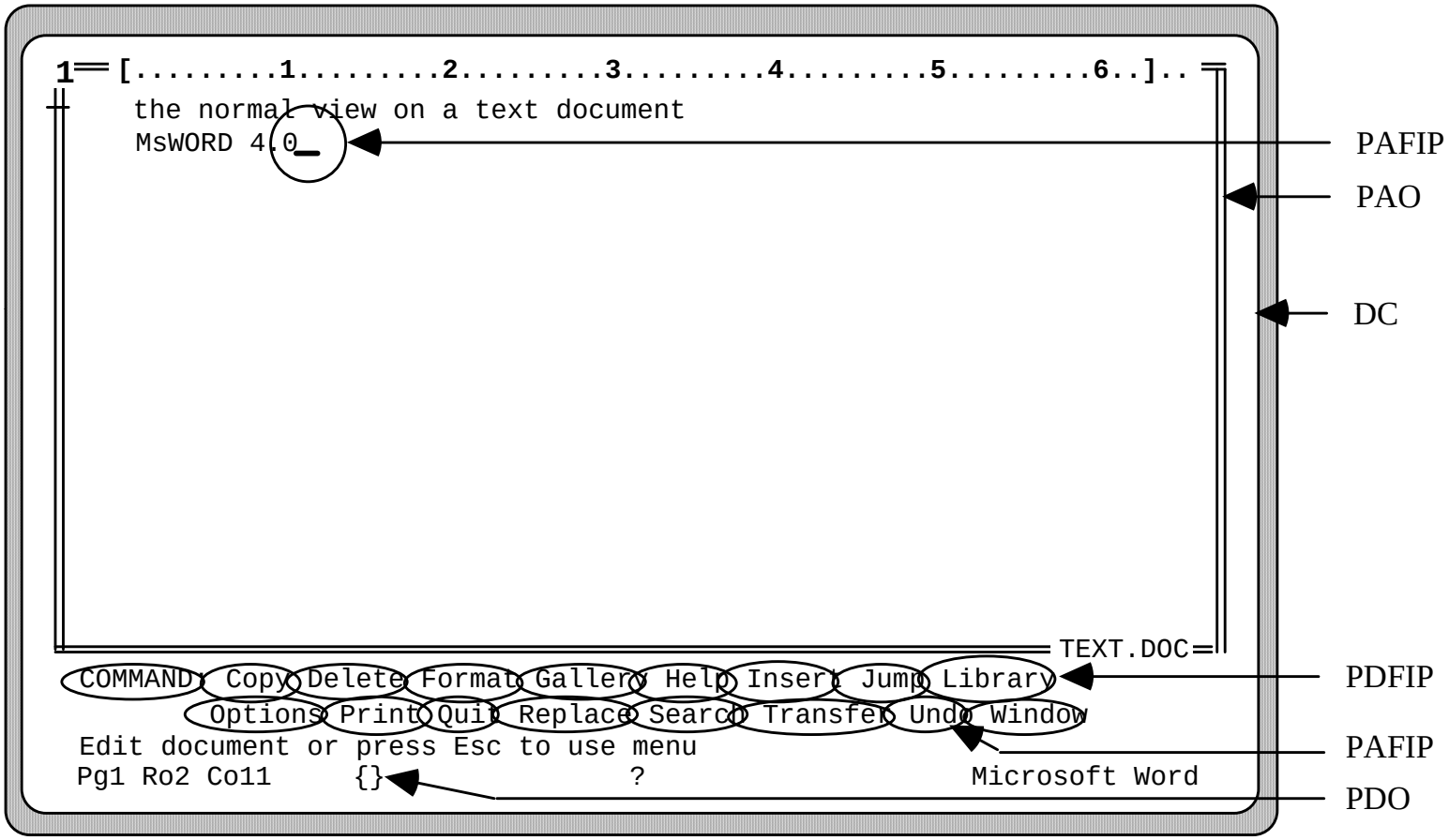
# Command language interface



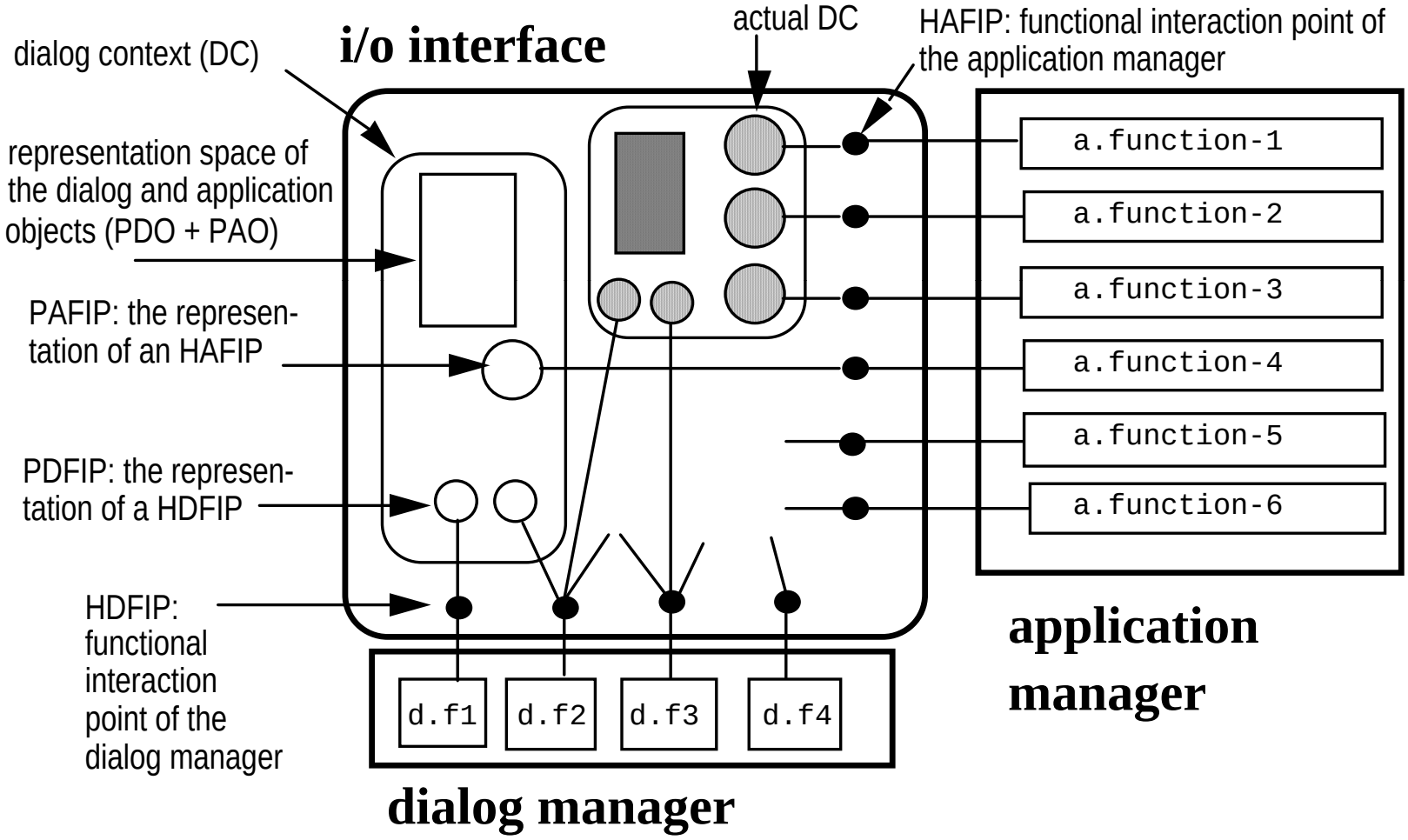
# Command language interaction



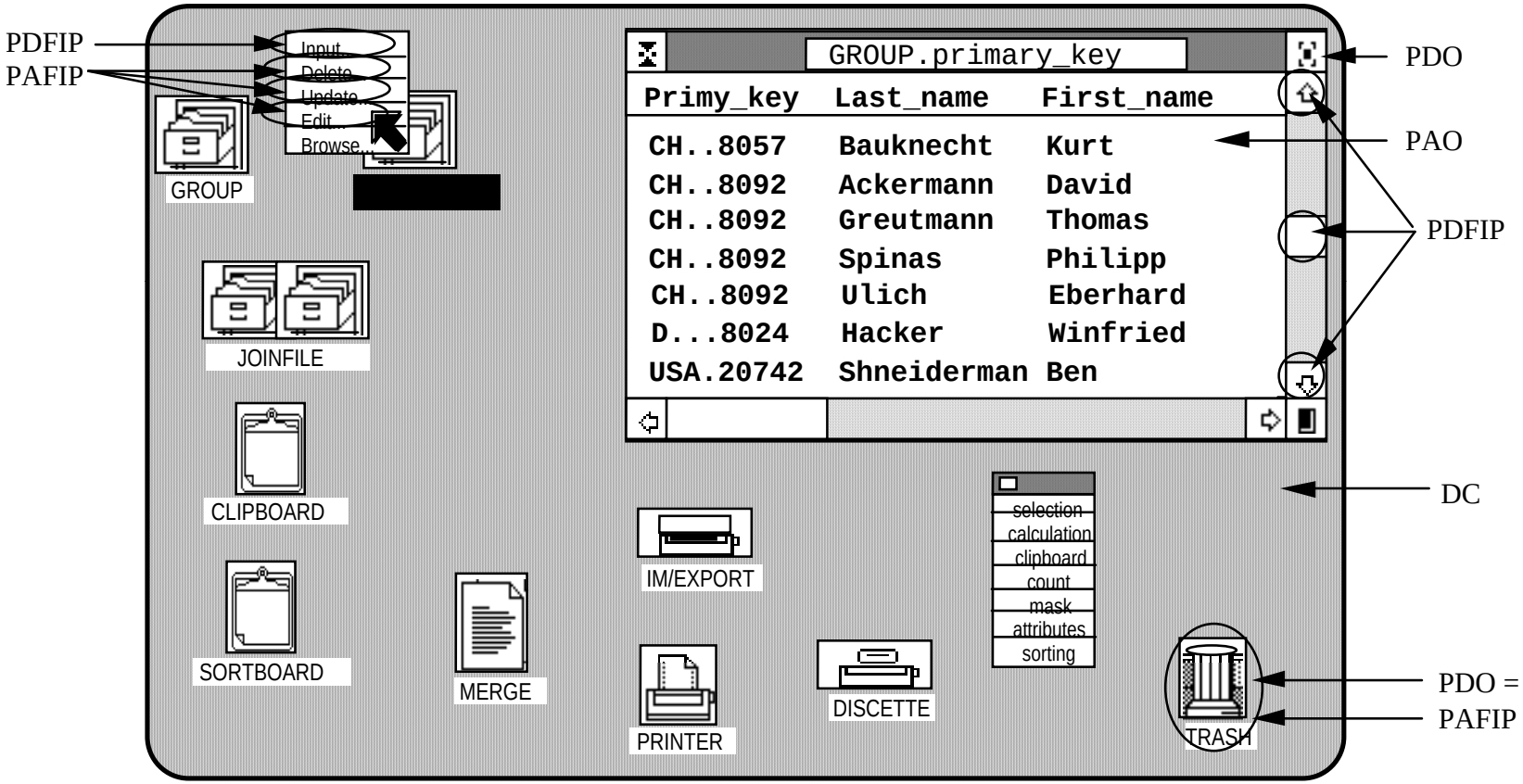
# Menu interface



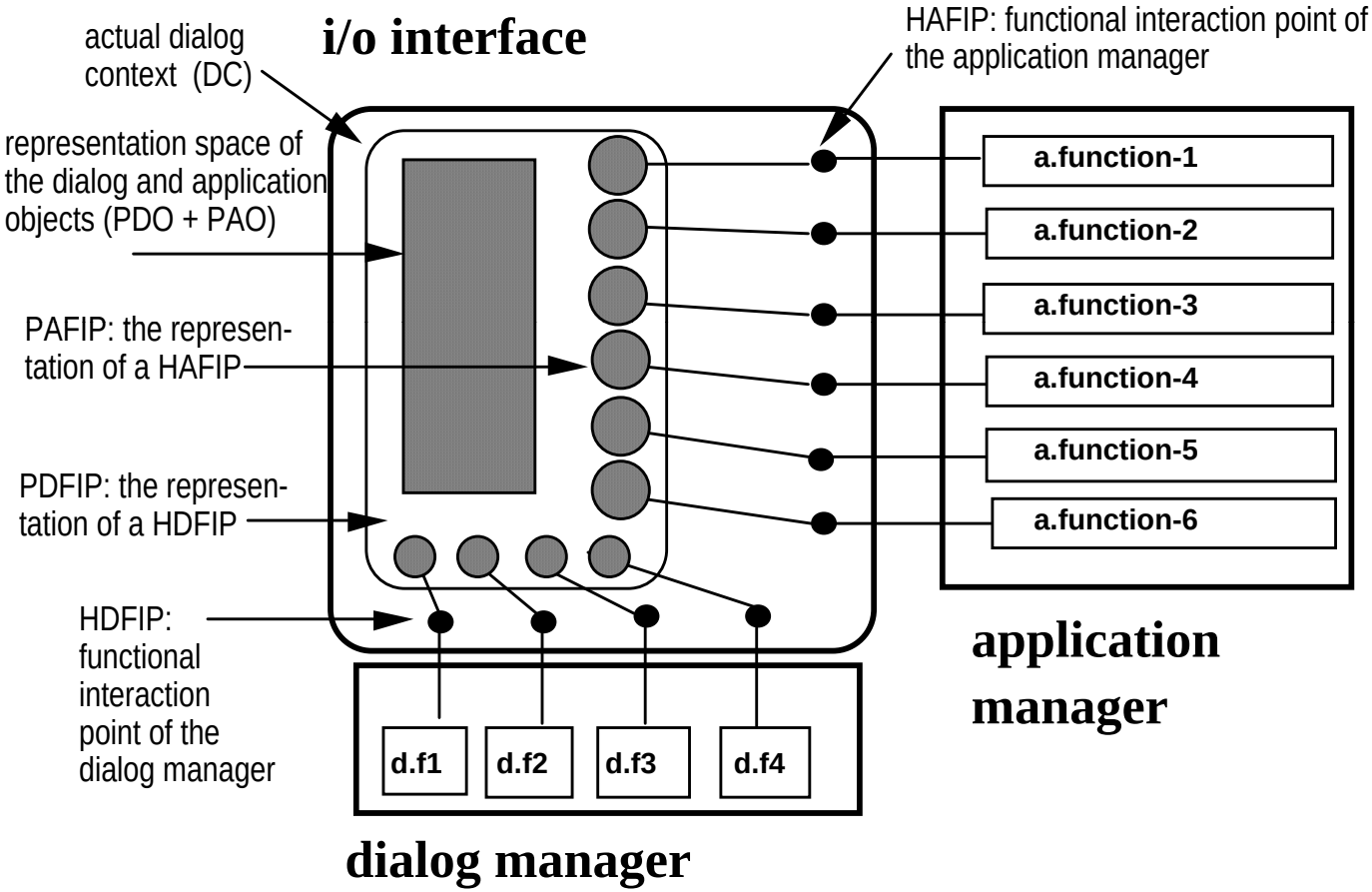
# Menu interaction style



# Direct manipulation interface



# Direct manipulation interaction



About HCI in general:

L. Barfield: The user interface - concepts & design. Addison Wesley, 1993.
P. Booth: An introduction to Human-Computer Interaction. Lawrence Erlbaum, 1990.
A. Dix, J. Finlay, G. Abowd, R. Beale: Human-Computer Interaction. Prentice, 1993.
L. Macaulay: Human-Computer Interaction for Software Designers. Thomson, 1995.
D. Norman, S. Draper: User centered system design. Lawrence Erlbaum, 1986.
J. Preece, Y. Rogers, H. Sharp, D. Benyon, S. Holland, T. Carey: Human-Computer Interaction. Addison Wesley, 1994.
B. Shneiderman: Designing the user interface. Addison Wesley, 1997, 3rd edition.

About design principles:

C. Brown: Human-Computer Interface design guidelines. Ablex, 1989.
W. Galitz: Handbook of screen format design. QED, 1989.
C. Gram, G. Cockton (eds.): Design priniples for interactive software. Capman & Hall, 1996.
D. Hix, R. Hartson: Developing user interfaces. Wiley, 1993.
ISO 9241 (Part 10: Dialogue principles, Part 12: Presentation of information, Part 14: Menu dialogues, Part 15: Command dialogues, Part 16: Direct manipulation dialogues, Part 17: Form fill-in dialogues)
D. Mayhew: Priniples and guidelines in software user interface design. Prentice, 1992.

About usability evaluation methods:

J. Dumas, J. Redish: A practical guide to usability testing. Ablex, 1993.
D. Freedman, G. Weinberg: Walkthroughs, Inspections, and technical reviews. Dorset, 1990.
ISO 9241 (Part 11: Guidance on usability, Part 13: User guidance)
A. Monk, P. Wright, J. Haber, L. Davenport: Improving your Human-Computer Interface: a practical technique. Prentice Hall, 1993.
J. Nielsen, R. Mack (ed.): Usability inspection methods. Wiley, 1994.

About Design:

D. Norman: The psychology of everyday things. Basic Books, 1988.