

Lecture 3: Part 2: Information Processing Theory (Atkinson and Schiffrin Model, Gagné's Model)

I/Atkinson and Schiffrin Model

Atkinson and Schiffrin proposed a model for human memory in 1968. This model indicated that the human memory is composed of two different memory stores: short term memory or working memory (STM) and long term memory (LTM). They, later, added another type which is sensory memory, as sub division of short term memory.

1- Sensory Memory

Information enters our information processing system through our senses that are linked to channels. This is closely tied to the sensational properties our body is backed with .i.e. Humans receive information from the external world through senses: hearing, sight, tasting, touching. This information reception process happens in a very short period of time (proportions of seconds)

Each sense of ours is related to a memory. The sensory memory for vision is called **iconic** memory (0.5_1.0 seconds) while that of audition (hearing) is called **echoic** memory (4_5 seconds).

2- Short Term Memory (Working Memory)

After receiving information through senses, these information move to the working memory where they are either rehearsed and stored for later use or discarded and forgotten. The duration her is from 18 to 20 seconds (Peterson and Peterson 1959). In case the information has not been actively rehearsed (no attention), it is discarded.

3- Long Term Memory

If you are attentive about the information you have just received, than it will travel to another information storage tool called Long term memory. The latter is a permanent store where processed information can be stored for longer periods of time if not for ever. Here, the terms storage and retrieval are useful.

II/ Gagné's Instructional Design Model

- To better explain how humans learn and recall information, Gagné developed a model named the **Instructional Design Model** which included *nine events of instruction*. This model is closely associated with the information processing model theorized by Atkinson and Schiffrin earlier in this course.
- Serving as a systematic framework for designing instruction, Gagné's instructional design model facilitates understanding the internal cognitive processes such as attention, perception, and memory encoding that are essential for learning.

The Nine Events of Instruction

During the teaching process, teachers tend to take some actions in order to elicit certain learners' internal mental processes. Those external actions are referred to as the Nine Events of Instruction. Those actions, again are meant to elicit the information processing system in humans i.e. learners. Those events are explained in what follows:

- 1- **Gain Attention:** corresponding cognitive or internal process is **reception**
- 2- **Inform Learners of the Objective: expectancy**
- 3- **Stimulate Recall of Prior Learning: retrieval**
- 4- **Present the content (stimulus): selective Perception**
- 5- **Provide learning guidance: semantic encoding**
- 6- **Elicit Performance (practice): responding**
- 7- Provide Feedback: reinforcement
- 8- **Assess Performance: Retrieval**
- 9- **Enhance retention and transfer: Generalization**

Instruction and Cognitive Flow

The crucial insight of Gagné's model is that **effective instruction manages the flow of information through the learner's cognitive system.**

- **Preparation (Events 1-3):** These events prepare the learner's mind (sensory register and working memory) to successfully receive and process the new information.
- **Acquisition/Performance (Events 4-7):** These events directly manage the presentation, encoding, practice, and reinforcement of the information, optimizing the transfer from working memory to long-term memory.

- **Generalization/Application (Events 8-9):** These events ensure the learned information is retrievable and can be applied to new, real-world situations, which is the final stage of long-term memory retention and effective learning.