

Books: Primary book

Dix A., Finlay J., Abowd G. and
Beale, R. 2004 Human Computer Interaction,
3rd edition, Prentice Hall.

→ Schneiderman, Designing the user interface,
Pearson, 2016. (Strategies for
effective HCI)

④ Similarities and differences between
Computer and smartphones.

★ Interaction b/w human and Computer

→ A human being interacts with a task
through computer.

→ The computer mediates the interaction ~~between~~
the human being and the task.

→ human are more capable of decision
making, but computers are very fast
in performing computations.

- ↳ The interaction between human and computer should be open ended.
- ↳ Ideally, the interface between human and computer should vanish.

④ Goal of HCI: To design effective interaction between humans and computers.

Developer + User

HCI = User Interface design + User Experience design
(UI) (UX)

HCI is influenced by:

- Comp. Arch., prog., graphics, multimedia
- Physiology, psychology, art and design
- Print Technology.

HCI involves:

- Studying User.
- Designing systems.

"Software has to be usable to be useful"

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Cognition: How much attention user provides
to the interface in the real world

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④ Dixie Finley - Ch - 1

↳ (Input - Output channels Devices)

↳ Eye gaze, Eye fixation, no. of eye fixations, duration of eye fixations.

⑤ Object - Action Interface Model. (OAI)

↳ Used for designing user interfaces. (UIs)

↳ Idea:

→ Visual constructs should be related to the domain of the task.

→ The UI should have the information that is very relevant.

→ Use real-world knowledge of the user and design the system that has a very similar construct known to the user.

→ The user should be able to grasp and learn to use the system very easily.

→ ~~THE~~ "Who you are designing for" is IMP.

⑥ Different Styles of Interaction

① Direct Manipulation

↳ Directly interacted with system
like mouse serviced with a smile

② Menu-Based Manipulations

→ Work is done based on choice of certain operations from menu.

③ Form - filling.

↳ Entries in form.

④ Use of Command language

↳ Using CLI.

3 Main Tasks in HCI:

① Data entry

② Information Display

③ Navigation across the screen

① Data Entry:

↳ Minimal key strokes (Make data entry simple and clear)

② Information Display

↳ Minimum cognitive load on user

③ Navigating the interface:

↳ User should get a fell fell that he/she is in control.

↳ The user should not feel being controlled by the system.

* Types of Menu:

- ↳ Order of items in menu are based on criticality, alphabetical order, frequency, etc.
- ↳ There are dropdown menu, pop up menu, vertical menu, horizontal menu, etc.

Widgets: Window Gadgets.

Qn Write different types of widgets.

- ↳ Clocks, weather, calendar, task list, email widget, messaging widgets, etc.
- ↳ Sliders, radio button, dialog box, combobox, list box, etc check-box, button, etc.

* FITT'S LAW

Movement time is a function of distance to the target and width of the target.

$$MT = a + b \log_2 \left(\frac{2D}{w} \right), \quad a, b \text{ are empirical}$$

Constants that service with smile determined for a particular device.

~~④~~ Index of difficulty (ID) = $\log_2 \left(\frac{2D}{w} \right)$

Measured in bids.

$$\text{Throughput} = \frac{ID}{MT} \rightarrow \text{bids/sec.}$$

$$MT = a + b \cdot ID$$

~~⑤~~ Similarities and differences between PC and smartphones.

⑥ Virtual Reality and Augmented Reality

Use of computer software.

to make interaction and simulate
much more better and a world.
hide the natural
environment of user.

do not hide the
environment of user.

→ Pokemon GO

→ Medieval

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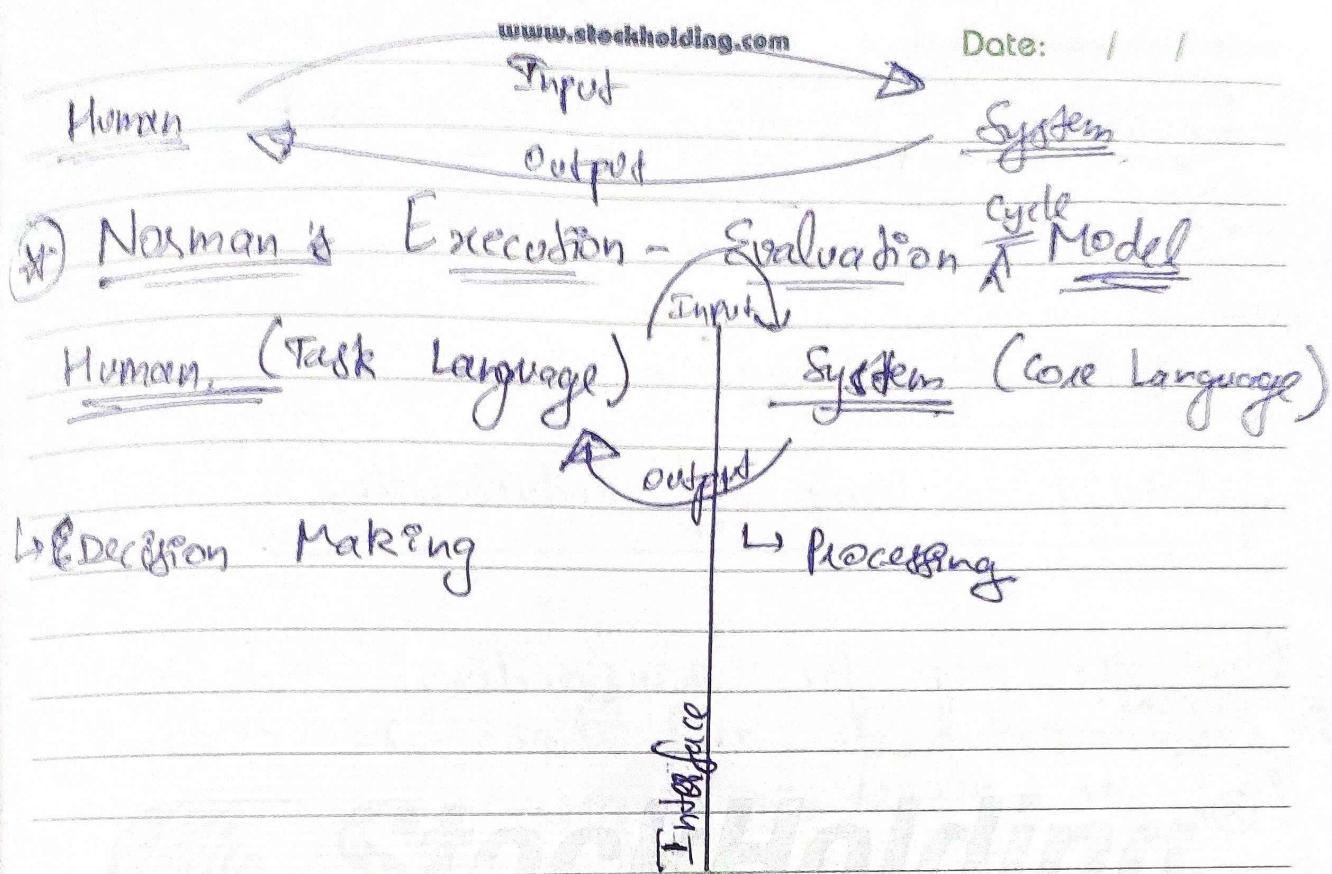
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* User Manuals

- ↳ Designing user manuals. (to learn how to use a technology)
- ↳ functionalities, well-labelled diagrams, do's and don'ts, precautions, too complicated sometimes.
- ↳ More time you take to comprehend the manual, ~~more~~ unfavorable it is.

* Input and Output Devices (condense from book)

- ↳ QWERTY Keyboard is the commonly used keyboard.
- ↳ Touch Screen is both input and output
- ↳ Types of Screens → Capacitive & Resistive
- ↳ Types of printers.
- ↳ Characteristics of Interface of input-output devices, so as to make them more usable.



④ Domain: → Area / tasks which you are working on

④ Task: → Aim / goal / operations to manipulate the concepts of domain.

④ Goal: → Desired output from the performed task.

④ Indention: → Specific action required to attain the goal.

④ Task - Analysis: → Involves identification of self-life with problem space for user in context of domain, task, goals & indention.

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⑩ Execution - Evaluation Cycle.

- ① → Gulf of execution
- ② → Gulf of evaluation

Gulf = Gap of understanding.

More the gap for understanding how to use
the system and how to evaluate
in, the worst the design.

⑪ Phases of Norman's Execution - Evaluation Model

- ① Establish Goal.
- ② Forming Intention
- ③ Specifying the action sequence.
- ④ Executing the action.
- ⑤ Perceiving the system state.
- ⑥ Indurcing with system state.
- ⑦ Evaluating the system state w.r.t. goals and intention.

⑫ 3 - Island Accident.

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ARYAN

SEHGLAL

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Name - ARYAN SEHGLAL

Roll No. - 2019UES2019

Q. Find out all that you can about the Natural Language Interfaces. Are there any successful systems? For what applications are they more appropriate?

Ans:

Natural-Language User Interface is a type of computer-human interface where linguistic phenomena such as verbs, phrases, and clauses act as UI controls for reading, selecting and notifying data in software application.

Natural language interfaces are sought after for their speed and ease of use but most suffer challenges to understanding wide varieties of ambiguous inputs.

Some applications, where natural language interfaces have been successful to some extent are:

i) Personal Virtual assistants like google assistant, cui, alexa, etc.

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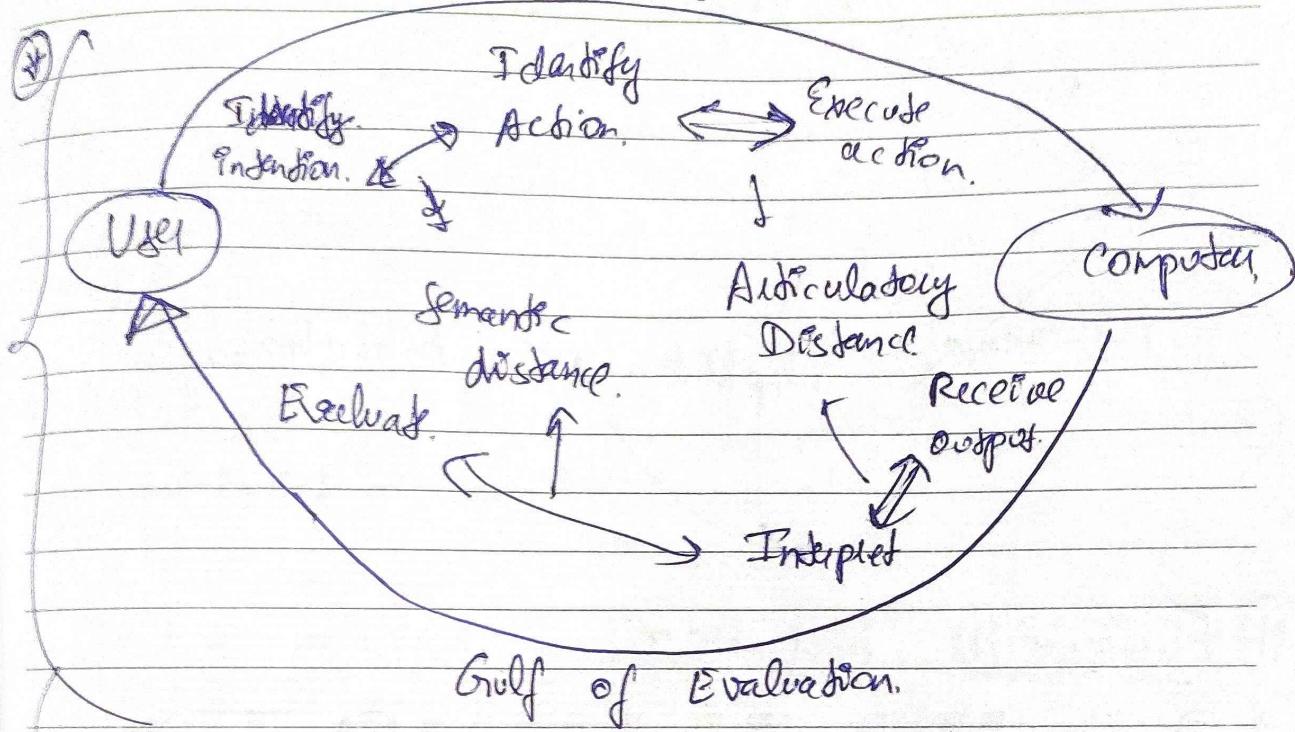
- ④
- 2) Wearables, because inputs are limited as far as wearables, speaking if natural possibility.
 - 3) Search Engines, also take natural language as input to query and search through the world wide web., etc.

• Natural language interfaces have an immense potential and will be suitable for many domain like, web-based services, physically challenged people, embedded applications, software development, etc.

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Gulf of Execution

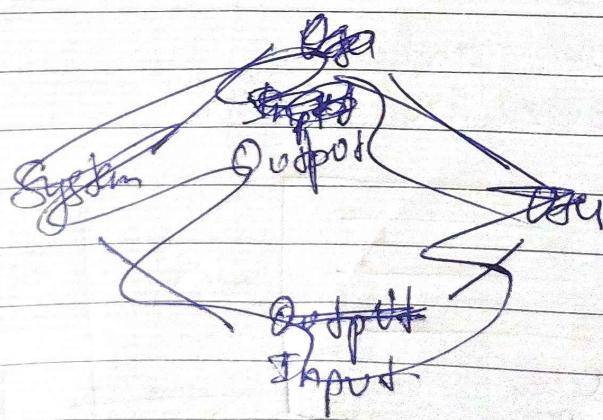
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{ Have a computer can make a user
Understand the output. }

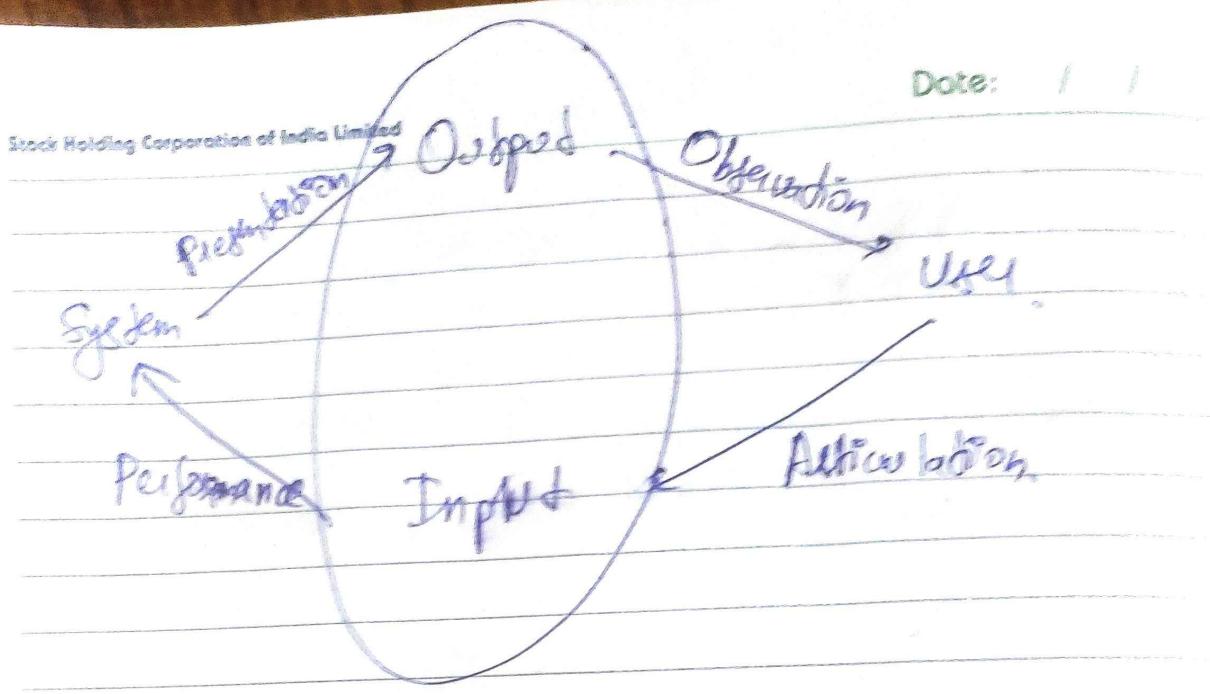
Interaction Framework

- ↳ System
- ↳ User
- ↳ Input
- ↳ Output



Components of Interaction framework.
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- ↳ Articulation, performance, presentation, Observation



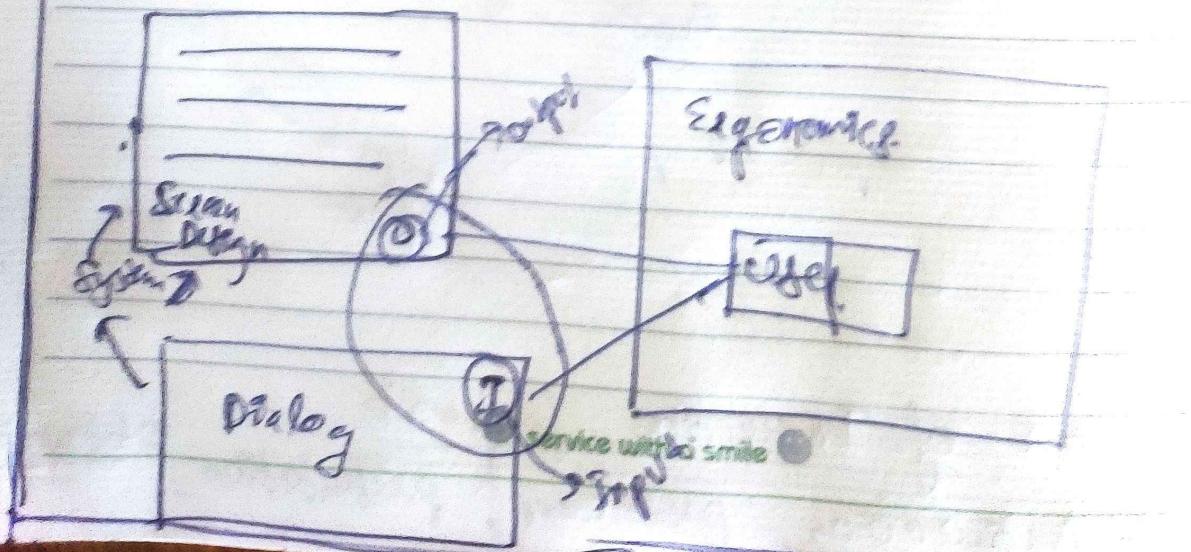
Framework and HCI

→ ACM SIGCHI

→ Ergonomics → Human aspects/factors of user interface.

Framework for HCI:

Social and organizational context



Ergonomics

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Ergonomics = Study of physical characteristics of the interactions, how the controls are designed, the physical environment in which the interaction takes place, layout and physical qualities of the screen.

① Arrangement of icons / visual constructs on screen can be on the basis of:

- ① Functional
- ② Sequential
- ③ Frequency.

② Physical Factors (for ergonomics)

↳ Where it will be used?

↳ How it will be used?

↳ Size / Age of user?

↳ User should be able to see critical things.
(elaborate)

Ergonomics contribution to HCI is a determining constraint in the way we design systems and suggests detailed guidelines and specific standards.

① # Interaction Styles

- ↳ GUI (Graphical User Interface) → (Visual constructs)
- ↳ CLI (Command Line Interface)
- ↳ Menus → Recognition is ~~easier~~ better than recall.
- ↳ Natural Language Interfaces
- ↳ Question - Answer → Form Filling (Query dialog box)
- ↳ Form - Filling. (Spread sheets)
- ↳ WIMP (Windows, Icons, Menus, Pointers)
 - ↳ It makes GUI interface.
 - ↳ Point and Click interfaces.
- ↳ 3D interfaces - (VR interfaces)
- ↳ Toolbar and Palette.

② # Paradigms of Interaction

→ Ch-4 of book

① Time sharing system :-

- Every user is assigned a time quota
- ↳ Preemptive
- ↳ Overhead of context switching
- ↳ Form the basis of interaction systems
- ↳ multi tasking

② Video Display Unit (VDUs):

- ↳ SAGE Project
- ↳ sketch pad.

③ Programming Toolkit:

④ Personal Computing:

↳ Alan Kay's Vision of Handheld PC.

⑤ The Metaphor

↳ Turtle in LOGO.

↳ Visual construct denoting some real world entity.

⑥ Direct Manipulation

↳ Rapid feedback.

↳ characteristics from LISP

① Visibility of objects of interest.

② Incremental action at the interface with a rapid feedback on all actions.

③ Reversibility of all actions.

④ Syntactic correctness of all actions.

⑤ Replacement of complex command with actions to manipulate directly, the sensible approach.

"What you see is what you get" Date: / /
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(WYSIWYG)

(In book) and
Qn Word processor is similar to break down the principle of WYSIWYG.
Ans However it is in alignment and not unaligned with the principles of direct manipulation.

Discuss the ways in which word processor is (or) is not a direct manipulation interface for editing a document using Shneiderman's criteria.

(Question from book)

↳ take each criteria and explain with example.

{ No direct cut as such, but question similar to not given in book will come in exam}

⑦ Paradigm of Interaction
Language v/s Action Paradigm

↳ Ex: Programming by example.

⑧ Hypertext (Paradigm)

↳ Another paradigm of interaction.

↳ "memon" → Nelson

↳ The use of ~~bullet~~^{service with a smile} linking & memo for more than just the storage

and retrieval of textual information. The term hyper media or multimedia is used to denote non-linear storage of all forms of electronic media

- ⑨ Multimodality (Paradigm):
- ↳ Multiple modes / senses of interaction with human being
 - ↳ Haptic senses are employed for multimodal interaction with system.

- ⑩ Computer Supported Cooperative Work (CSCW):
- ↳ Use of networking
 - Ex: Email.

[Psychology of HCI → CARD, MORGAN, Newell]

- ⑪ WWW (World Wide Web)
- ↳ Mesh of networks

- ⑫ Agent based interfaces
- ↳ Spell check
 - ↳ Automate the task / repeated task.
 - ↳ based on if-else rules

- ⑬ Ubiquitous Computing
- ↳ Now

- ⑭ Sensor based and content aware.

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