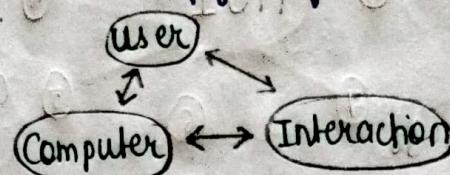


UNIT 1 - INTRODUCTION TO HCI

What is HCI?

- Human Computer Interaction (HCI) is study that refers communication b/w Human (user) and computer system.
- Also known as CHI (Computer Human Interface) or MMI (Man Machine Interaction).
- It focuses on designing computer systems and interfaces that are easy to use and helpful for people.



Q Human ?

- It has capacity to observe, think, sense and react to objects surrounded to it.
- Has qualities eg: Vision, Hearing, Movement, Thinking etc.
- Machine that works on request & responds mechanically
- Types : i) Input Device eg - Keyboard, Mouse ii) Output Device eg Printer, LCD

Models of Interaction ?

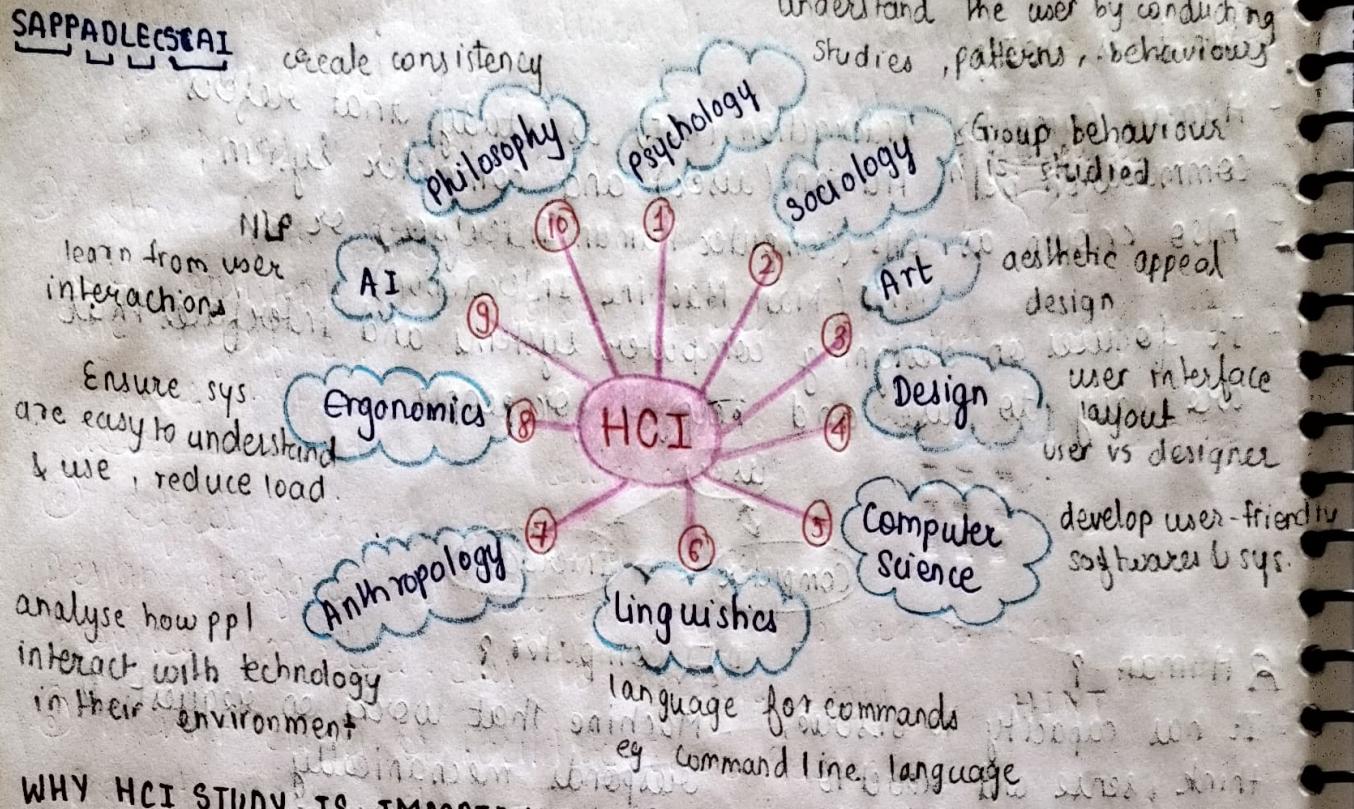
- With help of interaction design, styles ; Human & computer interact

Donald Norman's 7 stages of interaction / Principles for Transforming Difficult Task into Simple Ones

- ① **Establishing the Goal** what to achieve? what need from system?
- ② **Forming the intention** decide plan/strategy to complete goal.
- ③ **Selecting the Action / Specifying the action sequence**
- ④ **Executing the action** user performs the actions
- ⑤ **Perceiving the system state** user observes the system's response to their action
- ⑥ **Interpreting the system state** user receives feedback provided by system
- ⑦ **Evaluating the outcome** system state = user goal (comparison) → achieved.



DISCIPLINES INVOLVED IN HCI



WHY HCI STUDY IS IMPORTANT?

- HCI is highly imp. as we interface with many computerised machines on daily basis like ATM machines, local train ticket, image based unlocking systems, hot drinks dispensing machines, etc.
- User gives command by voice, biometric, touch, etc. so this interaction has increased a lot.
- HCI is important to

GOALS OF DESIGNERS

① Recognize the User Goals

think differently about achieving goal (Designer)

Goals are different from overall task to do

Each user is different, their privileges change overtime

② Understand the Problem

choose among available quantitative & qualitative data

③ Modelling users

satisfy maximum requirements

eg. car manufacturing → stylish look → safe & comfort
→ interior features → no. of ppl
→ luggage

- determining user requirement

- communicate with stakeholders

- build commitment to design

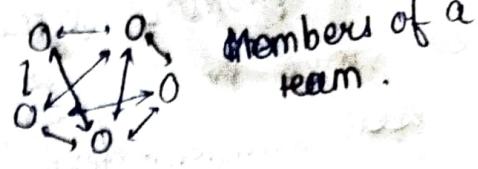
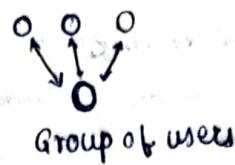
- measure of design effectiveness.

④ Setting the Vision

⑤ Design Product
more user friendly

⑥ Teamwork

'we' than 'me'
'we did this' over 'I did this'



"PSYCHOLOGY OF EVERYDAY THINGS" BY DONALD NORMAN

- A book by Norman in field of HCI
- Normans core message is that good design makes things understandable & usable, reducing user errors & frustration by focusing on human psychology & behaviour
- eg doors → user is confused → push or pull ??
some require push, some require pull, some require both, some require left & right sliding
- Products / objects should be designed to increase its usability & understanding.
- It should maintain interaction quality.



Generally designs are observed in :

① Industrial Design
interaction with user &
manufacturing by
providing better service
with development of new
concepts & specification

② Interaction Design
Interaction betw user &
tech. This is based
on social culture,
psychology, ergon-

③ Experience Design
made with purpose
to improve ~~interaction~~
quality in design of
product, process, overall
environment including
review & feedback

PRINCIPLES OF HCI

① Know the Users

Understanding User Characteristics - who are they? , abilities, limitations, needs, preference , age, etc

User Research - conduct interviews, surveys

② Understand the Task

Task analysis - what task user needs to perform? , breakdown into steps & understand context

User Goals - identify goals , design system that support these goals.

③ Reduce Memory Load

Design interface that reduces the need for users to remember information betⁿ actions. (STM & LTM)



keep options & instructions visible

④ Strive for Consistency

Use consistent terms, colors, layouts, behavior throughout the interface.

Ensure that similar action produce similar results, helping users to predict their outcome.

⑤ Refresh Memory & Remind Users

Design interface that rely on recognition rather than recall.

Provide reminders, cues to complete tasks.

HINT

⑥ Prevent Errors or Facilitate Error Recovery

Prevent errors before they occur (eg. irrelevant data)

Provide clear, undo, redo, helpful error messages & easy way to correct mistakes.

$$2 + 2 \neq 5 ?$$

⑦ Naturalness

Design interface that feels natural, align with real world expectations

Use metaphor, analogies so user can easily relate



⑧ Recognize the Diversity

wide range of abilities, offer customization options, be mindful of cultural sensitivity.

Overall: system should be easy & pleasant to use.

SHNEIDERMAN'S 8 GOLDEN RULES

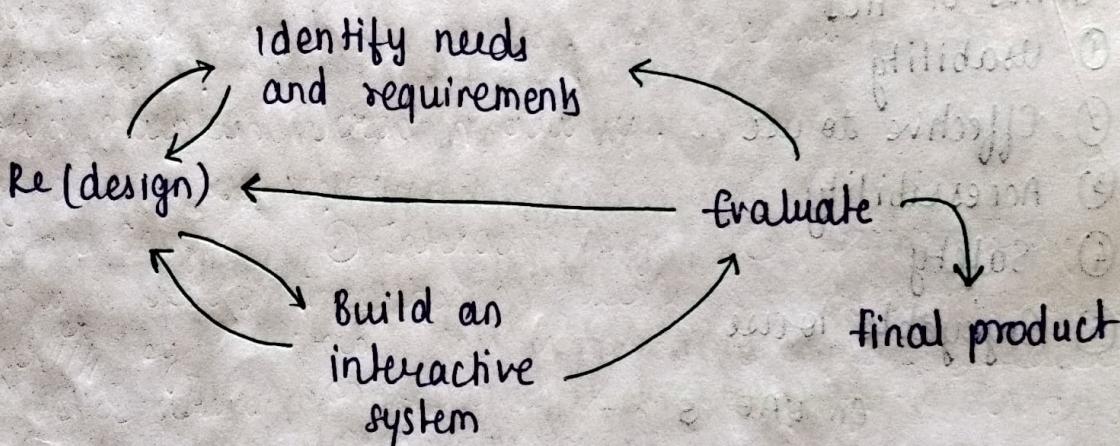
- ① Strive for consistency
- ② Enable frequent users to use
- ③ Offer informative feedback
- ④ Design dialog to yield closure
- ⑤ Offer simple error handling & prevention
- ⑥ Permit easy reversal of actions
- ⑦ Support internal locus of control
- ⑧ Reduce short term mem.
(keep user activity in control)

USER-CENTERED DESIGN

- The process of collecting feedback from user to improve the design is known as User-centered Design (UCD)
- UCD is a collection of process that focus on putting users at the center of product design and development.
- The idea is to ensure that the design process is centered around the users, making their experience as effective & satisfying as possible.

Principles of UCD

- ① focus on user and their needs
- ② Iterative Design process - product is continuously refined based on user feedback



- ③ Design the whole User Experience.
how user interact with the product in various context.
- ④ Involvement of users throughout the Design process.
- ⑤ Design for usability.
- ⑥ Accessible and Inclusive Design.
accessible to all users.

Advantages

- ① Enhance user satisfaction
- ② Increase usability
- ③ Improve accessibility
- ④ Higher engagement & retention

Disadvantages

- ① Balancing user needs & goals.
- ② Costly & time consuming.
- ③ Difficult to translate data to design
- ④ Resistance to change.

MEASURABLE HUMAN FACTORS

These factors help in understanding how users interact with technology and identify areas for improvement.

- ① Time to learn
- ② Speed of performance
- ③ Rate of user errors
- ④ Retention of knowledge over time.
↳ how well users continue to engage with & use system/product over time.
- ⑤ Subjective satisfaction
Is user satisfied?

GOALS OF HCI

- ① Usability - systems are easy to use & learn & satisfy the users
- ② Effective to use - involving user in design
- ③ Accessibility - everyone can access & benefit from it → (universal)
- ④ Safety - secure user privacy
- ⑤ Enjoyable to use - satisfaction, enjoyment, emotional response

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Darren's Norman Principle of Design

- ① visibility
- ② feedback
- ③ constraints
- ④ Mapping
- ⑤ Affordance
- ⑥ Context Consistency

oooooooooooo

Nielsen's 10 Heuristics

- ① Keep user in control
- ② Prevent errors
- ③ Help user get oriented
- ④ Help user get started
- ⑤ Give immediate feedback
- ⑥ Use consistent interface
- ⑦ Help user remember & recover
- ⑧ Reduce cognitive load
- ⑨ Be consistent & predictable
- ⑩ Help user feel in control