IIT ROORKEE

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NPTEL

NPTEL ONLINE CERTIFICATION COURSE

INTRODUCTION TO INTERACTION DESIGN

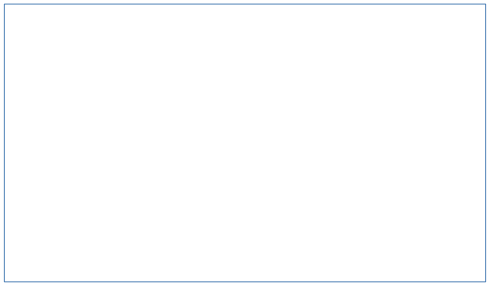
Lecture 07

Role of Cognition

Prof. Sonal Atreya

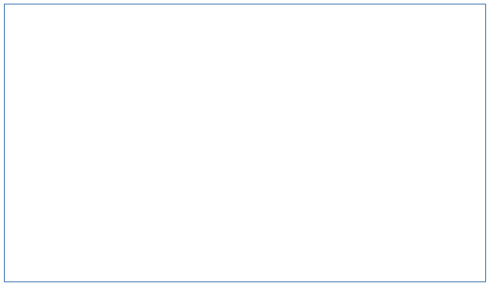
DEPARTMENT

Role of Cognition
In Interction Design



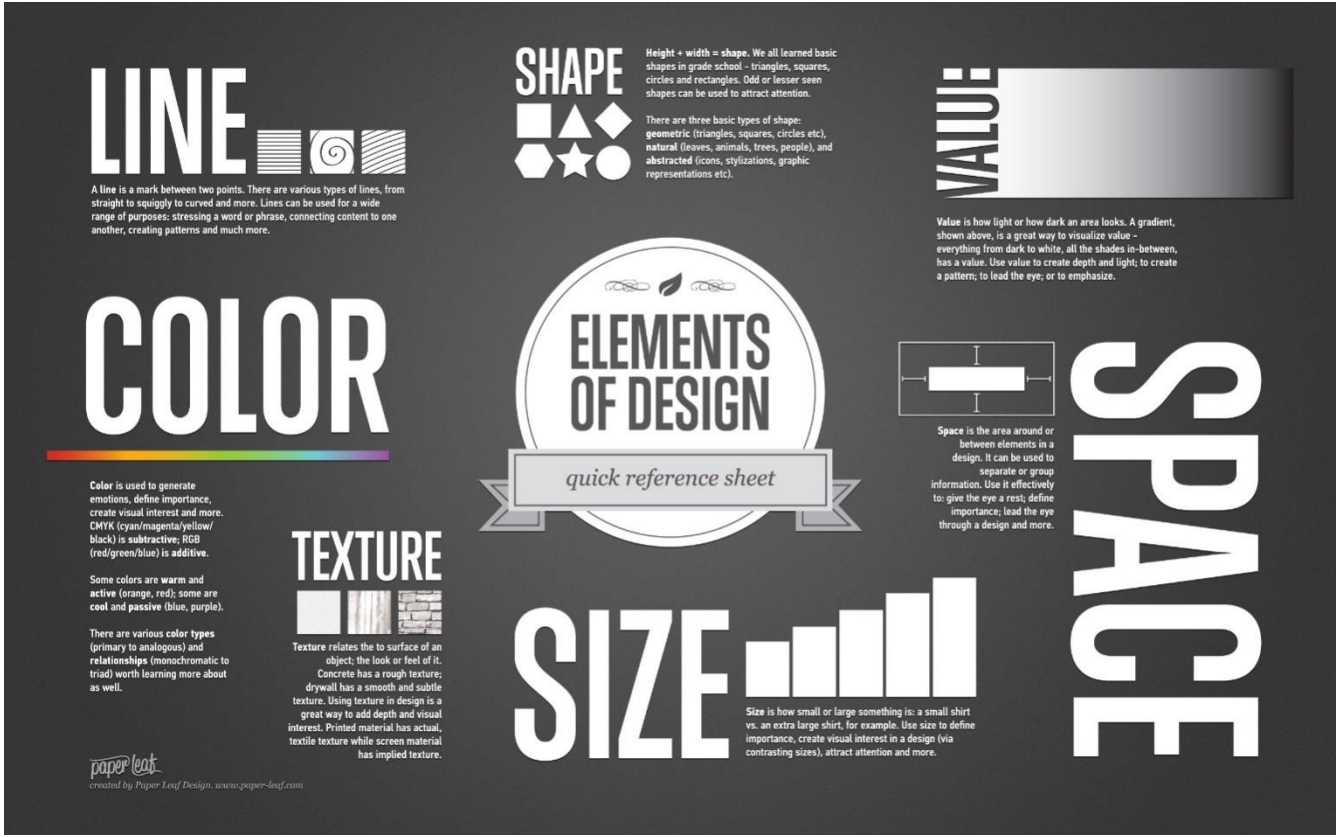
Cognition

Cognition refers to the mental processes and activities related to acquiring, processing, storing, and using information. It involves a range of higher mental functions such as perception, attention, memory, language, problem-solving, decision-making, and reasoning.



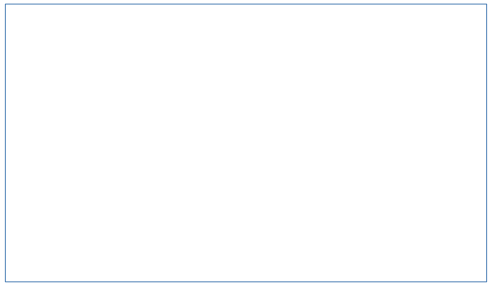
Source: mindsea.com

Source: Lesmor design

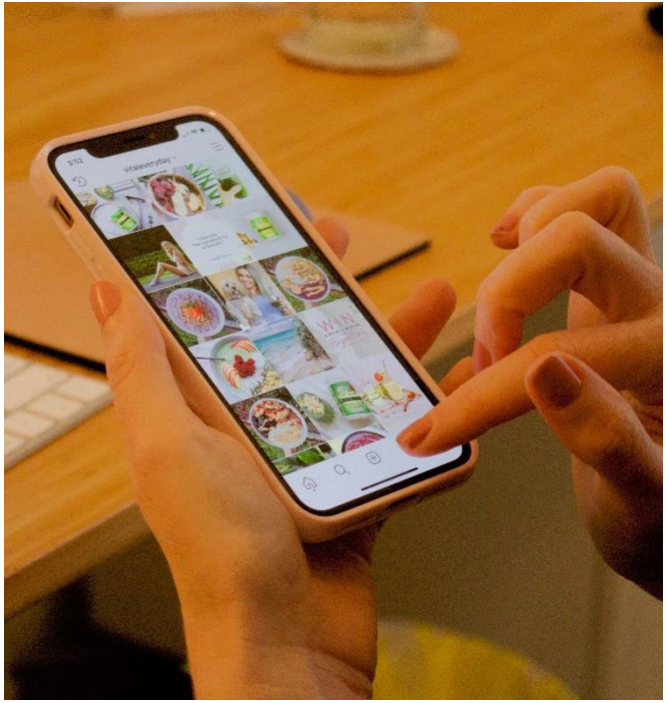


Source: Paper-leaf

Experiential cognition is a state of mind where people perceive, act, and react to events around them intuitively and effortlessly. It requires reaching a certain level of expertise and engagement. Examples include driving a car, reading a book, having a conversation, and watching a video.



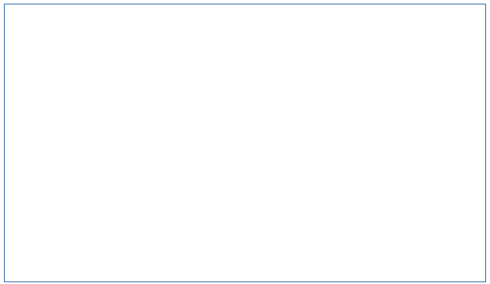
Examples of experiential cognition

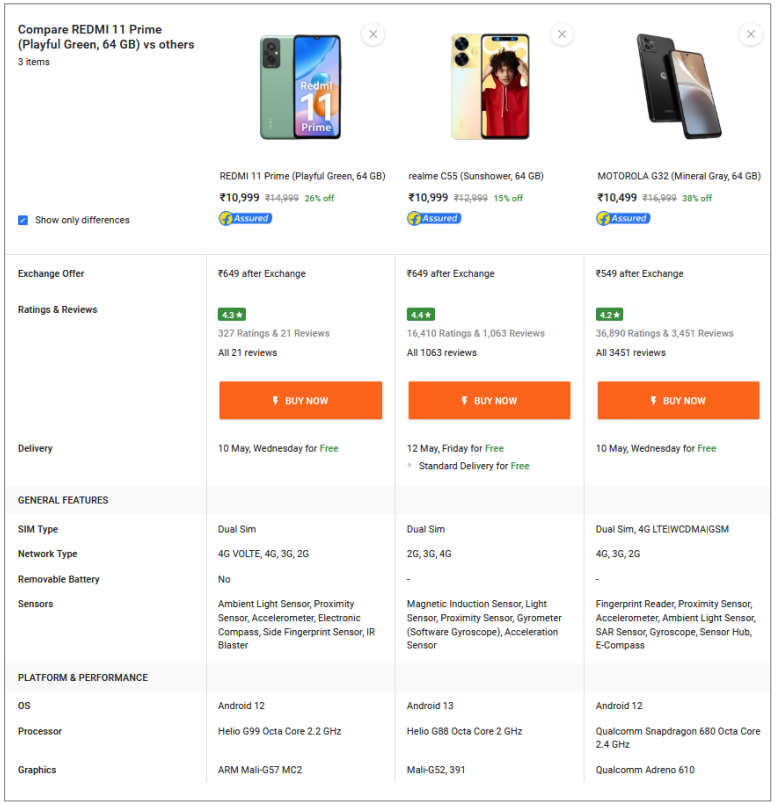


Scrolling through Social media

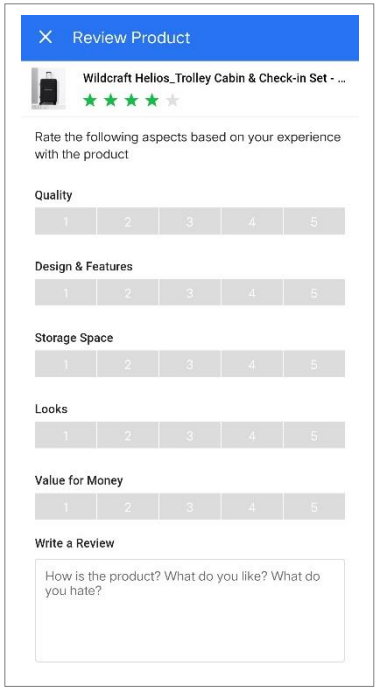
Driving a car

Reflective cognition involves mental effort, attention, judgment, and decision-making, which can lead to new ideas and creativity. Examples include designing, learning, and writing a report.





Comparing products



Writing reviews or feedback, or any other content

Examples of reflective cognition

Cognition has been described in terms of specific kinds of processes These include the following:

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

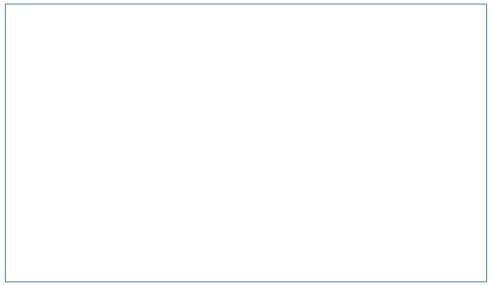
Attention

Attention is a cognitive process that refers to the ability to selectively concentrate on certain aspects of the environment while ignoring others. It is the mechanism that allows us to focus our mental resources on a specific task or stimulus, and it is essential for many cognitive functions, such as perception, memory, and learning.

Presentation of information

Bowling			
Dhruv Pandey	Aditya Chopra	Yuvraj Basoiya	Karan Sharma
O	O	O	O
5.0	5.0	5.0	5.0
M	M	M	M
0	0	0	0
R	R	R	R
36	40	36	36
W	W	W	W
0	2	0	0
Econ	Econ	Econ	Econ
7.20	8.00	7.20	7.20

Bowling	O	M	R	W	Econ
Dhruv Pandey	5.0	0	36	0	7.20
Aditya Chopra	5.0	0	40	2	8.00
Yuvraj Basoiya	5.0	0	43	1	8.60
Karan Sharma	5.0	0	51	0	10.20



Bowling	Dhruv Pandey	Aditya Chopra	Yuvraj Basoiya	Karan Sharma
O	5.0	5.0	5.0	5.0
M	0	0	0	0
R	36	40	36	36
W	0	2	0	0
Econ	7.20	8.00	7.20	7.20

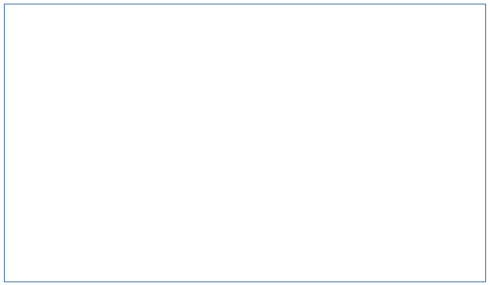
Bowling	O	M	R	W	Econ	
Dhruv Pandey	5.0	0	36	0	7.20	
Aditya Chopra	5.0	0	40	2	8.00	
Yuvraj Basoiya	5.0	0	43	1	8.60	
Karan Sharma	5.0	0	51	0	10.20	
Arnav Aggarwal	3.0	0	27	1	9.00	(2w)
Divyansh Vohra	2.0	0	16	0	8.00	

To do

- Color
- Underlining
- Sequence of information
- Spacing of items

To avoid

- Cluttering visual interfaces with too much information.



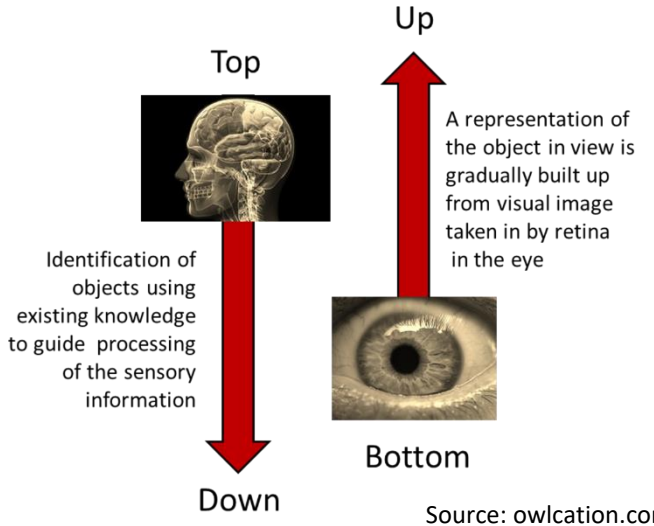
Perception

Perception is the process by which we interpret and organize sensory information from our environment. It involves taking in sensory input from the world around us through our senses (e.g., vision, hearing, touch, taste, smell), and then using this information to form a mental representation of the world.

Source: study.com

Perception

Perception is a complex and multi-stage process that involves both **bottom-up processing** (processing sensory information from the environment) and **top-down processing** (using prior knowledge and expectations to interpret and organize sensory information).



Source: owlcation.com

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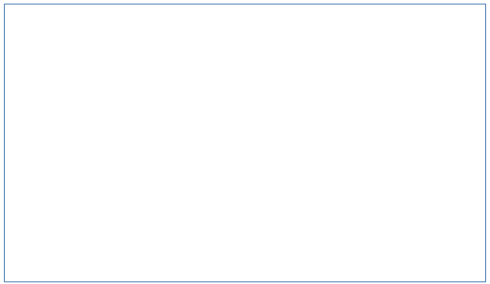

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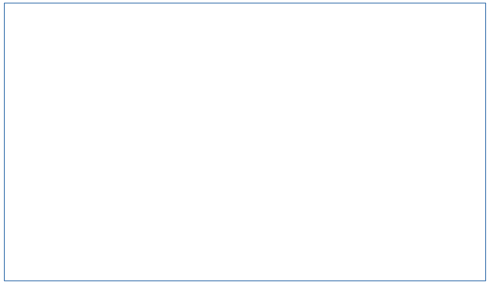
To do

- Distinguish icons and graphical representations
- Grouping information- separators and white space
- Color contrast techniques
- Distinguish audio sounds
- Distinguish haptic feedback

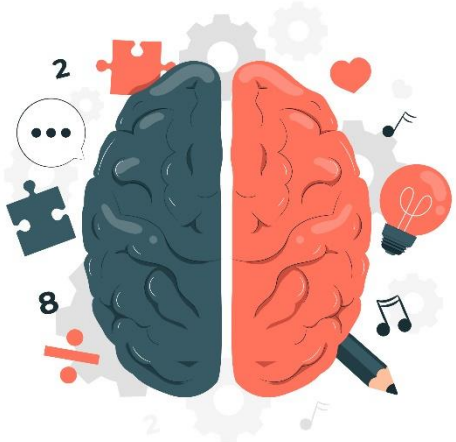


Memory

Memory is the ability to encode, store, and retrieve information over time.

For example, it allows them to recognize someone's face, remember someone's name, recall when they last met them, and know what they said to them last.

It is a critical cognitive process that underlies many aspects of human behaviour, including learning, decision-making, and problem-solving.



Source: Freepik

Memory

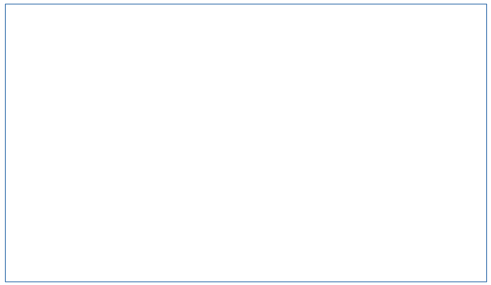
There are different types of memory, including

- Sensory memory
- Short-term memory
- Long-term memory

Sensory memory refers to the brief retention of sensory information (e.g., visual or auditory stimuli) that occurs immediately after a stimulus is presented.

Short-term memory, also known as working memory, is the temporary storage and manipulation of information needed for cognitive tasks, such as mental arithmetic or remembering a phone number.

Long-term memory refers to the storage of information over an extended period of time, ranging from minutes to years.



Personal Information Management

The number of documents written, images created, music files recorded, video clips downloaded, emails with attachments saved, URLs bookmarked, and so on, increases every day. A common practice is for people to store these files on a phone, on a computer, or in the cloud with a view to accessing them later. This is known as ***personal information management*** **(PIM).**

Memory Load and Passwords

Multifactor authentication (MFA) is a security mechanism that requires users to provide two or more different types of authentication factors to verify their identity when accessing a system or application. Authentication factors can be categorized into three types: something you know (e.g., a password or PIN), something you have (e.g., a security token or smart card), and something you are (e.g., biometric data such as fingerprint or facial recognition).

George Miller's (1956) seven plus or minus two theory

8, 12, 5, 9, 16, 24, 82, , 1, 15, 22, 45, 7

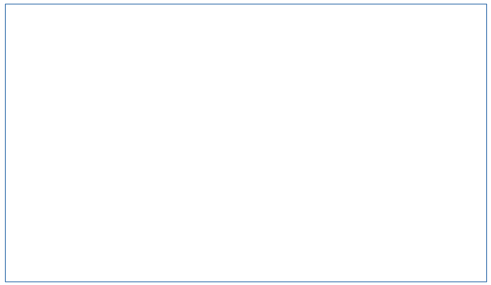
Cat, shoe, milk, hole fly, chocolate, butter, house, string, shirt, key

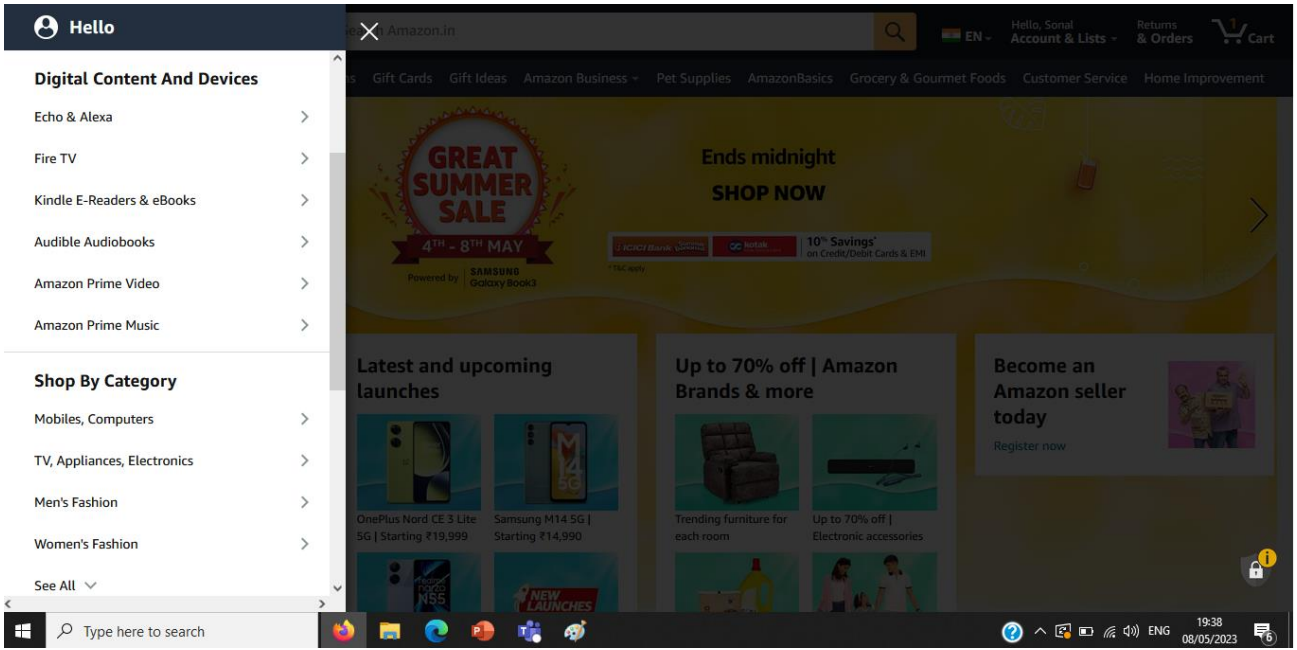
House cat, shoe string, chocolate milk, butter fly, key hole

House milk , cat shoe, butter key, chocolate shoe, fly hole

Perception of some designers:

- Only seven options on a menu
- Only seven icons on a menu bar
- Seven bullets in a list
- Seven tabs at the top of a website page
- Seven items on a pull-down menu

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See All
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Up to 70% off | Electronic accessories
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Digital Forgetting

- To-do lists
- Reminders

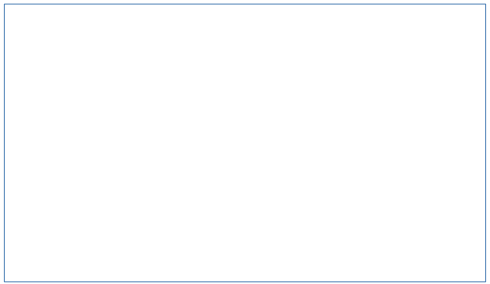
Source: https://cosmopalistan.wordpress.com/2015/12/01/good-morning-lucy/

Designing for memory loss

- Alzheimer's disease

To do

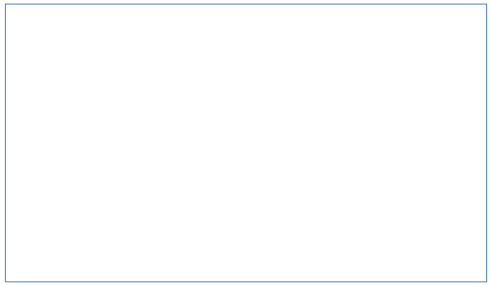
- Avoid long and complicated procedures for carrying out tasks
- Design interfaces that help recognition rather than recall - using familiar interaction patterns, menus, icons, and consistently placed objects
- Provide users with a variety of ways of labeling digital information (for example files, emails, and images) to help them easily identify it again through the use of folders, categories, color, tagging, time stamping, and icons.



Learning

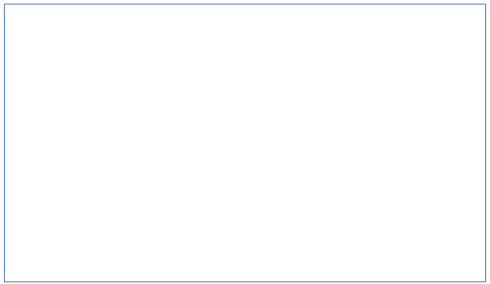
Learning is closely connected with memory. It is the process by which an individual acquires knowledge or skills through experience, study, or instruction. It is a fundamental aspect of human development and behaviour, and it plays a crucial role in shaping our understanding of the world around us.

- Incidental learning
- Intentional learning



To do

- Interfaces that encourage exploration
- Interfaces that constrain and guide users to select appropriate actions when initially learning

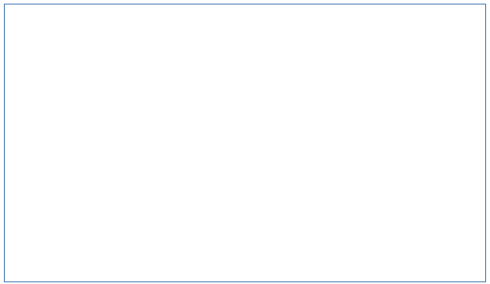


Reading, speaking, and listening

Reading, speaking, and listening are three forms of language processing that have some similar and some different properties. One similarity is that the meaning of sentences or phrases is the same regardless of the mode in which it is conveyed.

To do

- Short length of speech-based menus and instructions
- Clear audio in artificial speech voices
- Making text large on a screen



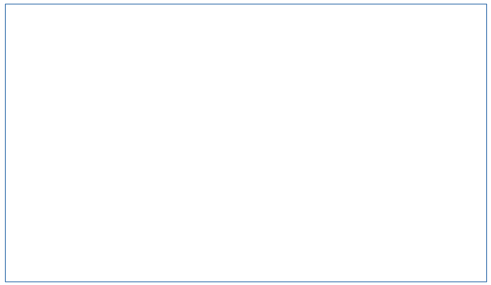
Problem-solving, planning, reasoning, and decision-making

These are processes involving reflective cognition.

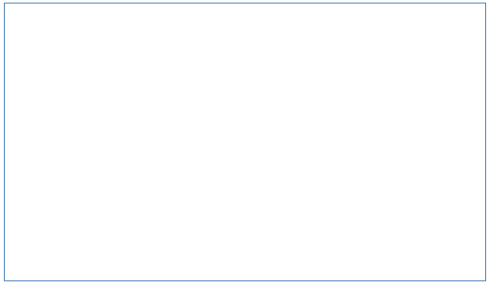
They include thinking about what to do,

What the available options are, and

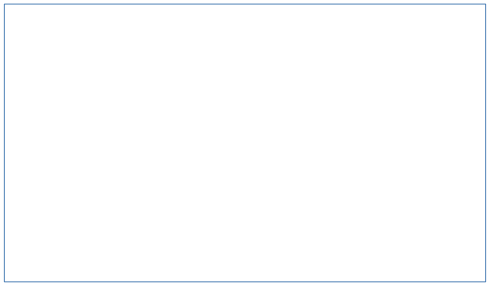
What the consequences might be of carrying out a given action.



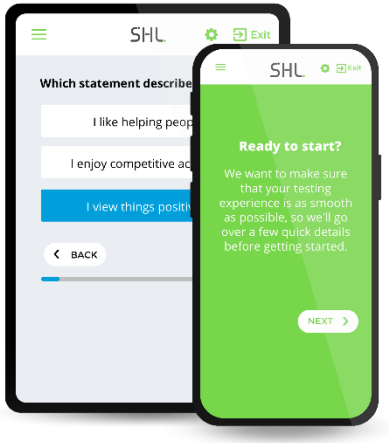
Problem-solving is the process of identifying, analyzing, and resolving problems or obstacles in order to achieve a specific goal. It involves using various cognitive strategies and approaches to break down complex problems into smaller, more manageable components and to identify potential solutions.



Planning is the process of developing a course of action to achieve a specific goal. It involves setting objectives, identifying resources, and determining the steps needed to reach a desired outcome.



Reasoning is the process of using logical and critical thinking to make sense of information and to draw conclusions based on evidence and facts. It involves analysing data, evaluating arguments, and making informed judgments.



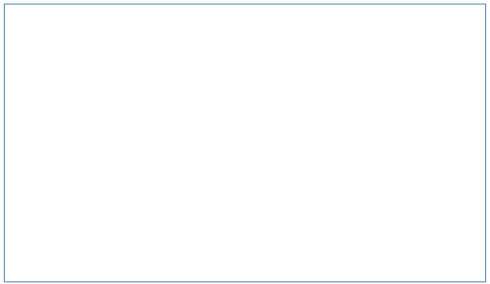
Source: Shl.com

Decision-making is the process of choosing a course of action from among several alternatives. It involves assessing the available options, considering the potential risks and benefits of each option, and making a choice based on the best available information.

Source: Sciencesoft

To do

- Information and help pages- for easy access for people who want to understand more about how to carry out an activity more effectively (for example, web searching).
- Simple and memorable functions for quick decision-making and planning.



Thank You