

# AN OVERVIEW OF COGNITIVE PSYCHOLOGY WITH REFERENCE TO HUMAN-COMPUTER INTERACTION DESIGN

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## **Abstract**

*This paper explores the design implications of cognitive psychology with respect to human-computer interaction that may additionally be mapped onto user interfaces. The foremost principles of current user interface pointers lie on attention, perception, memory, language, learning and higher reasoning. These six types of cognitive processes are interdependent and occur simultaneously. They play a vital role in experimental and philosophical modes of cognition. However, these strategies do not deal with the difficulties that may also arise due to the intrinsic shape of human intelligence and human limitations. An example of this would be the identification and design of Icons which would be displayed on the screen in order that a person can easily understand them and the sort of activity that must be initiated by connecting cognitive thoughts while experiencing or performing the assigned task. This enables the human-computer interaction to support the cognitive domain making the user interface an easier one.*

**Keywords:** *HCI –Human-Computer Interaction, Cognitive Psychology, Human Intelligence, Design Interaction, Reasoning*

## **Introduction to HCI**

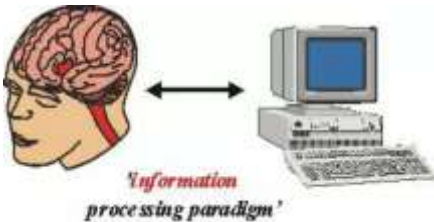
HCI (Human Computer Interaction) cognitive science of design. It is a junction between the psychology and technology, which provides support and understand the interaction of human being with and through technology. A well-designed user interactive design reduces the time of performing tasks. The three basic variables for task performance are speed, accuracy and quality. The main aim of HCI is to produce a software and hardware that are useful, usable and visually appealing. Design evaluation is an important factor which analyzes whether the design is feasible to all the users, which requires proper observation before implementation.

## **Cognitive Psychology: The Science of How We Think**

Cognitive psychology is branch of psychology, which involves the study of interior intellectual processes which carried inside your brain, including perception, thinking,

memory, attention, language, problem-solving, and learning. Here the mind as an information processor. Cognitive psychologists try to build up cognitive models of the information processing that goes on inside people's minds, including attention, perception, memory, language, learning and higher reasoning.

### Human as an Information Processor



Cognitive psychology sees the individual as a processor of information, in much the same way that a computer takes in information and follows a program to produce an output. The computer gave cognitive psychologists an image, to which they could relate human mental processing and how the human mind

handles information by using computer as a tool is known as the computer analogy. Each information fed into the computer as codes in which the computer stores, uses it, retrieves it to produce the output. This idea of processing the information was adopted as an approach to identify how human perception works.

For instance, the eye gets visual data and codes that into an electric neural action which is fed back to the mind where it is "stored" and "coded". This data is can be utilized by other parts of the brain based on the mental exercises, for example, retention, perception and attention. The output (i.e. behaviour) may be, for instance, to read what you can see on a printed page.

Subsequently the information processing approach portrays thinking as the situation giving input of data, which is then transmuted by our intelligences. The data can be stored, recovered and changed using "mental programs", with the outcomes being behavioural responses.

### Types of Cognitive Process with Respect to HCI

There are six types of cognitive processes play a vital role in realistic and thoughtful modes of cognition. They are attention, perception, memory, language, learning, and higher reasoning. The processes are interdependent and occur simultaneously. The description of each process along with a few related implications are as follows:

- **Attention:** It is a process of concentrating on an object selected. Object can either be concrete or abstract that resides out in the mind.
- **Perception:** The process of capturing information from the surroundings and processing it called Perception. It observes the object in and around the environment. Here the input perceived through sense organs (such as eyes, ears, nose, mouth, and fingers) and in turn transformed into objects or ideas.

- **Memory:** It is a process for storing, seeking and retrieving knowledge, which enables the user to recollect and identify objects, and to determine appropriate actions. Any new information comes in, it identifies what must be stored and ignored.
- **Language:** It is a processes for comprehending and communicating through linguistic by means of reading, writing, speaking, and listening. Though these language-media have much in common, they differ on numerous dimensions including: durability, skimming, cultural roles, use in practice, and cognitive effort requirements.
- **Learning:** It is a process of creating new knowledge and know the purpose of it. It involves in connecting new knowledge to the existing one. Interaction is important element in the process of learning.
- **Higher Reasoning:** The process which contains deep understanding such as problem-solving, planning, reasoning, decision-making. It's a conscious process that entails lot of discussion with self, others, books etc. The people who engage themselves in higher reasoning are always connected to higher reasoning capacity.

### **Suggestions to Improve the User Interaction Design**

Before creating the any user interface we have to keep the following things in mind:

1. Knowing, understanding and meeting the expectation of the users
2. Observation of user's responses during trail implementation
3. Creating user friendly design for ease of access
4. Avoid complexity of design
5. Make information visible, and appealing when user tries to attempt to it.
6. Avoid messing up too many information at one design.
7. Selection of relevant design which provides proper interface
8. Representation of any information or object must be easily recognizable by users.
9. Complexity in any form must be avoided
10. Too many graphics or unpleasant audio must be ignored.
11. Users memory should not be overloaded.

### **Conclusion**

As technology enters in our every part of our lives, we must be able to utilize them for the purpose with great cause of innovation. The field of HCI with respect to cognitive psychology is an effective tool to improve the quality of our lives by creating a better user interface design. Hence, the user interface designer must know the user's requirements and understand the individual differences in creating a user interface model. And they should also observe the user responses before finalizing the interaction design. Thus, cognitive psychology plays an important role in understanding the human mind in order to create a

usable, understandable user interface design to promote ease of access and meets individual differences.

## References

1. Beaudouin-Lafon, M. (2006). Human-computer interaction. *Interactive Computation: The New Paradigm*, 227–254. [https://doi.org/10.1007/3-540-34874-3\\_10](https://doi.org/10.1007/3-540-34874-3_10)
2. Carroll, J. M. (1997). Human-computer Interaction: Psychology as a Science of Design. *Annual Review of Psychology*, 48(February 1997), 61–83. <https://doi.org/10.1146/annurev.psych.48.1.61>
3. Carroll, J. M., & Campbell, R. L. (1989). Artifacts as psychological theories: The case of human-computer interaction. *Behaviour and Information Technology*, 8(4), 247–256. <https://doi.org/10.1080/01449298908914556>
4. Gieselmann, M., & Sassenberg, K. (2022). The More Competent, the Better? The Effects of Perceived Competencies on Disclosure Towards Conversational Artificial Intelligence. *Social Science Computer Review*, 1–22. <https://doi.org/10.1177/08944393221142787>
5. Görnemann, E., & Spiekermann, S. (2022). Emotional responses to human values in technology: The case of conversational agents. *Human-Computer Interaction*, 1–28. <https://doi.org/10.1080/07370024.2022.2136094>
6. Serim, B., Spapé, M., & Jacucci, G. (2023). Revisiting embodiment for brain–computer interfaces. *Human-Computer Interaction*, 1–27. <https://doi.org/10.1080/07370024.2023.2170801>