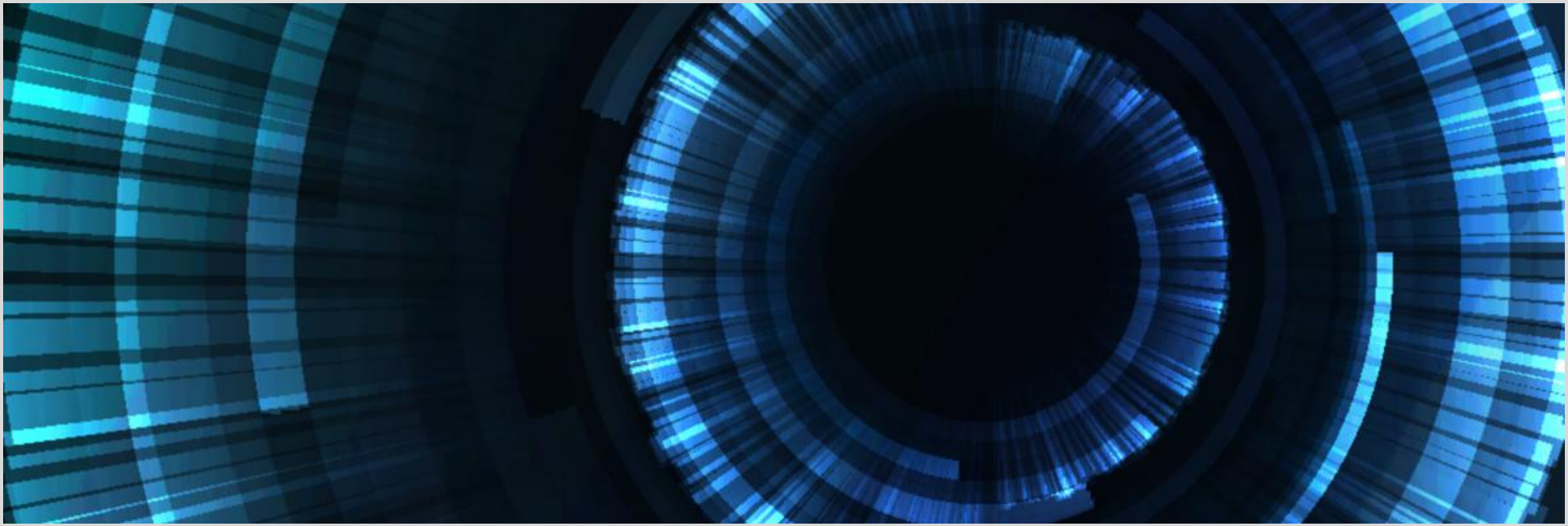
Human Computer Interaction



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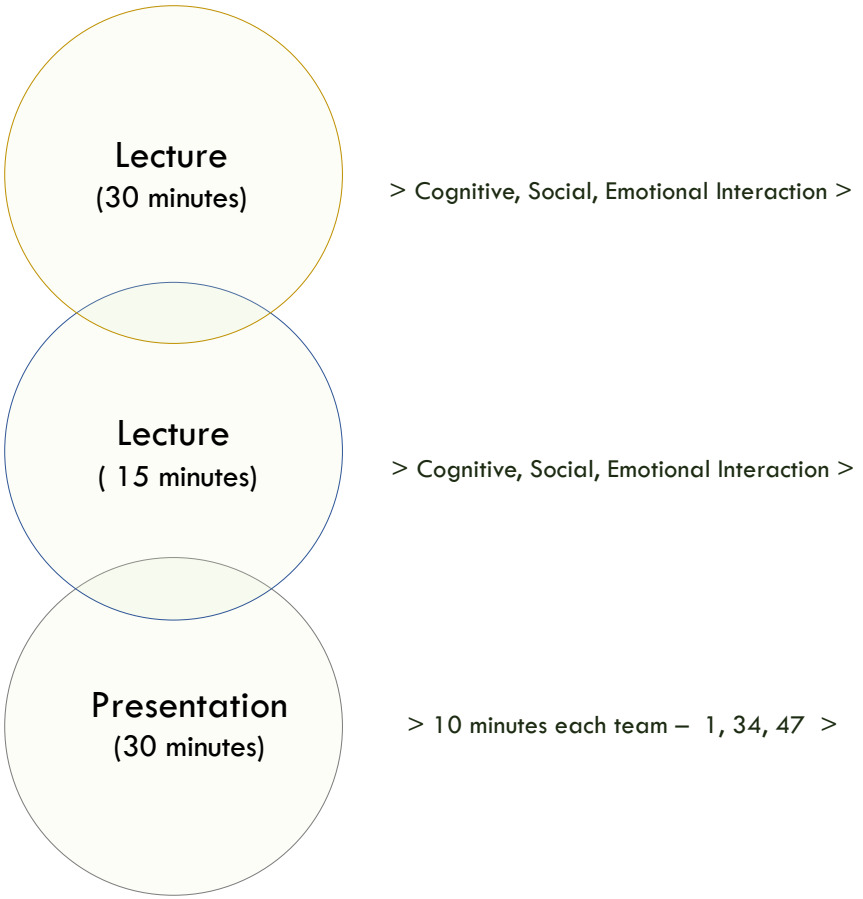
HUMAN CENTERED DESIGN

Agenda – 14 February



This week – 14 & 16 February

Monday 14 February

TEAMS - 1, 34, 47

Wednesday 16 February

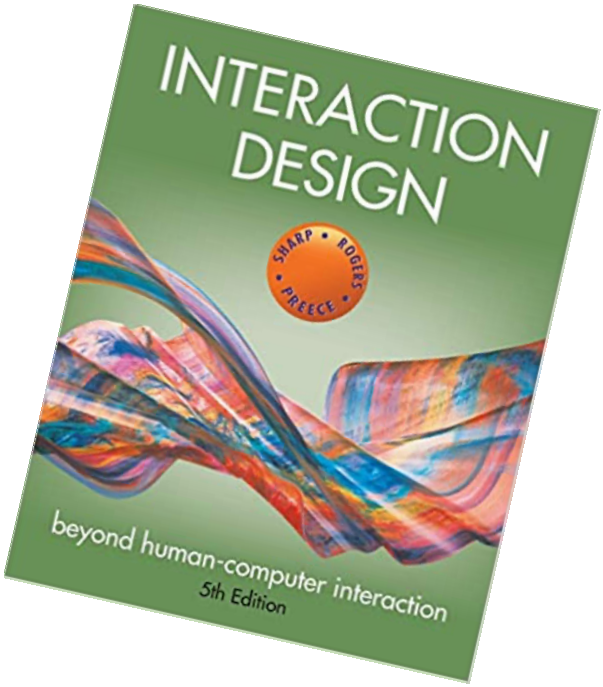
TEAMS - 11, 45, 54

Next week – Mid-Sem Exam

Wednesday 23 February 11:00-12:00pm

INTERACTION DESIGN:
Beyond Human-Computer Interaction.
2019. (5th Edition)

ALL CHAPTERS & LECTURE SLIDES
& TOPICS COVERED UPTO WEEK 7



Goals of this Week

- *Individual cognition*
  - *What is cognition*
- *Social interaction*
  - *Presence and conversation*
- *Emotional interaction*
  - *Expressing the interface*

Cognition

What is cognition?

Cognition is defined as 'the mental action or process of acquiring knowledge and understanding through thought, experience, and the senses.

It is in essence, the ability to perceive and react, process and understand, store and retrieve information, make decisions and produce appropriate responses.

Cognitive is the state of mind... Thinking, Remembering, Learning, Seeing, Reading, Writing, Listening, Deciding, Contemplating, Day-Dreaming, etc.

Experiential Cognition (Thinking quickly and reacting effortlessly). Eg. Taking an Autorikshaw after getting off from the Metro; Driving a car; Playing a video game; etc.

Reflective Cognition (Slow Thinking) Eg. Learning a programme; Thinking of concepts that lead to new ideas; etc.

What is cognition?

Cognitive aspects of interaction design.
The study of human cognition can help us:

1.Understand what humans are good and bad at, and it shows how this knowledge can inform the design of technologies that both extend human capabilities and compensate for human.

2. Understand the impact of multitasking on human behavior. It can also provide insights into other types of digital behaviors, such as decision-making, searching, and designing when using computer technologies by examining human abilities and limitations..

3. Relevant cognitive theories, have been applied in HCI to inform technology design. Other ways of conceptualizing human behavior will be with a focus on the social and emotional aspects of interaction which will be presented in the next class.

What is cognition?

DIFFERENT KINDS OF COGNITION

- Attention
- Perception
- Memory
- Learning
- Reading, speaking and listening
- Problem-solving, planning, reasoning and decision-making

It is important to note that many of these cognitive processes are interdependent: several may be involved for a given activity. It is rare for one to occur in isolation.

1. Attention

- Selecting things to concentrate on at a point in time from the mass of stimuli around us. It involves selecting things on which to concentrate, at a point in time, from the range of possibilities available, allowing us to focus on information that is relevant to what we are doing. The extent to which this process is easy or difficult depends on (1) whether someone has clear goals and (2) whether the information they need is salient in the environment.
- Allows us to focus on information that is relevant to what we are doing
- Involves audio and/or visual senses
- Focused and divided attention enables us to be selective in terms of the mass of competing stimuli but limits our ability to keep track of all events
- Information at the interface should be structured to capture users' attention, e.g. use perceptual boundaries (windows), colour, reverse video, sound and flashing lights

Activity:

- Find the price for a double room at the Quality Inn in Bedford

Pennsylvania
Bedford Motel/Hotel: Crinaline Courts
(814) 623-9511 S: $118 D: $120
Bedford Motel/Hotel: Holiday Inn
(814) 623-9006 S: $129 D: $136
Bedford Motel/Hotel: Midway
(814) 623-8107 S: $121 D: $126
Bedford Motel/Hotel: Penn Manor
(814) 623-8177 S: $119 D: $125
Bedford Motel/Hotel: Quality Inn
(814) 623-5189 S: $123 D: $128
Bedford Motel/Hotel: Terrace
(814) 623-5111 S: $122 D: $124
Bradley Motel/Hotel: De Soto
(814) 362-3567 S: $120 D: $124
Bradley Motel/Hotel: Holiday House
(814) 362-4511 S: $122 D: $125
Bradley Motel/Hotel: Holiday Inn
(814) 362-4501 S: $132 D: $140
Breezewood Motel/Hotel: Best Western Plaza
(814) 735-4352 S: $120 D: $127
Breezewood Motel/Hotel: Motel 70
(814) 735-4385 S: $116 D: $118

Activity:

- Find the price of a double room at the Holiday Inn in Columbia

South Carolina

City	Motel/Hotel	Area code	Phone	Rates Single	Rates Double
Charleston	Best Western	803	747-0961	$126	$130
Charleston	Days Inn	803	881-1000	$118	$124
Charleston	Holiday Inn N	803	744-1621	$136	$146
Charleston	Holiday Inn SW	803	556-7100	$133	$147
Charleston	Howard Johnsons	803	524-4148	$131	$136
Charleston	Ramada Inn	803	774-8281	$133	$140
Charleston	Sheraton Inn	803	744-2401	$134	$142
Columbia	Best Western	803	796-9400	$129	$134
Columbia	Carolina Inn	803	799-8200	$142	$148
Columbia	Days Inn	803	736-0000	$123	$127
Columbia	Holiday Inn NW	803	794-9440	$132	$139
Columbia	Howard Johnsons	803	772-7200	$125	$127
Columbia	Quality Inn	803	772-0270	$134	$141
Columbia	Ramada Inn	803	796-2700	$136	$144
Columbia	Vagabond Inn	803	796-6240	$127	$130

Activity:

- Tullis (1987) found that the two screens produced quite different results
  - 1st screen - took an average of 5.5 seconds to search
  - 2nd screen - took 3.2 seconds to search
- Why, since both displays have the same density of information (31%)?
- Spacing & Grouping
  - 1st screen - information is bunched up together, making it hard to search
  - 2nd screen - characters are grouped into vertical categories of information making it easier

Design implications

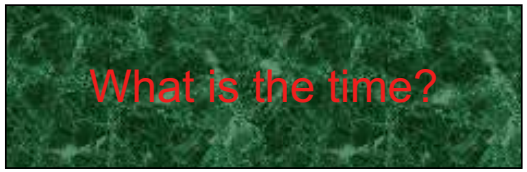
- Make information noticeable when it needs attending to
- Use techniques that make things stand out like colour, ordering, spacing, underlining, sequencing and animation
- Avoid cluttering the interface with too much information
- Search engines and forms that have simple and clean interfaces are easier to use

2. Perception

- How information is acquired from the world and transformed into experiences

- Obvious implication is to design representations that are readily perceivable, e.g.
  - Text should be legible
  - Icons should be easy to distinguish and read

Which is easiest to read?



What is the time?

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Design implications

- Icons should enable users to readily distinguish their meaning
- Bordering and spacing are effective visual ways of grouping information
- Sounds should be audible and distinguishable
  eg. success sound, invalid input
- Speech output should enable users to distinguish between spoken words
- Text should be legible and distinguishable from the background
- Tactile feedback should allow users to recognize and distinguish different meanings.
  – eg. track pad 'click'

3. Memory

- Involves first encoding and then retrieving knowledge
- We don't remember everything - involves filtering and processing what is attended to
- Context is important in affecting our memory (i.e. where, when)
- We recognize things much better than being able to recall things

Design implications

- Don't overload users' memories with complicated procedures for carrying out tasks
- Design interfaces that promote recognition rather than recall
- Provide users with various ways of encoding information to help them remember
  - e.g. categories, colour, flagging, time stamping

4. Learning

- How to **learn** to use a computer-based application

- Using a computer-based application to **understand** a given topic

- People find it hard to learn by following **instructions** in a manual
  - prefer to learn by doing
    eg. Tutorials in Adobe CC

Design implications

- Design interfaces that
  - encourage exploration
  - constrain and guide learners

- Dynamically linking concepts and representations can facilitate the learning of complex material

  – New learnings based on previous learnings

5. Reading, speaking, and listening

- The ease with which people can read, listen, or speak differs
  - Many prefer listening to reading
  - Reading can be quicker than speaking or listening
  - Listening requires less cognitive effort than reading or speaking
  - Dyslexics have difficulties understanding and recognizing written words

Applications

- Speech-recognition systems allow users to interact with them by asking questions
  - e.g. Google Voice, Siri, Alexa
- Speech-output systems use artificially generated speech
  - e.g. written-text-to-speech systems for the blind (screen readers)
- Natural-language systems enable users to type in questions and give text-based responses
  - e.g. Ask search engine, Chatbots

Design implications

- Speech-based menus and instructions should be short
- Accentuate the intonation of artificially generated speech voices
  - they are harder to understand than human voices
  - humanise the voice
- Provide opportunities for making text large on a screen eg. custom font size

6. Problem-solving, planning, reasoning and decision-making

- Involves reflective cognition
  - e.g. thinking about what to do, what the options are, and the consequences
- Often involves conscious processes, discussion with others (or oneself), and the use of artefacts
  - e.g. maps, books, pen and paper
- May involve working through different scenarios and deciding which is best option

Design implications

- Provide additional information/functions for users who wish to understand more about how to carry out an activity more effectively.
  eg. on-hover text, first run experience, etc.

- Use simple computational aids to support rapid decision-making and planning for users on the move
  eg. flight details like duration of flights; tax% calculation; savings during on-line shopping,etc

Summary - Cognition

- Cognition involves several processes including attention, memory, perception and learning
- The way an interface is designed can affect how well users can perceive, attend, learn and remember how to do their activities
- Can lead to thinking about how to design better products

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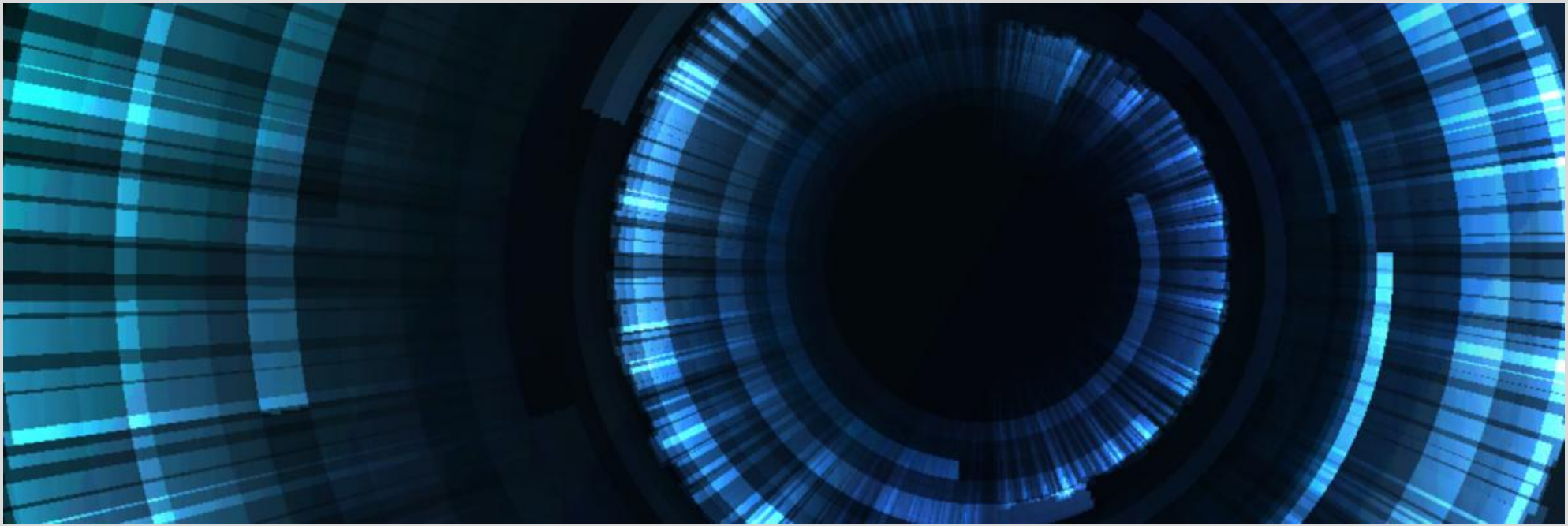

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