

Cognitivism

About cognitivism

One of the first criticisms of [behaviorist learning approach](#) came from [gestalt psychologists](#) during the first decades of the 20th century and was related to behaviorist dependencies exclusively on overt behavior. It was the [gestalt](#) views on learning that influenced [new approaches](#) extending beyond behaviorism and setting the **basic principles** of what is today known as [cognitive learning theories](#). In the 1960s behaviorism was as a dominant [learning paradigm](#) slowly replaced by cognitivism.

[Cognitive](#) approach to learning, unlike behavioral,

- sees learning as the **active** acquisition of new knowledge and developing adequate **mental** constructions,
- sets the **learner** as the **locus of control** and not just as a passive participant in the process of learning,
- attempts to open the “black box” of his mind and **explain** complex **cognitive processes** and architecture,
- addresses learning with regard to **insight, information processing, memory, perception,**
- emphasizes the role of **prior knowledge** and experiences for learning outcomes, and
- sees learner as an **organized information processor**.

Human memory

If human cognitive architecture is to be analyzed, then the role and properties of human memory system should also be accounted for. **Memory** is often defined as “*an organism's ability to store, retain, and recall information and experiences*”¹⁾. Since it has a crucial role in acquisition and retention of knowledge, it was the subject of many researches and an essential part of many cognitivist learning theories.

- [A Brief History of Human Memory Systems Research](#)
- [Human Working Memory](#)

Learning theories:

- [Gestalt Psychology](#) - Max Wertheimer (1880 – 1943)
- [Assimilation Theory](#) - David Ausubel (1918 - 2008)
- [Social Cognitive Learning Theory](#) - Albert Bandura (1925 -)
- [Conditions of Learning](#) - Robert Gagné (1916 - 2002)
- [Schema Theory](#) - Richard Anderson (1934 -)
- [Script Theory](#) - Roger Schank
- [Dual Coding Theory](#) - Allan Pavio (1925 -)
- [Cognitive Load Theory \(CLT\)](#) - John Sweller
- [Cognitive Theory of Multimedia Learning \(CTML\)](#) - Richard Mayer

Instructional design theories and learning models:

- Cone of Experience - Edgar Dale (1900 – 1985)
- Elaboration Theory - Charles Reigeluth
- Concept Mapping - Joseph Novak
- Component Display Theory - Dave Merrill
- Structural Learning Theory - Joseph Scandura
- Principles and effects of CLT and CTML - (various researchers)

Criticisms

Since the beginning of its intensive development during the 1960s various critics of cognitivism have emerged, challenging its assumption that **mental functions can be compared to an information processing model**. Some authors like John Searle or Roger Penrose claim that computation, due to its inherent limitations, can never achieve the complexity and possibilities of human mental functions and therefore cannot be successfully used to describe them. Common examples for this are:

- **Gödel's incompleteness theorems** which claim that *“within any given branch of mathematics, there would always be some propositions that couldn't be proven either true or false using the rules and axioms... of that mathematical branch itself. You might be able to prove every conceivable statement about numbers within a system by going outside the system in order to come up with new rules and axioms, but by doing so you'll only create a larger system with its own unprovable statements.”*²⁾ Oversimplified, this means computers will never be capable of human-like cognition since they are limited to a limited set of axioms. The information-processing model should therefore have a limited application in case of humans. Kurt Gödel proved his two theorems of incompleteness in 1931.
- **Turing's halting problem** which claims that given a description of a program, it is impossible to decide whether the program finishes running or continues to run forever for any given program input. This theorem proven by [Alan Turing](#) in 1936 shows how some things are naturally non-computable.

During the 1970s **humanism** evolved as an opposing view to both behaviorism and cognitivism beginning with the **holistic approach**, belief in the power of an individual and view **learning as a way of fulfilling his potentials**.

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