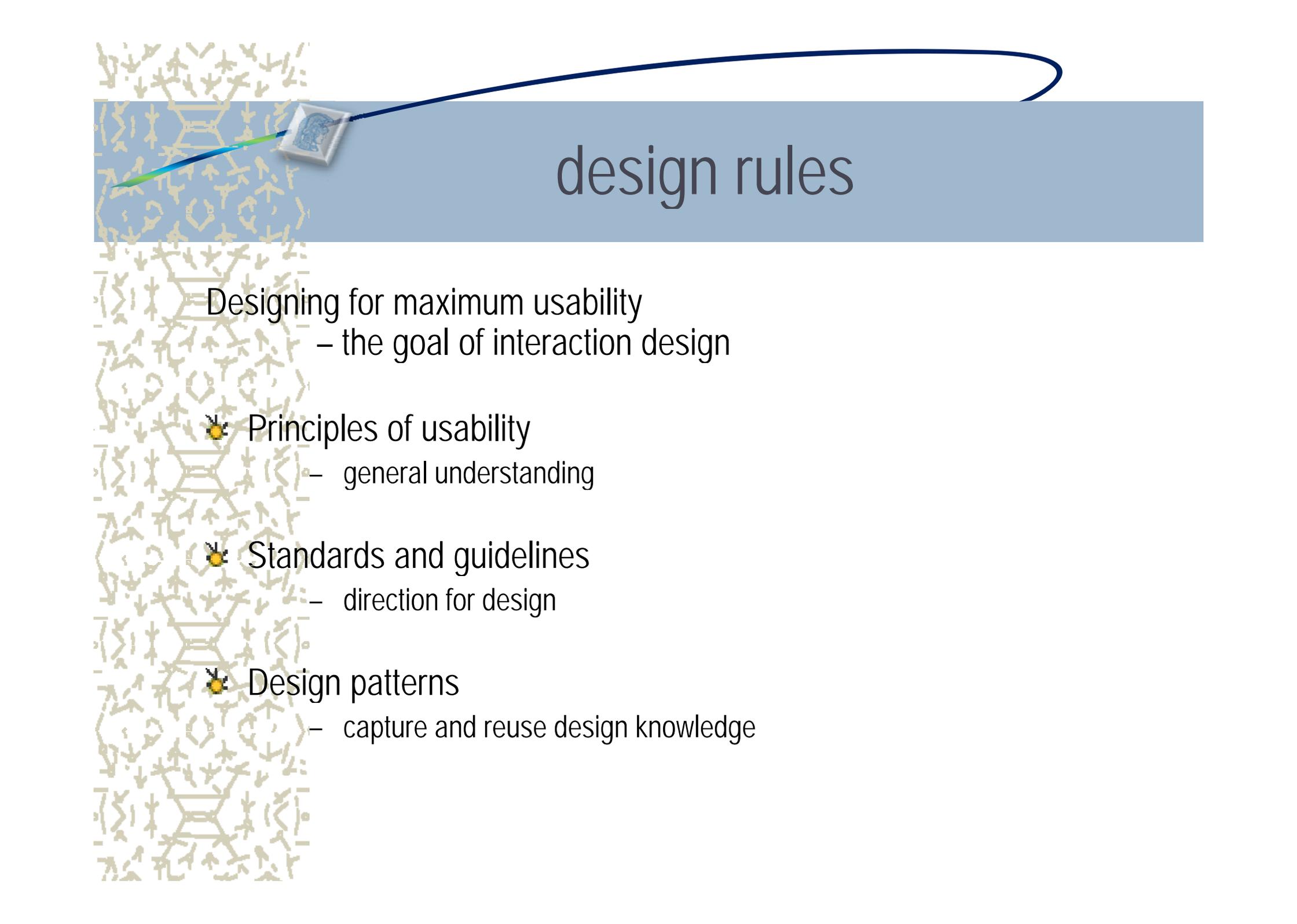


# design rules and Usability Guidelines

## Lecture 7



# design rules

Designing for maximum usability  
– the goal of interaction design

✦ Principles of usability  
– general understanding

✦ Standards and guidelines  
– direction for design

✦ Design patterns  
– capture and reuse design knowledge

# types of design rules

## ✦ principles

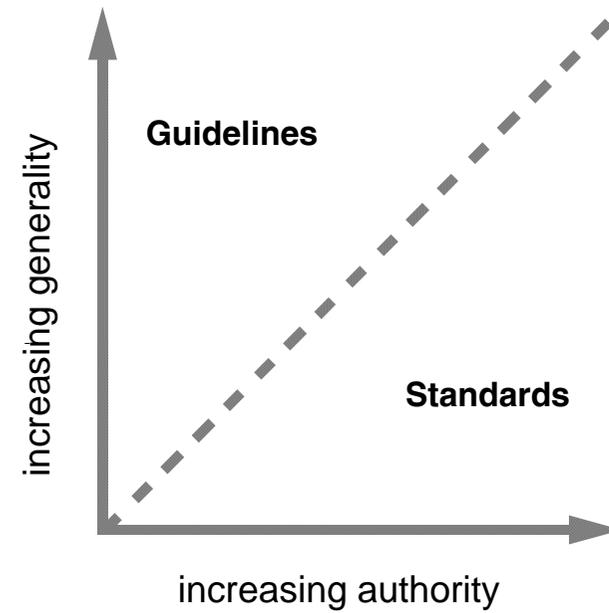
- abstract design rules
- low authority
- high generality

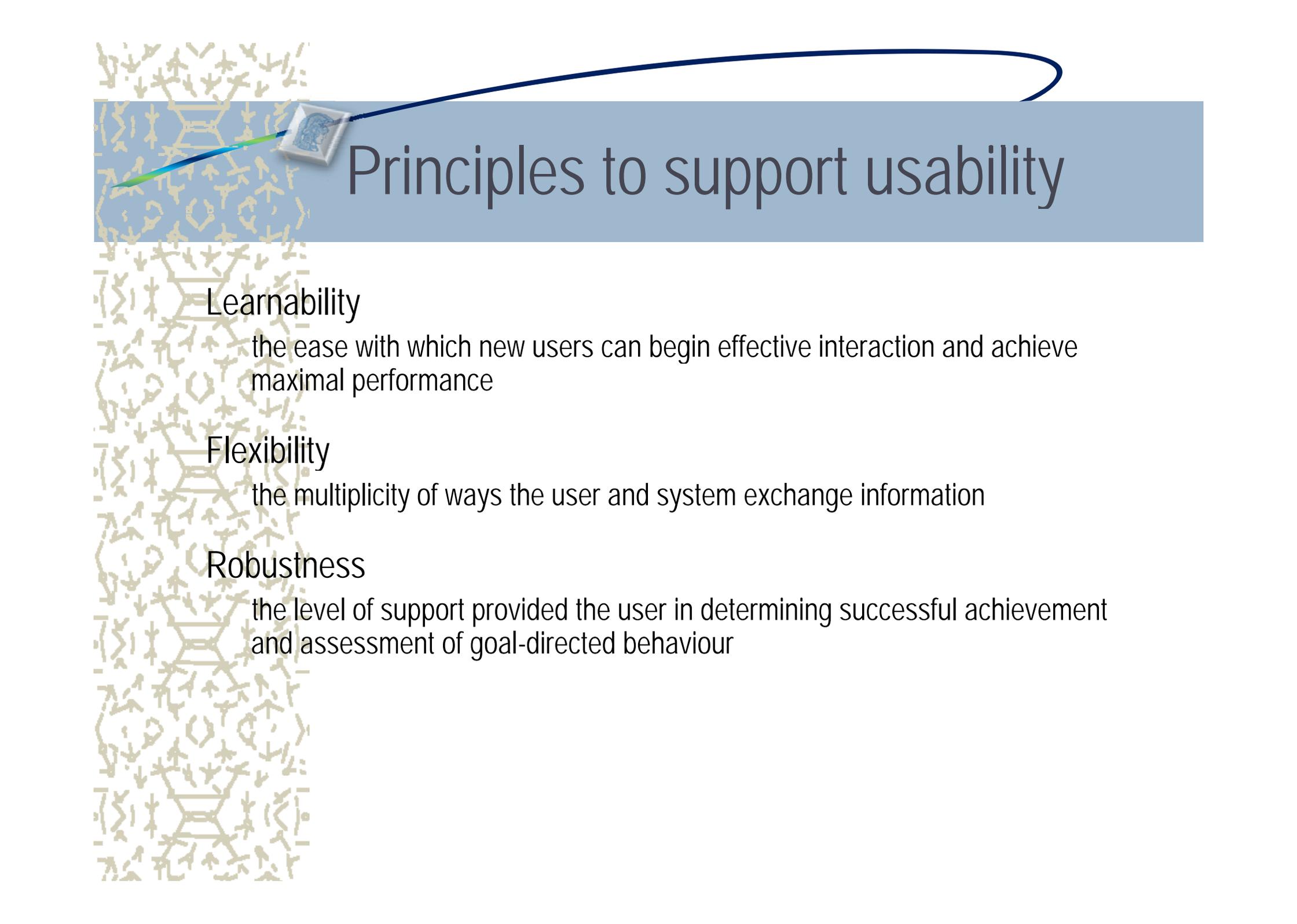
## ✦ standards

- specific design rules
- high authority
- limited application

## ✦ guidelines

- lower authority
- more general application





# Principles to support usability

## Learnability

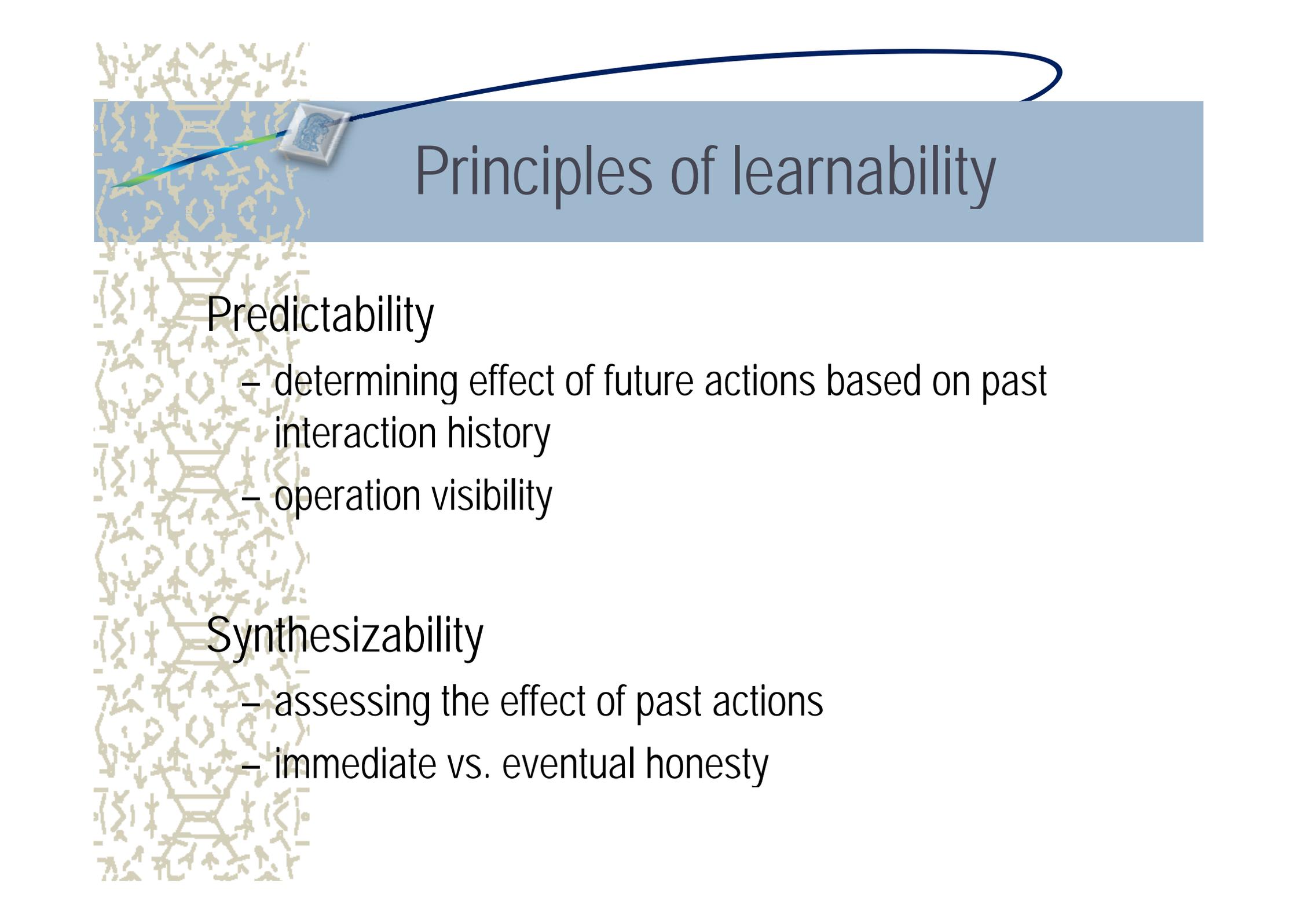
the ease with which new users can begin effective interaction and achieve maximal performance

## Flexibility

the multiplicity of ways the user and system exchange information

## Robustness

the level of support provided the user in determining successful achievement and assessment of goal-directed behaviour



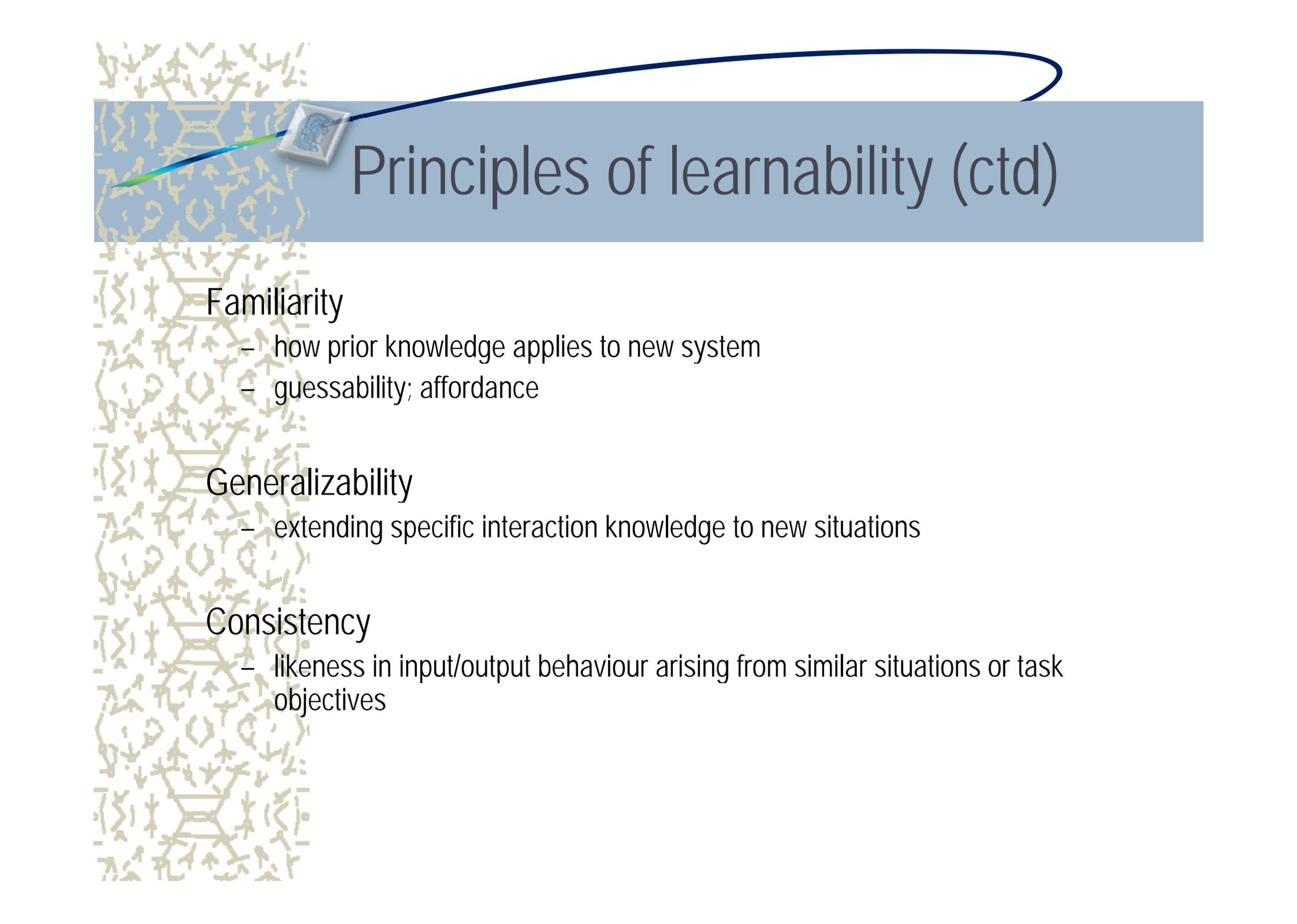
# Principles of learnability

## Predictability

- determining effect of future actions based on past interaction history
- operation visibility

## Synthesizability

- assessing the effect of past actions
- immediate vs. eventual honesty



# Principles of learnability (ctd)

## Familiarity

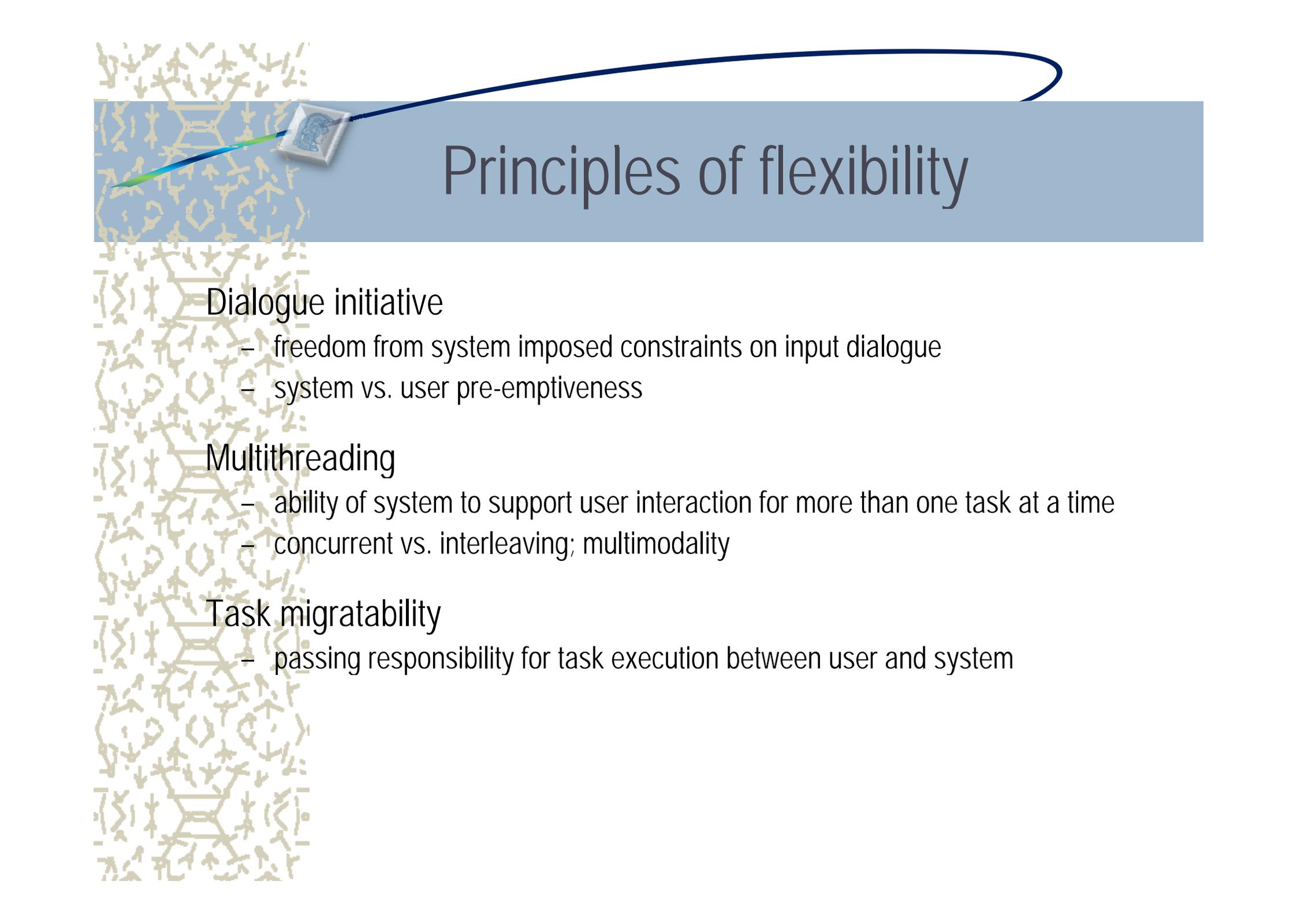
- how prior knowledge applies to new system
- guessability; affordance

## Generalizability

- extending specific interaction knowledge to new situations

## Consistency

- likeness in input/output behaviour arising from similar situations or task objectives



# Principles of flexibility

## Dialogue initiative

- freedom from system imposed constraints on input dialogue
- system vs. user pre-emptiveness

## Multithreading

- ability of system to support user interaction for more than one task at a time
- concurrent vs. interleaving; multimodality

## Task migratability

- passing responsibility for task execution between user and system



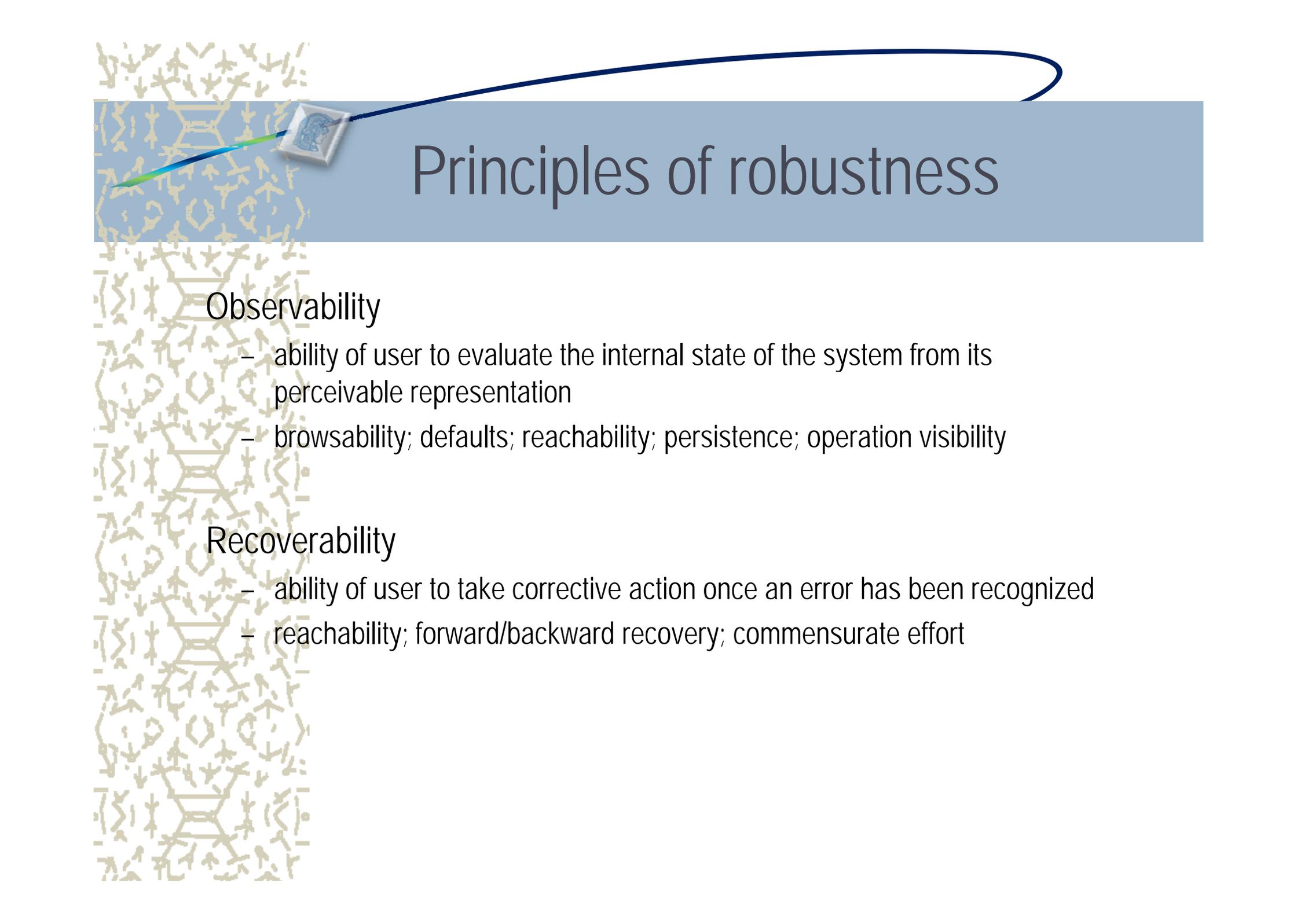
## Principles of flexibility (ctd)

### Substitutivity

- allowing equivalent values of input and output to be substituted for each other
- representation multiplicity; equal opportunity

### Customizability

- modifiability of the user interface by user (adaptability) or system (adaptivity)



# Principles of robustness

## Observability

- ability of user to evaluate the internal state of the system from its perceivable representation
- browsability; defaults; reachability; persistence; operation visibility

## Recoverability

- ability of user to take corrective action once an error has been recognized
- reachability; forward/backward recovery; commensurate effort



# Principles of robustness (ctd)

## Responsiveness

- how the user perceives the rate of communication with the system
- Stability

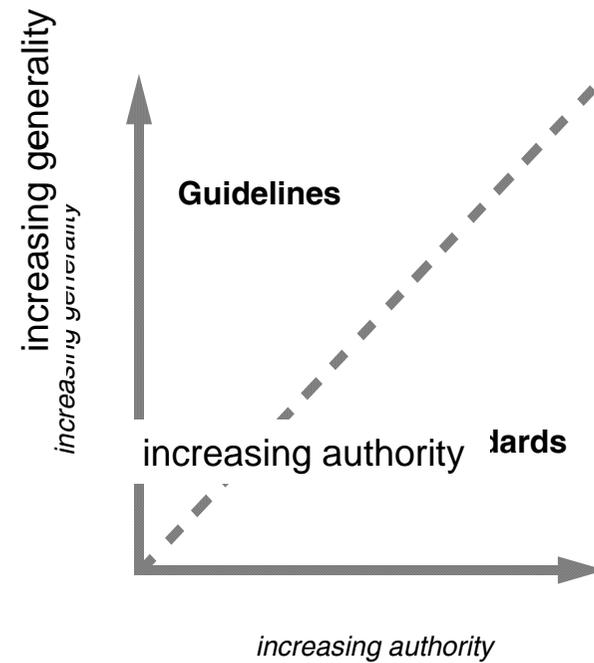
## Task conformance

- degree to which system services support all of the user's tasks
- task completeness; task adequacy

# Using design rules

## Design rules

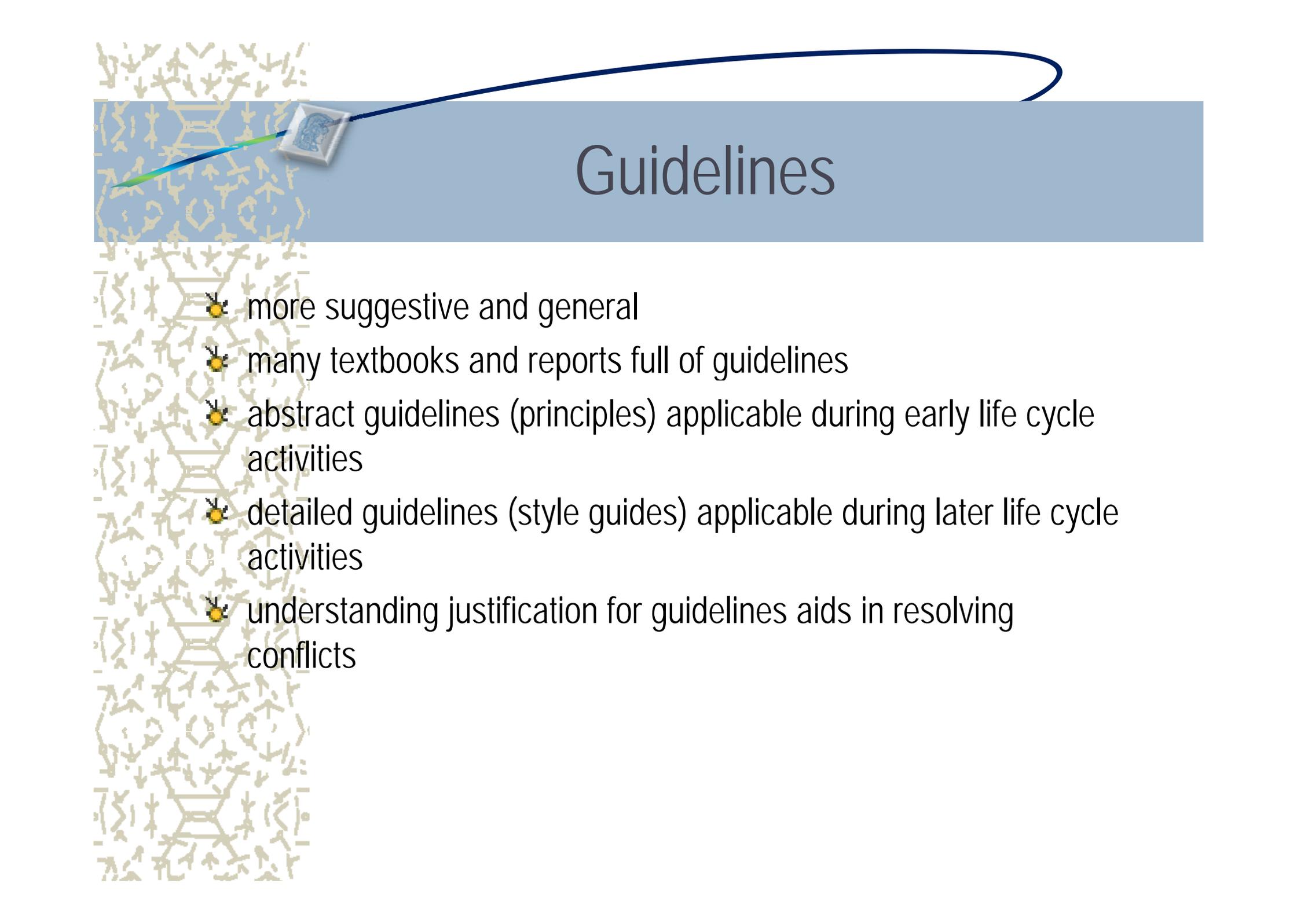
- suggest how to increase usability
- differ in generality and authority





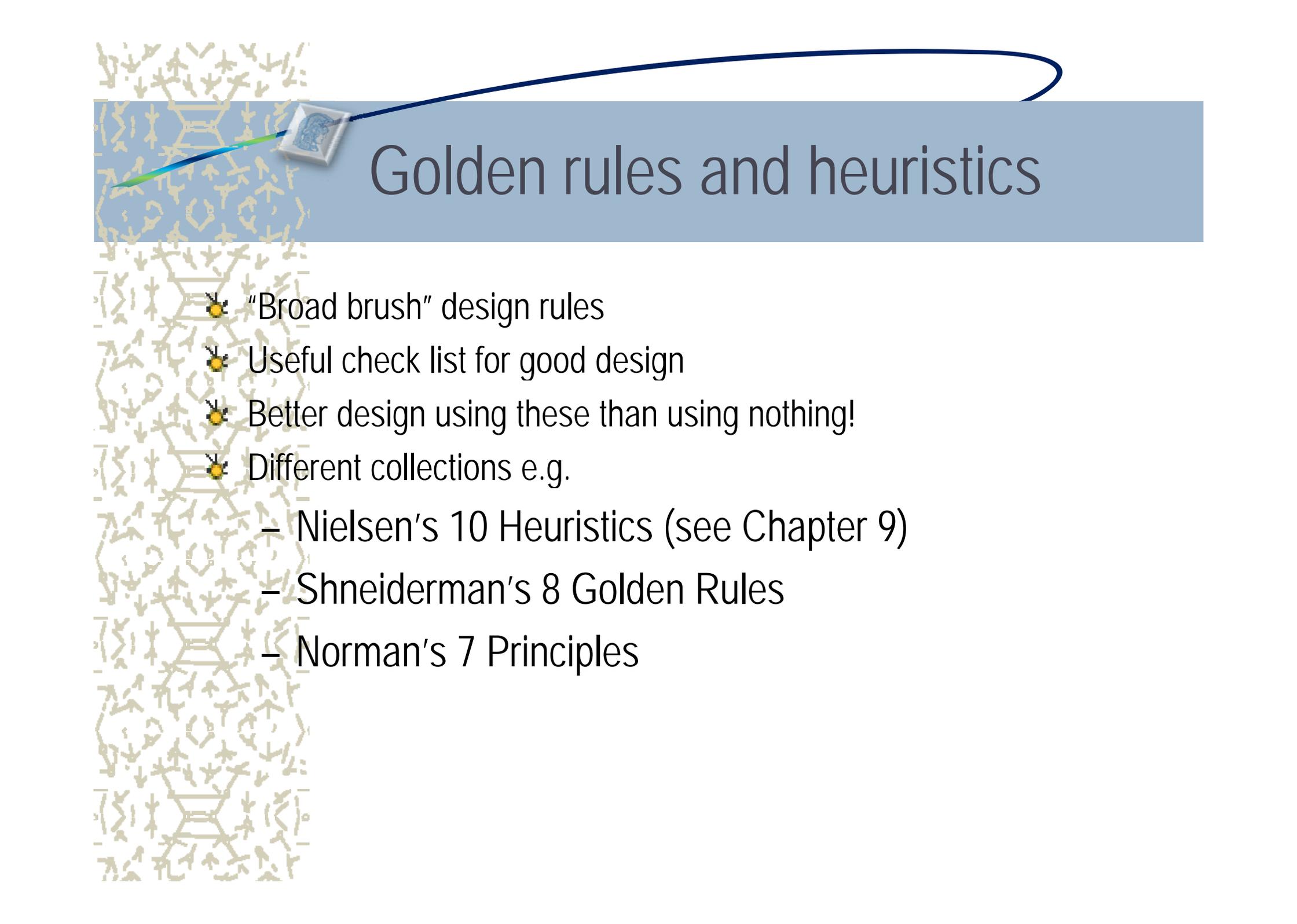
# Standards

- ✦ set by national or international bodies to ensure compliance by a large community of designers standards require sound underlying theory and slowly changing technology
- ✦ hardware standards more common than software high authority and low level of detail
- ✦ ISO 9241 defines usability as effectiveness, efficiency and satisfaction with which users accomplish tasks



# Guidelines

- more suggestive and general
- many textbooks and reports full of guidelines
- abstract guidelines (principles) applicable during early life cycle activities
- detailed guidelines (style guides) applicable during later life cycle activities
- understanding justification for guidelines aids in resolving conflicts



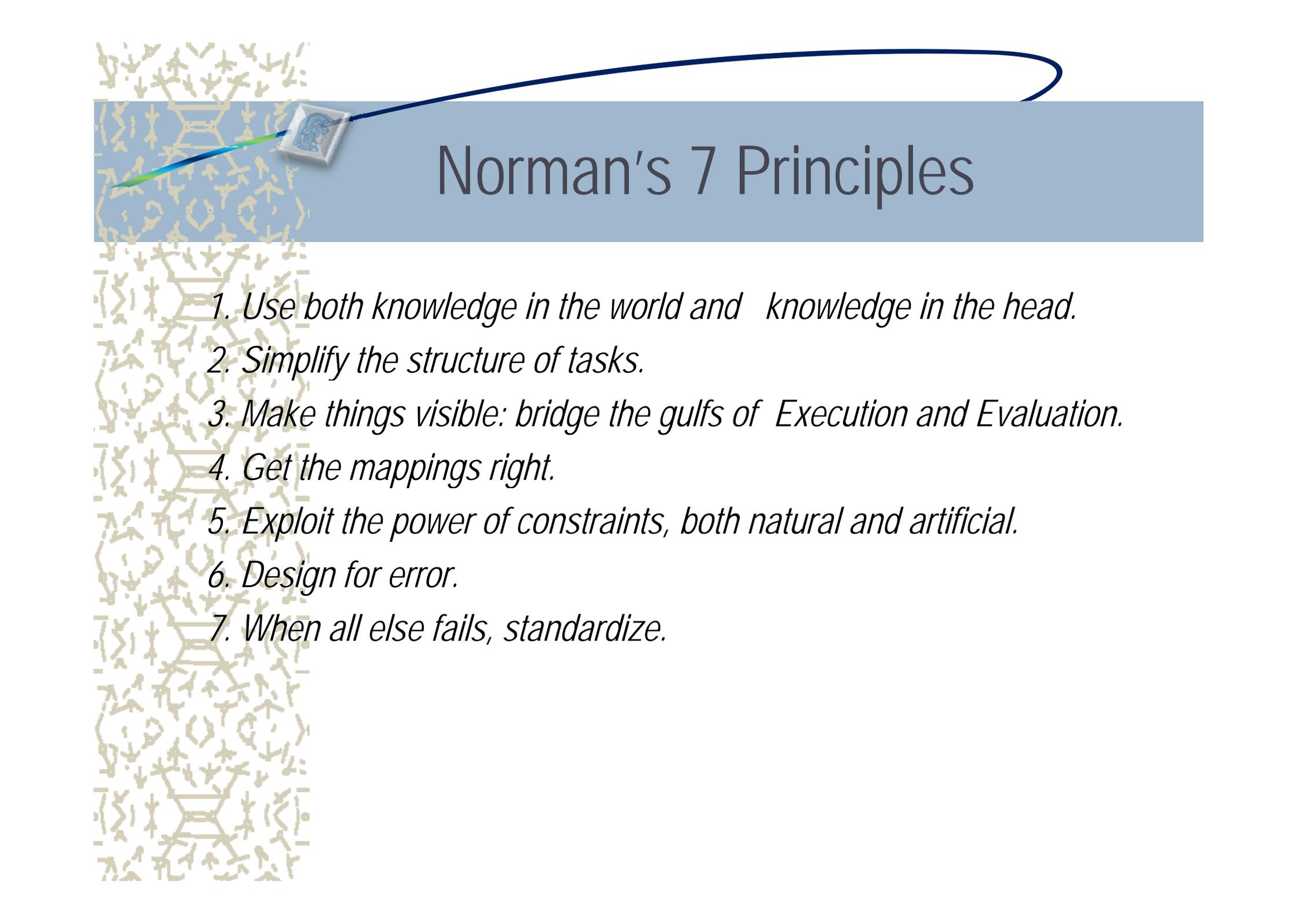
# Golden rules and heuristics

- "Broad brush" design rules
- Useful check list for good design
- Better design using these than using nothing!
- Different collections e.g.
  - Nielsen's 10 Heuristics (see Chapter 9)
  - Shneiderman's 8 Golden Rules
  - Norman's 7 Principles



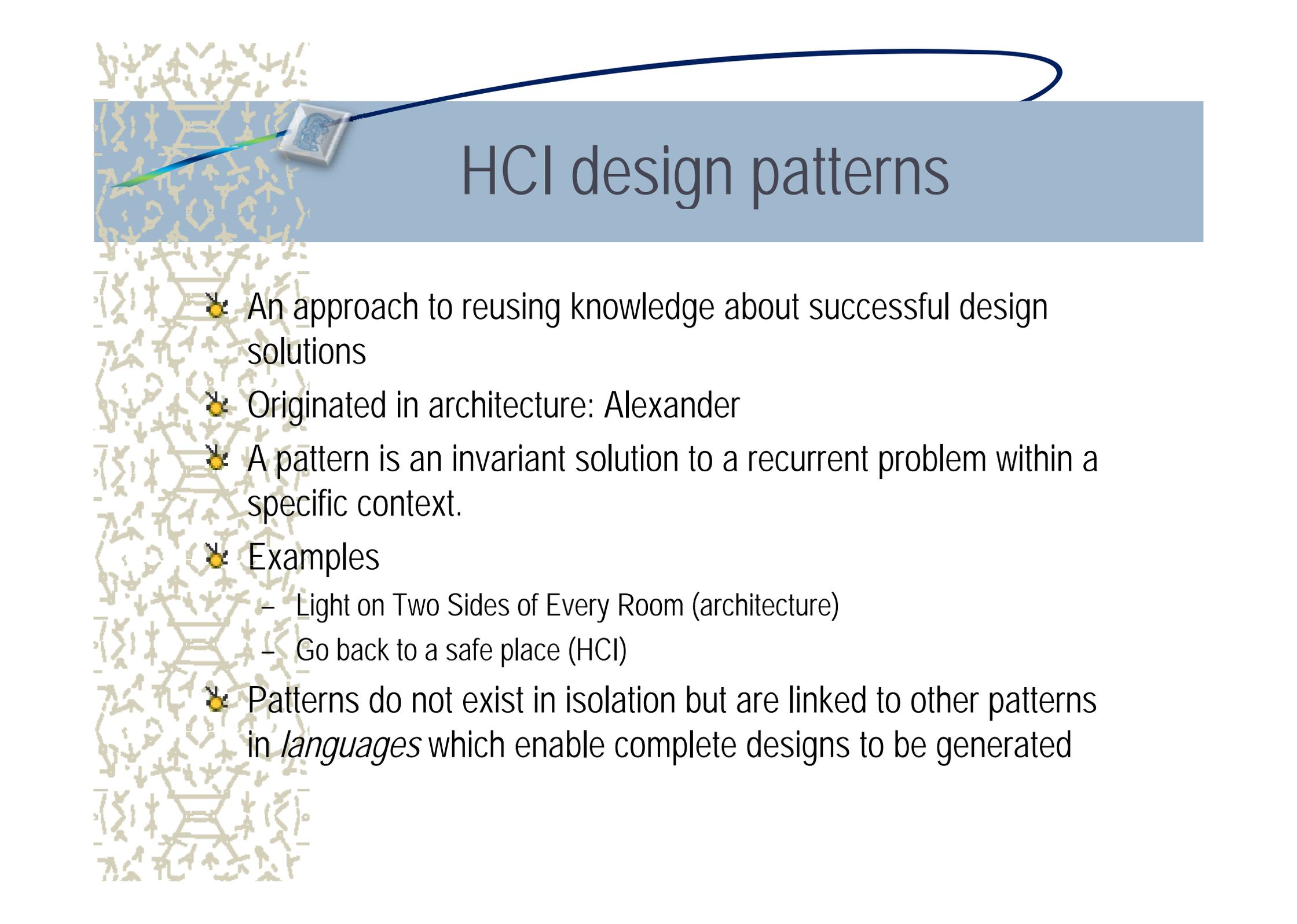
# Shneiderman's 8 Golden Rules

- 1. Strive for consistency*
- 2. Enable frequent users to use shortcuts*
- 3. Offer informative feedback*
- 4. Design dialogs to yield closure*
- 5. Offer error prevention and simple error handling*
- 6. Permit easy reversal of actions*
- 7. Support internal locus of control*
- 8. Reduce short-term memory load*



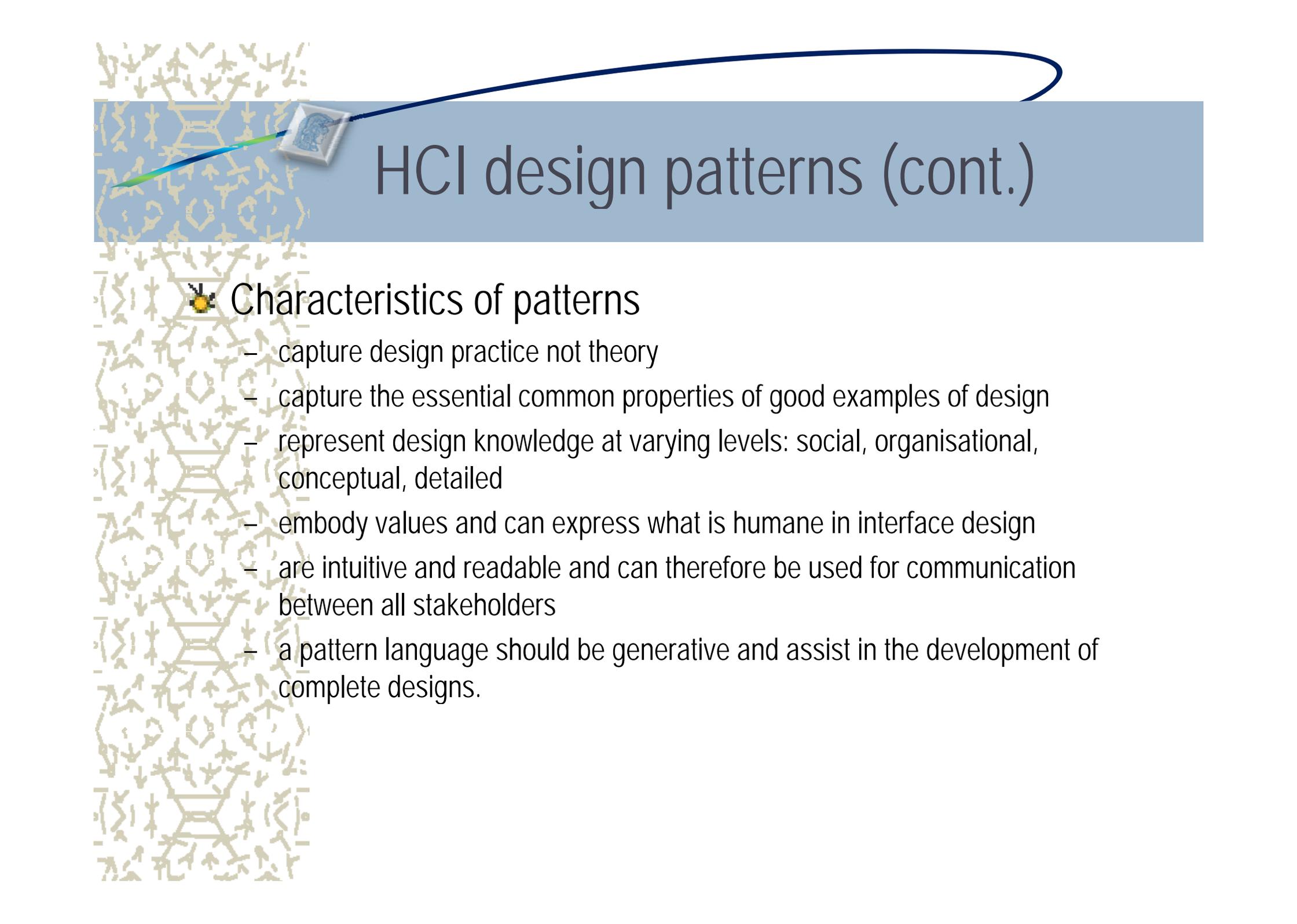
# Norman's 7 Principles

- 1. Use both knowledge in the world and knowledge in the head.*
- 2. Simplify the structure of tasks.*
- 3. Make things visible: bridge the gulfs of Execution and Evaluation.*
- 4. Get the mappings right.*
- 5. Exploit the power of constraints, both natural and artificial.*
- 6. Design for error.*
- 7. When all else fails, standardize.*



# HCI design patterns

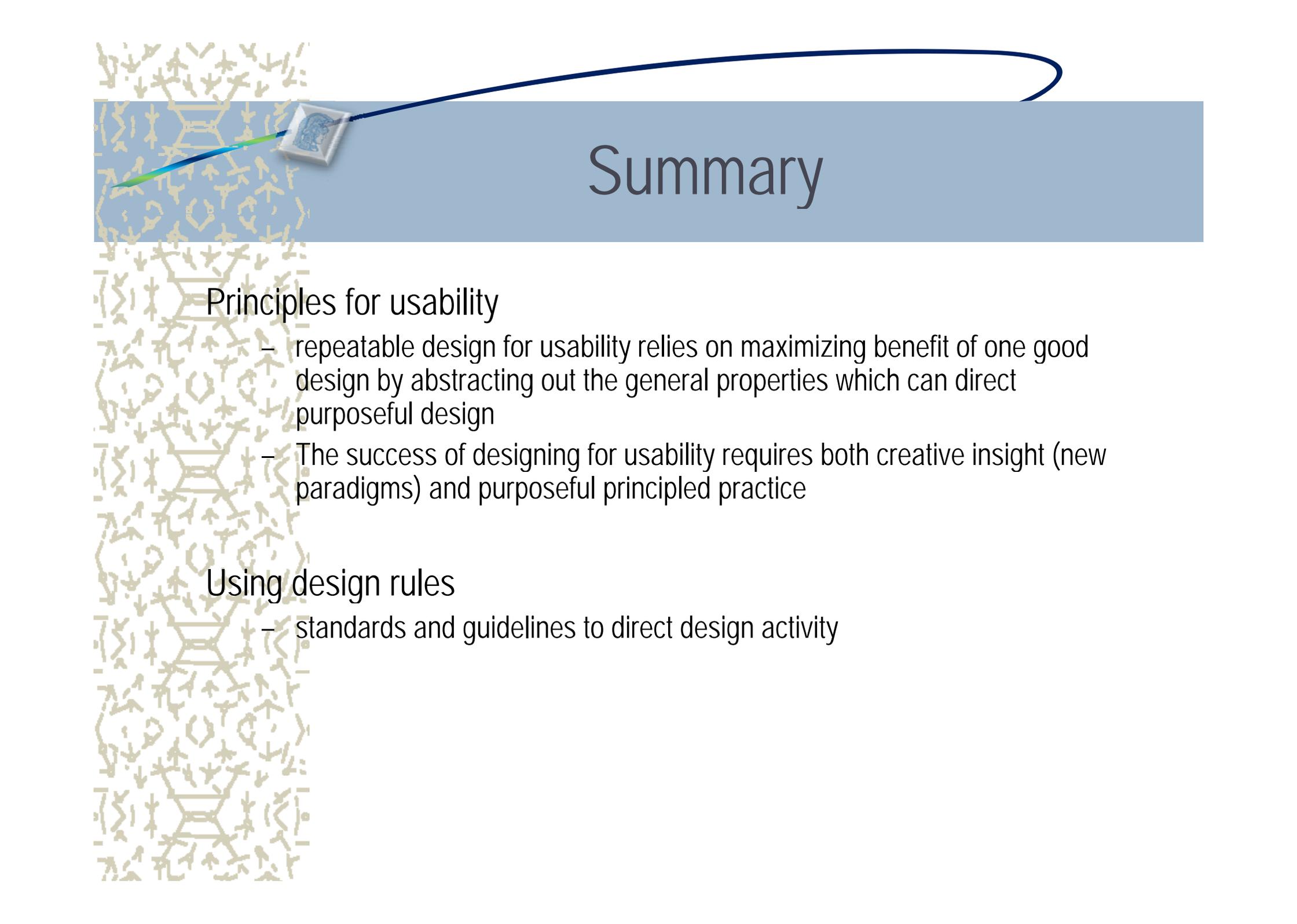
- ✦ An approach to reusing knowledge about successful design solutions
- ✦ Originated in architecture: Alexander
- ✦ A pattern is an invariant solution to a recurrent problem within a specific context.
- ✦ Examples
  - Light on Two Sides of Every Room (architecture)
  - Go back to a safe place (HCI)
- ✦ Patterns do not exist in isolation but are linked to other patterns in *languages* which enable complete designs to be generated



# HCI design patterns (cont.)

## ✦ Characteristics of patterns

- capture design practice not theory
- capture the essential common properties of good examples of design
- represent design knowledge at varying levels: social, organisational, conceptual, detailed
- embody values and can express what is humane in interface design
- are intuitive and readable and can therefore be used for communication between all stakeholders
- a pattern language should be generative and assist in the development of complete designs.



# Summary

## Principles for usability

- repeatable design for usability relies on maximizing benefit of one good design by abstracting out the general properties which can direct purposeful design
- The success of designing for usability requires both creative insight (new paradigms) and purposeful principled practice

## Using design rules

- standards and guidelines to direct design activity