USER PROFILE



Materi kuliah

Pengantar

- Sistem Interaktif bertujuan meningkatkan efisiensi & efektifitas performansi user
- PERFORMANCE = TIME + EFFORT,
- System designer harus mampu :
  1. Mengukur performansi
  2. Memanipulasi faktor – faktor yang berpengaruh



Determinant performansi User

1. **Human Information Processing System**
2. **User physchology characteristic**
3. **User knowledge & experience**
4. **User Job & Task**
5. **User Physical Characteristic**
6. **User Physical Environment**
7. **User Tool**

Information Processing Capabilities of Human Mind

- Faktor penentu utama untuk merancang sistem interaktif
- Pemahaman bagaimana orang berpikir, belajar dan berkomunikasi
- Bisa dianalogikan dengan model pemrosesan dalam komputer

Komparasi Human Vs Computer

Human Memory

- Short Term
- Intermediate Term
- Long Term
- Books
- Picture

Computer

- Register
- Main Memory
- Permanent Memory / Disk
- Tape Magnetic

Komparasi Human Vs Computer

Human Input device

- Eye
- Ears
- Touch

Computer Input device

- Keyboard
- Touch Screen
- Mouse

Human Output device

- Voice
- Eyes
- Hands

Computer Output device

- Screen
- Printer
- Voice synthesizer

Komparasi Human Vs Computer

Human Process

- Knowledge & Skills
- Excecutive Control
- Recognition

Computer Process

- Operating System
- Compiler
- Application

Cognitive resource

- **Resource Limited task**

  Performansi task dapat ditingkatkan apabila diberi tambahan cognitive resource

  Misal task butuh perhatian atau konsentrasi

- **Data Limited task**

  Performansi task dapat ditingkatkan apabila kualitas atau kuantitas data ditingkatkan

  Misal problem solving or decision making task

User's Task Performing

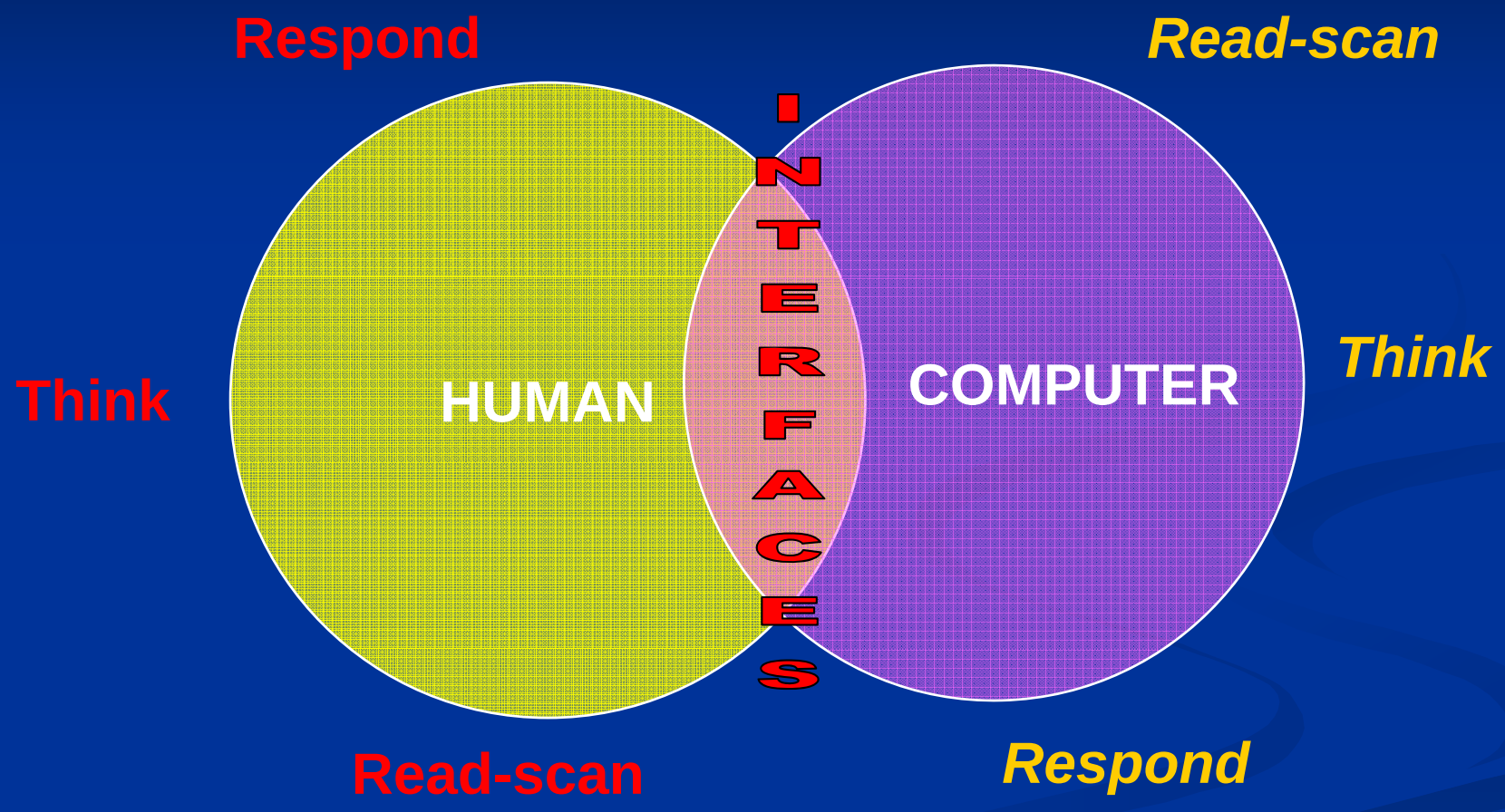
- **Functional Task**

  Task yang harus dilakukan berkaitan dengan *content of the problem*

- **Operational Task**

  Task yang harus dilakukan berkaitan dengan *means of solving the problem* (berinteraksi dengan UI system)

Three-phase model of HCI



3 Phase Human Information Processing System

1. Perceptual System (Read – scan)
2. Cognitive System (Think)
3. Motor System (Response)

The Human Information Processing System

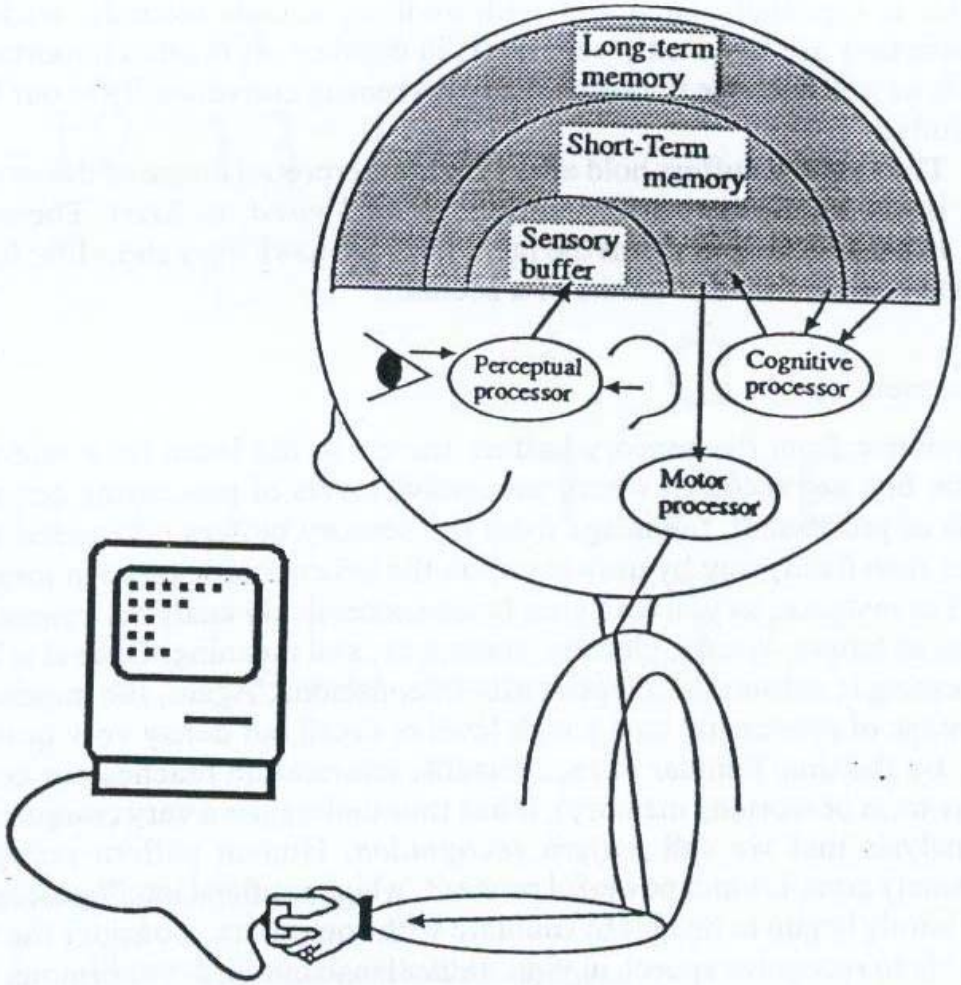


Figure 2–3 The human information processing system. From Card, "The Model Human Processor: A Model for Making Engineering Calculations of Human Performance," *Proceedings of the Human Factors Society 25th Annual Meeting*, 1981, 301–5. © 1981, by the Human Factors Society Inc. Reprinted with permission. All rights reserved.

Cognitive System

Short-term Memory (STM) :

- Not only a storage buffer but also a (very slow) processor
- Limited in Capacity and Duration

Long Term Memory (LTM) :

- Unlimited in Capacity and permanent duration
- Request effort & concentration to put new information in LTM

Implikasi UI design dikaitkan dengan karakteristik STM

- Organisasikan informasi dalam pola yang berarti karena kapasitas dan durasi STM terbatas

  Contoh :

  1112222 lebih mudah diingat drpd 68934762

  100 + 100 lebih mudah diproses drpd 147 + 732
- Rancang label dan penamaan yang mudah untuk membedakan kata secara fonematik

  Contoh :

  pengucapan *delete* dengan *repeat* ; ubah delete dengan *erase*

Implikasi UI design dikaitkan dengan karakteristik STM

Informasi mudah hilang dari STM :

- Jika kurang konsentrasi, minimalkan kebutuhan STM ketika terjadi interaksi & informasi ada dalam STM
- Jika kompleksitas tugas meningkat, sederhanakan interaksi ketika informasi ada dalam STM
- Jika terlalu banyak informasi yang disimpan, jaga agar tidak terlalu banyak informasi dalam STM

Implikasi UI design dikaitkan dengan karakteristik STM

- Gunakan *visual cue* (warna) & *icon* untuk membantu pemanggilan kembali informasi yang disimpan sementara dalam STM
- Hindari terlalu banyak task kompleks dalam interaksi sederhana
- User dengan usia > 55, kemampuan menyimpan informasi dalam STM jauh berkurang

Long-Term Memory (LTM)

- *Information frequently accessed is more easier and faster to retrieve, than information that is accessed only occasionally or has not been access in a long time*
- Retrieval from LTM is slow and unreliable, but facilitated by frequency of access

Implikasi UI design dikaitkan dengan karakteristik LTM

- Strukturkan pelatihan dan pembelajaran dengan baik sehingga user mudah *learn by doing*.
- Kesesuaian antara *cue* dengan *context* tinggi, kemudahan cue & context diakses pada saat dibutuhkan
- Rancang penamaan, label, warna secara maksimal untuk membedakan informasi secara unik
- Gunakan *icon* & *visual cue*, juga *concrete word*

Primary process in Cognitive

- Attend selectively to incoming information
- Learning new information
- Solve the problem
- Communicate with others through Human Language

Implication for UI Design

- **Selective Attention**

  salient visual cues facilitate the selective attention mechanism
- **Learning**

  is facilitated by analogy, by structure & organization, if information is presented in incremental & independent unit
- **Solving problem**

  system should be flexible and allows shortcut for experienced user
- **Human Language**

Summary HIP

Strength

- Infinite capacity LTM
- Duration & complexity of LTM
- High capacity for learning
- Powerful attentional mechanism
- Powerful pattern recognition

Weakness

- Limited capacity STM
- Limited duration STM
- Error prone processing
- Unreliable access to LTM
- Very slow processing

Strength Human Vs Computer

HUMAN

- Powerful pattern recognition
- Powerful Selective Attention
- Capacity to learn
- Infinite-capacity LTM
- Rich, multikey LTM

COMPUTER

- High-capacity Memory
- Permanent Memory
- Very Fast Processing
- Error-free processing
- Reliable Memory access



Weakness Human Vs Computer

HUMAN

- Low Capacity Memory
- Fast Decaying Memory
- Slow Processing
- Error prone Processing
- Unreliable access to LTM

COMPUTER

- Simple template matching
- Limited learning capacity
- Limited capacity LTM
- Limited data integration

Motor System

- It is believe that thought is translated into action through a series of discrete micromovement
- Motor movement relevant to UI design include : head, eye, arm, hand and finger movement

Implication for UI design

- Minimize gross motor movement

  eg : movement back & forth between keyboard & mouse
- Provide adequate perceptual feedback

  eg : an instans keyboard echo on the screen
- Minimize Eye movement to increase performance & minimize fatigue

  eg : minimize scanning & searching

  minimize keyboard-eye movement

Phychological characteristic

- **Attitude** and **Motivation** play a significant role in the performance of task requiring motor skills, cognitive skills or perceptual skills
- Interactive System can be designed to :

1. Minimize the negative emotions of fear, anxiety, boredom etc
2. Maximize job satisfaction, motivation and attitude (eg : empowering, challenging or fascinating)

Phychological characteristic

Cognitive Style	Attitude	Motivation
■Verbal/Analytic	■Positive	■High
■Spatial/Intuitive	■Neutral	■Moderate
	■Negative	■Low

Implication for UI Design

USER Characteristic	DESIGN GOAL
Low motivation, discretionary use	Ease of learning
Low motivation, mandatory use	Control, power
High motivation, due to fear	Ease of learning, robustness, control, power
High motivation, due to interest	Power, ease of use

User's Knowledge & Experience

- Dimension of knowledge & experience is continuum, not just Novice or Expert
- Most of various kinds of K&E, relatively independet of one another
- Almost any combinations of different levels of different kinds of K&E
- Consider 2 determinant : Task Experience & System Experience

User's Knowledge & Experience

Educational Level High School College Advanced	**Reading Level** Related to Educational Lv	**Typing Skills** Expert (135 wpm) Good (55 wpm) Average (40 wpm)
Computer Literacy Highly Moderate Low	**Task Experience** (Semantic Knowledge) Refer to knowledge of task domain	**System Experience** (Syntactic knowledge) Refer to knowledge of particular language or mode of interaction
Application Experience Refer to have used other similar systems	**Native Language**	**Use of Others System**

Implication for UI Design

System Exp	Task Exp	Design Goal
LOW	LOW	Many prompt & efective error recovery procedure
HIGH	HIGH	Efficient commands, concise error msg, not verbose prompting
HIGH	LOW	Semantic help facilities & message
LOW	HIGH	Minimal semantic prompting, a lot of syntactic prompting & instruction

User Job dan Task Characteristic

Frequency of Use ■High ■Medium ■Low	**Primary Training** ■None ■Manual only ■Formal ■Mandatory	**System Use** ■Mandatory ■Discretionary
Task Importance ■ High ■ Low	**Task Structure** ■High ■Moderate ■Low	
Job Categories ■Executive ■Engineer	**Turnover Rate** ■High ■Moderate	**Other Tools** ■Calculator ■Telephone

Implication for UI Design

Characteristic	Design Goal
Frequency of Use	
■ High	Ease of Use
■ Low	Ease of Learning & Remember
Task Importance	
■ High	Ease of Use
■ Low	Ease of Learning & Remember
System Use	
■ Mandatory	Ease of Use
■ Discretionary	Ease of Learning & Remember

User's Physical Characteristic

Color Blind	Handedness	Gender
■ Yes	■ Right	■ Female
■ No	■ Left	■ Male
	■ Ambidextrous	

Implication for UI Design

- *Handedness* berpengaruh pada kemudahan penggunaan input device
- *Color Blindness* berpengaruh pada saat menggunakan layar berwarna
- *Gender* berpengaruh pada motorik

User's Physical Environment

- *Noise Level* berpengaruh pada kemampuan berkonsentrasi
- *Privacy* berpengaruh pada psikologi dan keamanan
- *Lighting* berpengaruh pada kemampuan mata dalam membaca
- *Workspace dimension* & *layout*, *Furniture* & *Equipment* berpengaruh pada kenyamanan bekerja

User's Tool

- Performansi dapat dipengaruhi jenis tool yang tepat untuk digunakan oleh user.

  eg berhitung dibantu kalkulator

  sekretaris lebih produktif mengetik dengan aplikasi *word processor*

- Jika level user pada semua performansi determinant dapat diketahui maka dapat didisain tool yang efektif

User's Tool

- Salah satu tool yang sangat bermanfaat untuk "knowing the user" dengan menggunakan *User classification strategy*

Summary

- 2 determinan yang tidak dapat diperbaiki adalah :
  user's information processing capability
  user's physical characteristic