

Lecture 5

# **Discipline of HCI**

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## Last Lecture's Revelation

**“Don't Make me THINK, is the key to a usable product”**

# In Today's Lecture

- Usability and Quality
- Interdisciplinary Nature of HCI
- Disciplines contributing to HCI

## Quote of the Day – Terry Winograd

“HCI is the kind of discipline which is neither the study of humans nor the study of technology, but rather the bridging between the two. So you always have to have one eye open to the questions:

- What can the technology do?
- How can you build it ?
- What are the possibilities?

And one eye open to the question

- What are people doing and how would this fit in
- What would they do with it ?

If you lose sight of either of those you fail to design well .. I think the challenge is to really keep knowledge of both the technology and the people playing ff against each other in order to develop new things”

# Usability and Quality

# Quality and Software

- What is Quality?
  - You like a product
  - Does not break down
- QA Teams

Quality is conformance to specifications

(British Defense Industries Quality Assurance Panel)

Quality is conformance to requirements

(Philip Crosby)



Quality is fitness for purpose or use

(Juran)

Quality is synonymous with customer needs and expectations

(R J Mortiboys)

Quality is meeting the (stated) requirements of the customer- now and in the future

(Mike Robinson)

Quality is the total composite product and service characteristics of marketing, engineering, manufacturing and maintenance through which the product and service in use will meet the expectations by the customer

(Armand Feigenbaum)

**Totality of characteristics of an entity that bear on its ability to satisfy stated and implied needs**

(ISO 8402 : 1994)

What is a Product?

# Product

- A generic term that refers to
  - Goods
  - Services
- Failure to meet quality requirements in either dimension can have serious negative consequences

# Software Quality

- The extent to which a software product exhibits these characteristics
  - Functionality
  - Reliability
  - **Usability**
  - Efficiency
  - Maintainability
  - Portability



# Software QA Teams

- Only test requirements
- Customers and users

## Interdisciplinary Nature of HCI

# What is HCI?

- HCI is a large interdisciplinary area
- Emerging as specialty concern within several disciplines, each with different emphases
  - Computer science (application design and engineering of human interfaces)
  - Psychology (the application of theories of cognitive processes and the empirical analysis of user behavior)
  - Sociology and anthropology (interactions between technology, work, and organization)
  - Industrial design (interactive products)

# What is HCI?

- HCI concerned with:
  - Joint performance of tasks by humans and machines
  - Structure of communication between human and machine
  - Human capabilities to use machines
  - Algorithms and programming of interfaces
  - Engineering concerns in designing and building interfaces
  - Process of design, specification and implementation
  - Design trade-offs

# What is HCI?

- Various aspects
  - Science
    - Human capabilities to use machines
  - Engineering
    - Building interfaces
  - Design
    - Design tradeoffs

# Case Study – Ticketing System

- A small ticketing agency has many shops distributed throughout the country
- Feels the need to install efficient ticketing system, for survival
- Manual Issuing Procedure
  - Call airlines to check for vacant seats
  - Check with customer if the available seat is suitable
  - Then ticket is written out manually
  - Customer receipts and itinerary
  - Accounting for issued tickets every two weeks

# Case Study – Ticketing System - Research

- The research on existing ticketing systems reveal
  - Computers always going wrong
  - Lack of trust in computers
  - Staff unable to understand messages
- The Result
  - Sales figures had dropped and were disappointing
  - A large number of sales staff had left

# Ticketing System - Recommendations

- Immediate booking via Internet
- Automatic print-out of tickets, itineraries and receipts
- Direct connection between booking system and accounting system
- Elimination of booking forms



# Ticketing System - Recommendations

- Layout of the agency needs to be changed for staff to operate computers
- Staff training
- Changes to job design
- Support to older staff during period of change
- Changes to employment conditions must be examined
- Staff relationship with other non-techi staff members (Technology Power)

# Factors in HCI

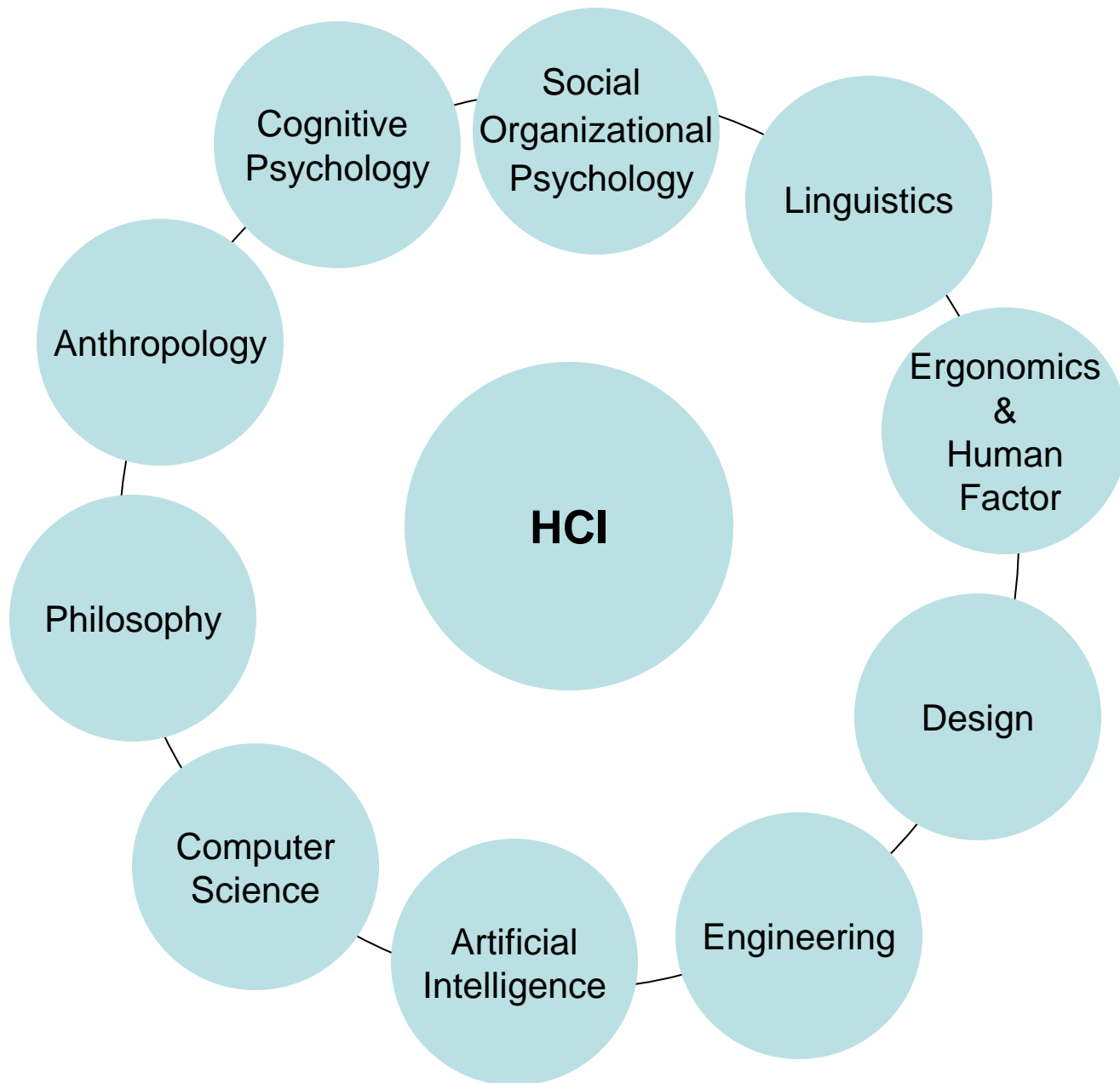
<b>Organizational Factors</b> Training, job design, politics, roles Work organization		<b>Environmental Factors</b> Noise, heating, ventilation, lighting	
<b>Health and Safety</b> Stress, headaches, Musculo-skeleton, disorders	<b>The User</b> Cognitive processes and capabilities Motivation, Enjoyment, Satisfaction, Personality Experience level		<b>Comfort Level</b> Seating Equipment layout
<b>User Interface</b> Input devices, output displays, dialogue structures, User of colour, icons, commands, graphics, natural language 3-D, user support materials, multimedia			
<b>Task Factors</b> Easy, complex, novel, Task allocation, repetitive, Monitoring, skills, multi-media			
<b>Constraints</b> Costs, timescales, budgets, Staff, equipment, building structure			
<b>System Functionality</b> Hardware, software, application			
<b>Productivity Factors</b> Increase output, increase quality, decrease costs, decrease errors, Decrease labour requirements, decrease production time, Increase creative and innovative ideas leading to new products			

# Interdisciplinary Nature of HCI

- HCI is understanding the Complex Relationship between Human and Computers
- Two Distinct “Species”
- Successful Integration is dependent upon the a better understanding of both Species
- Hence HCI borrows and establishes its roots in Disciplines concerned with both

# Interdisciplinary Nature of HCI

- HCI has roots in many disciplines
- HCI is inter-disciplinary in nature



# Interdisciplinary Nature of HCI – Human Side

- Cognitive Psychology
- Social Organizational Psychology
- Ergonomics and human Factors
- Linguistics
- Philosophy
- Sociology
- Anthropology

# Cognitive Psychology

- Understanding human behavior and mental processes
- Human information processing
  - See
  - Feel
  - Touch
  - Smell
  - Taste
- How much information can be processed and remembered

# Social Organizational Psychology

- Studying nature and causes of human behavior in social context
- Four core concerns
  - Influence of one individual on another person's attitude and behavior
  - Impact of a group on its member's attitude and behavior
  - Impact of a member on group's activities and structure
  - Relationship between the structure and activities of different groups
- Informs designers how computers affect working practices



# Ergonomics or Human Factors

- To define and design tools and various artifacts for different work, leisure and domestic environment to suit the capacities and capabilities of users
- Ergonomist translates the above information from the above mentioned sciences into context of design of products
- Increase feelings of comfort and satisfaction
- Concerns
  - Hardware design
  - Radiation from VDUs
  - Repetitive Strain Injury (RPI)

# Linguistics

- Scientific study of languages
- Command-object (delete 'report' OR 'report' delete)
- Understanding structure (syntax) and meaning (semantics)
- HCI goal is to develop natural language interfaces

# Philosophy, Sociology and Anthropology

- Contribution in the sense of Soft Sciences for HCI
- Considers introduction of IT in society
- Ethnography involves observing people
- Cognitive psychology tries to predict
- Computer Supported Cooperative Writing

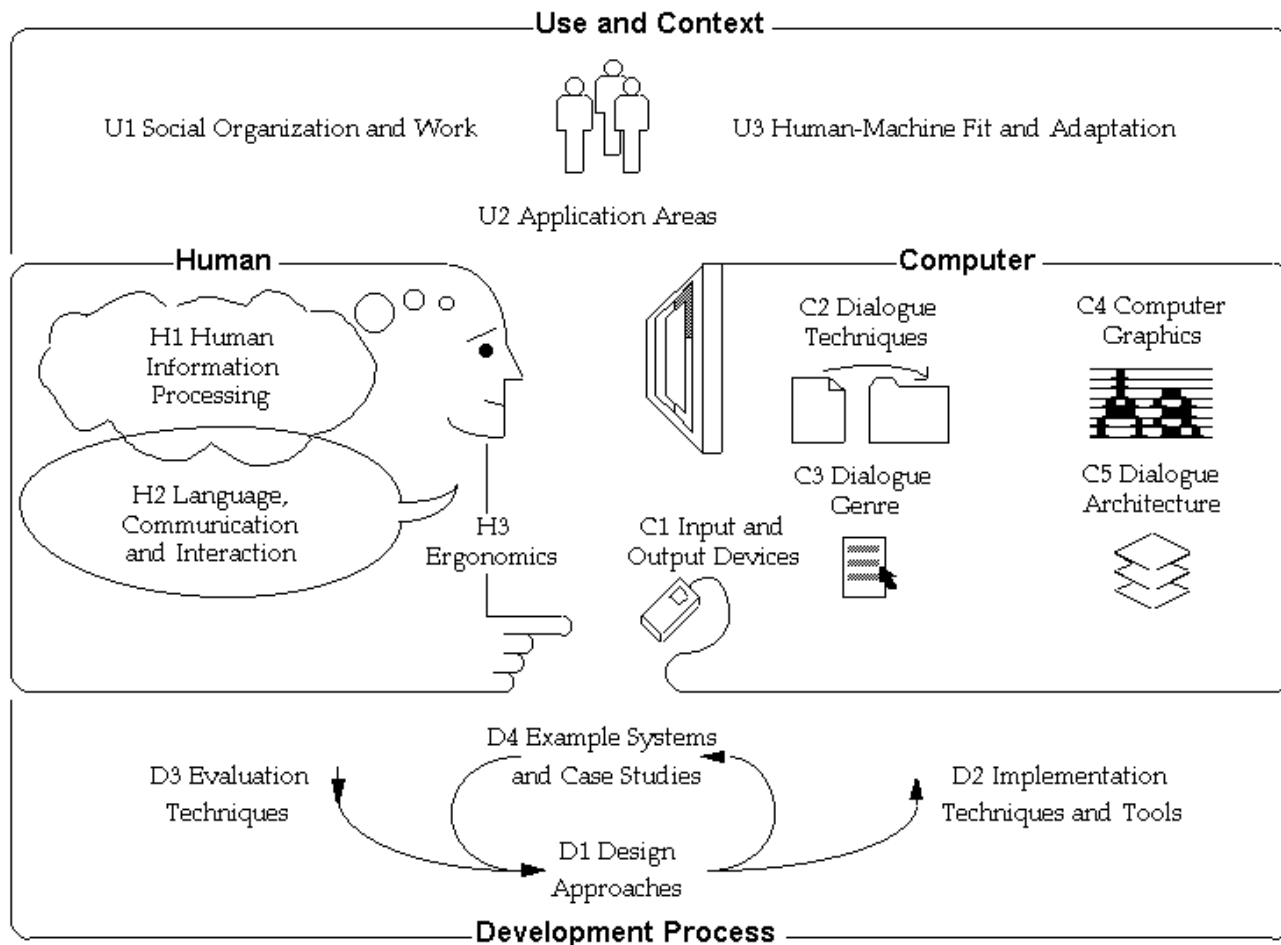
# Interdisciplinary Nature of HCI – Computer Side

- Computer Science
- Artificial Intelligence
- Engineering
- Design

# Other Disciplines

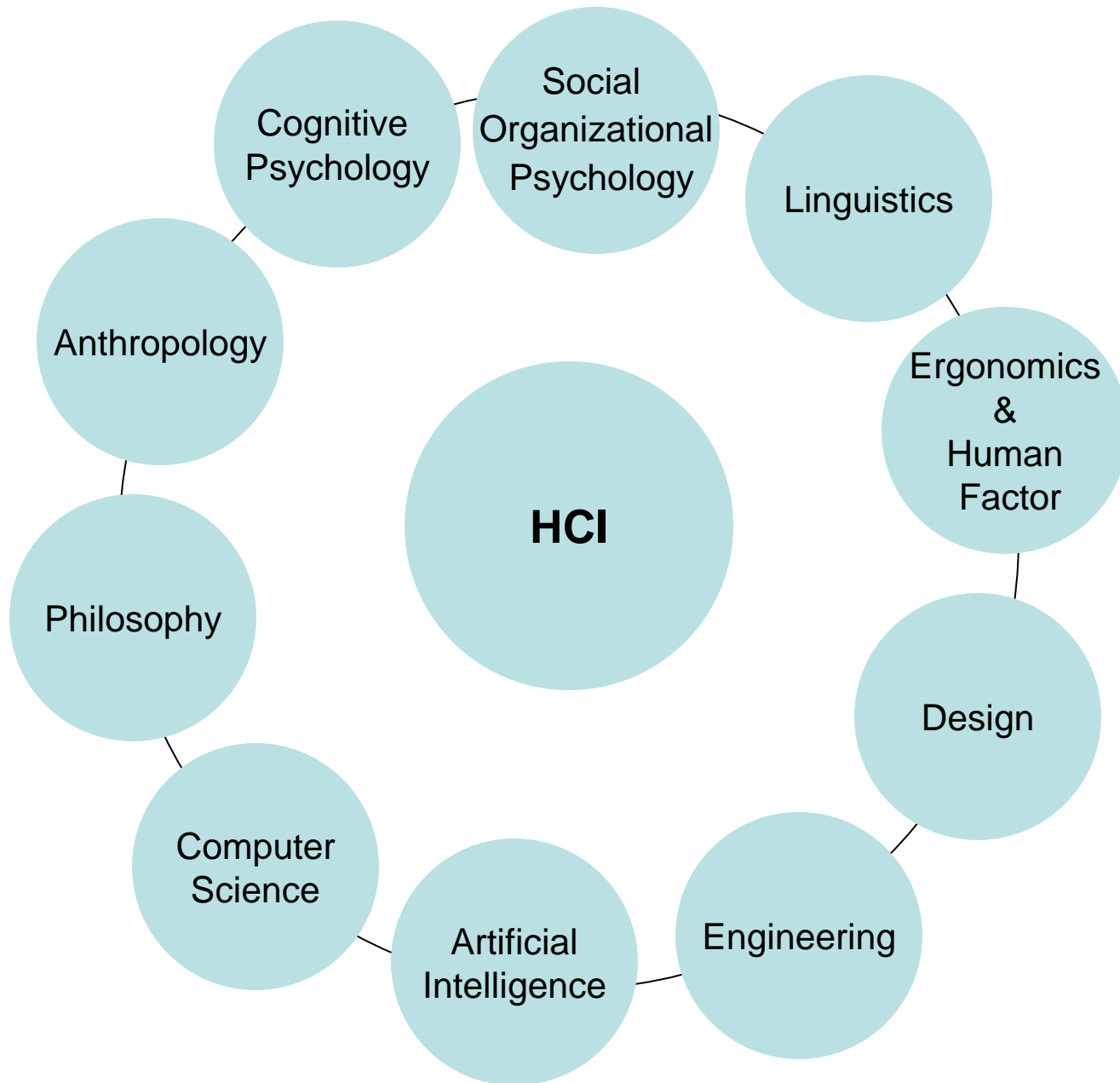
- Computer Science
  - Provides knowledge about capability of technology
  - Developing techniques to support software design, development and maintenance
- Artificial Intelligence
  - Intelligent Computing concerned with simulating human behaviour
  - HCI – development of expert and tutoring systems
- Engineering
  - Engineering takes findings of sciences and utilizes them in the production of artifacts
- Design
  - Design contributes creative skills and knowledge to this process

# Discipline of HCI



## What We Learnt Today ...

- Factors in HCI
- Interdisciplinary nature of HCI





## Next Lecture

- Human Side of HCI