Information Processing Memory Model

Praneesh R V
CB.SC.U4CYS23036

The **Information Processing Memory Model** is a cognitive framework that explains how humans take in information from the environment, make sense of it, store it, and later retrieve it when needed. It grew out of the **cognitive revolution in psychology during the 1950s and 1960s**, when researchers began comparing the human mind to a **computer system**. Just as a computer receives input, processes it, stores data, and produces output, the human brain is seen as following similar steps in processing information.

This model emphasizes that memory is **not a single unit**, but a system made up of different stages and processes. Incoming information passes through **various stages of memory storage**, where it can either fade away if unattended or be encoded into long-term memory if processed effectively. Factors such as **attention, rehearsal, organization, and prior knowledge** influence whether information is retained or lost.

The information processing approach is especially influential in **education and learning sciences**, because it helps explain why some information is remembered easily while other details are forgotten quickly. It also highlights the importance of **active engagement and metacognitive strategies** (thinking about one's own thinking) in strengthening memory.

The Atkinson–Shiffrin Model: Three Key Stages

Proposed by **Richard Atkinson and Richard Shiffrin in 1968**, this model describes memory as a system with three main stages:

1. **Sensory Memory**
    - The first stage where raw sensory input (sights, sounds, smells, etc.) is registered.
    - Capacity: very large, but duration is extremely brief (milliseconds to 2 seconds).
    - Example: The fleeting image you see when someone waves a sparkler in the dark.
2. **Short-Term Memory (STM)**
    - Information that is attended to moves here.
    - Capacity: limited (often cited as 7 ± 2 items).
    - Duration: about 15–30 seconds without rehearsal.

- Example: Remembering a phone number long enough to dial it.

3. **Long-Term Memory (LTM)**
    - With encoding and rehearsal, information is stored more permanently.
    - Capacity: virtually unlimited.
    - Duration: potentially lifelong.
    - Example: Remembering how to ride a bike or your first day of school.

Flow: Sensory Input → Sensory Memory → Attention → Short-Term Memory → Encoding → Long-Term Memory (retrieval brings it back to STM).

Four Stages of Information Processing Theory

The **information processing theory** (rooted in cognitive psychology and computer analogy models) emphasizes how learners handle incoming information. It outlines **four stages**:

1. **Encoding**
    - The process of receiving and transforming sensory input into a meaningful form.
    - Involves paying attention, organizing information, and linking it to prior knowledge.
2. **Storage**
    - Maintaining information over time.
    - Information may remain in STM briefly or be transferred to LTM for more permanent storage.
3. **Retrieval**
    - Accessing stored information when needed.
    - Can be recognition (identifying something familiar) or recall (actively bringing information to mind).
4. **Transformation**
    - Awareness and regulation of one's own thinking processes.
    - Involves planning, monitoring, and evaluating how information is processed and remembered.