

Concept Mapping

General

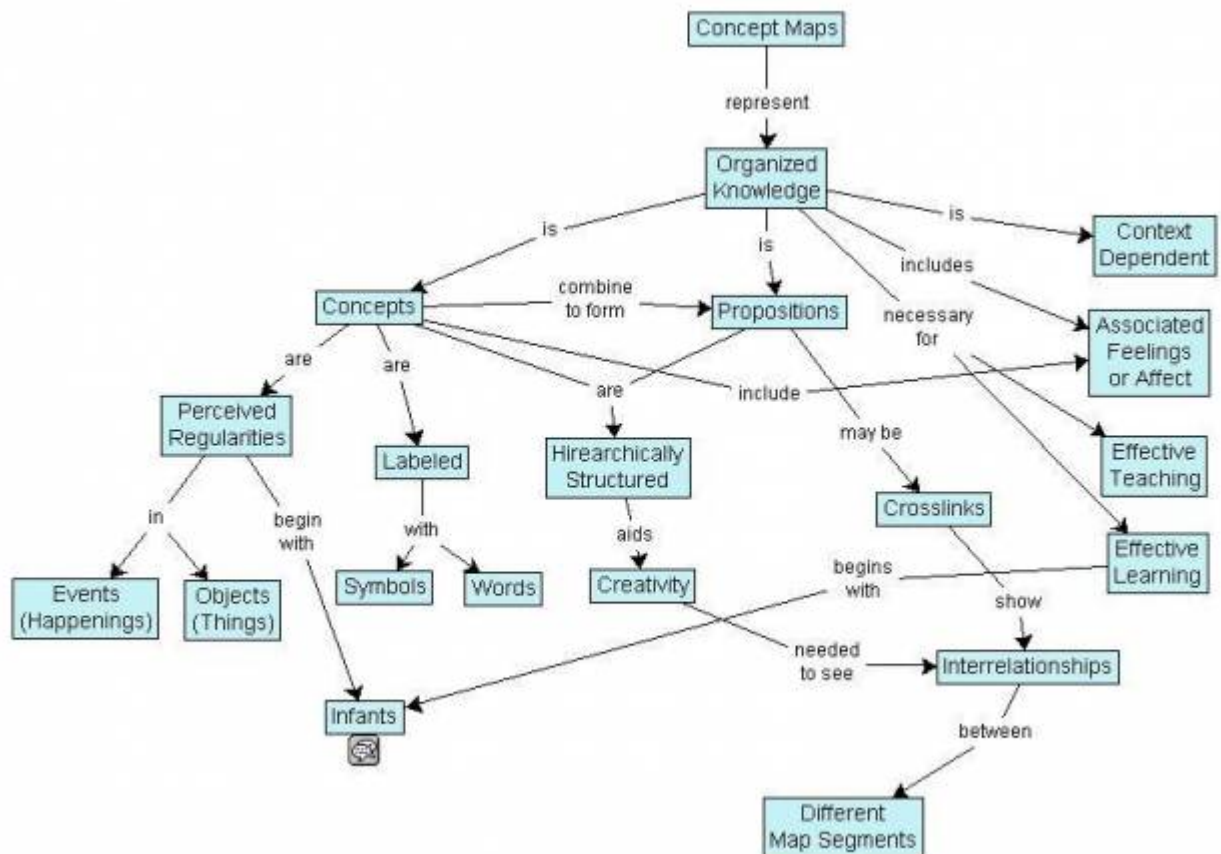
Concept mapping is a [cognitivist learning model](#) developed by [Joseph Novak](#) and his colleagues in 1972 as they worked on understanding how children's knowledge of science changes¹⁾. First concept maps were, however, proposed by some other authors as well²⁾, but concept maps in their fullest form were introduced by Novak in 1981³⁾. In Novak's words, concept map is “a **visual representation of the relationships between concepts** held by an individual, materials of a lecture, textbook, or laboratory exercise. By concept mapping even old and familiar material, we often recognize new relationships and meaning.”⁴⁾ Novak's works were influenced by [David Ausubel's assimilation theory](#).

What is concept mapping?

Concept mapping presents the process of building concept maps. In order to successfully build concept maps, their terminology needs to be clarified. Novak defines **concepts** as **patterns or regularities** in objects (*things*) or events (*happenings*).⁵⁾

For example, the *concept* “dog” is formed by a set of common characteristics of dogs. “Chihuahua”, a specific kind of dog, would here be an *object*. Every person has a different “dog” concept since the set of common characteristics forming it may vary from person to person and generally depends on experience, context and perspective. Still, these concepts are usually similar enough to enable people to successfully communicate and think in terms of concepts and change them over time.

On the visual level, a concept map is a hierarchical (general to specific) diagram containing nodes and links, both labeled with words or symbols. Novak describes the concept map building process in following steps⁶⁾:



- **Identify key concepts of the material** and list them or write them on pieces of paper to make them movable.
- **Rank the concepts** by placing most general ones at the top of the map with respect to the context of the matherial.
- **Add other more specific concepts** under the more inclusive ones.
- **Connect concepts by labeled lines.** Labels should add meaning by defining relationships between connected concepts.
- If desired, **specific examples of concepts can also be added** below concept labels
- If desired, change or reorganize the map in accordance with the newly noted relations between the concepts. Concept maps for the same topic can be organized in more possible ways.

Concepts maps were first meant to be used in science education. Today they are used in other areas as well, as they can help both teachers and students.

Concepts maps can help a teacher to **identify and organize concepts** he is about **to teach** and * gain **insight to what the students already know** or how they view the topic from concept maps drawn by the students, so he knows what should be taught next. A teacher can also use them to⁷⁾:

- teach terms, facts, and concepts of given topic,
- organize information into meaningful categories and relate those categories on a more general level,
- synthesize and integrate learned information thereby strengthening long-term retention,
- develop creativity and higher-level thinking skills, strategies, and habit.

To students concept maps give the ability to **organize** and **asses** their own knowledge. Learning here is manifested by **adding new concepts to the existing framework** of the concept map. This

process is, according to Novak⁸⁾, often accompanied by positive feelings.

A step-by-step example on how to introduce and work on concept maps with students in classes can be found in [Michael Zeilik's article on concept mapping](#).

Another important property of concept maps is that learning through adding new concept to them is inherently **meaningful learning**, since it establishes clear connections with the existing knowledge. **Rote learning** on the other hand is the result of **lack of established connections** to prior knowledge and forgetting of the learned information in 4-6 weeks⁹⁾.

Concept maps were earlier drawn by hand, but today a number of computer applications like the free [IHMC CmapTools](#) can be used to enhance this process.

Criticisms

Concept mapping is a very well accepted and widely used method, but it:

- was designed mostly to represent declarative and not procedural knowledge or algorithms,
- is a rather difficult and sometimes time-consuming cognitive task which requires training.

Keywords and most important names

- **Concept mapping, concept maps, concept, object, meaningful learning**
- [Joseph Novak](#)

Bibliography

[Novak, J. D. Introduction to concept mapping.](#)

[Novak, Joseph D. & Cañas, Alberto J. The Origin and Development of Concept Maps.](#)

[Zeilik, M. Classroom Assessment Techniques: Concept Mapping.](#)

Read more

[Novak, Joseph Donald, & Gowin, D. B. Learning how to learn. Cambridge University Press, 1984.](#)

¹⁾

[Novak, J. D., & Musonda, D. A Twelve-Year Longitudinal Study of Science Concept Learning. American Educational Research Journal, 28\(1\), 117-153. 1991.](#)

²⁾

[Stewart, J., Van Kirk, J., & Rowell, R. Concept maps: A tool for use in biology teaching. American Biology Teacher, 41\(3\), 171-175. 1979.](#)

³⁾

[Novak, J. Applying learning psychology and philosophy to biology teaching. The American Biology Teacher, 43\(1\), 12 - 20. 1981.](#)

4) 5) 6) 8) 9)
, , , ,

Novak, J. D. Introduction to concept mapping.

7)

Zeilik, M. Classroom Assessment Techniques: Concept Mapping.

From:
<https://learning-theories.org/> - **Learning Theories**

Permanent link:
https://learning-theories.org/doku.php?id=instructional_design:concept_mapping&rev=1299668790

Last update: **2023/06/19 15:49**

