



## CONCEPT MAP AND MIND MAP - CONSTRUCTION, USES AND DIFFERENCES

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### Abstract

*In this paper, author avers that concept mapping is the constructive way of learning. She focuses on the psychological foundation, meaning, and way of construction of concept map and difference between concept map and mind map*

**Key words:** *Constructivism, meaningful learning, mind mapping, concept learning*



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### Introduction

In traditional methods of teaching – learning in our secondary schools, teacher is the provider of knowledge and students are required to memorise this knowledge generally in the form of laws, formulae or theory and reproduce the same in examinations. These methods are based on the objectivist view of knowledge and ignore the inquisitiveness of learners and their ability to construct new knowledge. According the **National Curriculum Framework (NCF 2005)** learner constructs knowledge while engaged in the process of learning through well-chosen tasks and questions “Active engagement involves enquiry, exploration, concept mapping and debates etc.

Traditional methods of teaching and learning are based on objectivist view of knowledge. Objectivism is based on the assumption that knowledge is **objective, universal and complete** and it can be imparted by those who have it, to those who do not have it. Constructivism on the other hand is based on the assumption that knowledge is **subjective, contextual and inherently partial**. Objectivism thus presents knowledge as authoritarian and certain, whereas constructivism focuses on the resilience of the learner’s beliefs and the social construction reality.

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Constructivism as general philosophy has a long history Howkins, Dewey, Montessori, Piaget and Vygotsky are constructivist at root. These theories however failed to support significant reform in education because these could not translate constructivist perspectives into educational practice. In 1980s and 1990s researchers like Driver, Novak, Poster and Van Glaser Feld conducted number of experiments on classroom constructivism. Empirical data from these research studies revealed that active involvement helps in construction of knowledge. Constructivist paradigm is a new culture calls for a change in the classroom culture, attitudes, beliefs and practices. Role of teacher in this paradigm shift from transmitter of knowledge to **investigator** and **explorer** of knowledge. Role of student changes from **knowledge acquisition** to knowledge construction. In constructivist classrooms, Concept mapping has evolved as a one of the most useful strategies for leading students towards **meaningful learning**.

**Objectives:** To understand,

1. What is concept mapping?
2. Psychological foundation of concept mapping.
3. Difference between mind mapping and concept mapping.
4. Components, notations and types of concept mapping.
5. How does concept mapping facilitate meaningful learning?
6. Steps involved in concept mapping.
7. Rules to frame concept map
8. Uses of concept mapping.

### **What Is Concept Mapping?**

Concept map is visual and spatial device for representing the conceptual structure of broader concept, subject or discipline in two dimensional forms which is analogous to cognitive map, organiser or road map. The concept mapping technique was developed by Prof. Joseph D. Novak at Cornell University in the 1960s. This work was based on the theories of David Ausubel, who stressed the importance of prior knowledge in being able to learn about new concepts. Novak concluded that "Meaningful learning involves the assimilation of new concepts and propositions into existing cognitive structures".

**According to Jonassen, Biessner and Yacci in 1993** Concept maps are spatial representation of concepts and their interrelationships that are intended to represent the knowledge structures that humans store in their minds.

**According to Novak in 1980** Concept maps are diagrammatic representations which show meaningful relationship between concepts in the form of propositions.

Concept maps provide a unique graphical view of how students **organise, connect, and synthesize** information. In concept map concepts are arranged hierarchically, the most general **superordinate** concept is placed at the top of the map and the lower **subordinate** concepts are subsumed and less inclusive than higher one. This map is a new interpretation of old ideas and some degree of creative thinking. Concept mapping is strategy for helping students learn about the structure of knowledge and the process of knowledge production. Concept maps use three types of knowledge **facts, concepts and generalisation.**

### **Psychological foundation Concept Mapping**

As given in Hand book of NCERT (2006) the use of concept maps as a teaching strategy was first developed by J.D. Novak of Cornell University in early 1980s. It was derived from Ausubel's learning theory which places central emphasis on the influence of student's prior knowledge on subsequent meaningful learning. According to Ausubel when meaningful learning occurs, it produces a series of changes in our entire cognitive structure, modifying existing concepts and forming new linkage between concepts. Taking ideas from Ausubel's theory that cognitive structure is organised hierarchically and that most new learning occurs through derivative or correlative subsumption of new concept meaning under existing concept/propositional ideas, Novak developed the idea of hierarchical representation of concept called cognitive map or concept map (1979,1980,1981).Novak and Symington (1982), found that concept maps were not only a useful tool to represent changes in the knowledge structure of students over time, but also helped them to **learn how to learn.** Concept mapping has become an important tool to help students to learn meaningfully and to help teachers become more effective teachers. Concept maps are useful in helping students to recognise and modify knowledge structures (Novak and Gowin, 1989).

### **Similarities and Difference between mind mapping and concept mapping**

Concept mapping and mind mapping are powerful graphic organizers, strategies for organizing and representing knowledge.

#### **Similarities between Mind maps and Concept maps**

- Organise and represent knowledge
- One page method
- Context dependent

- Hierarchically structured
- Improve comprehension
- Improve memorisation
- Possible use of colours

### **Differences between Mind map and Concept map**

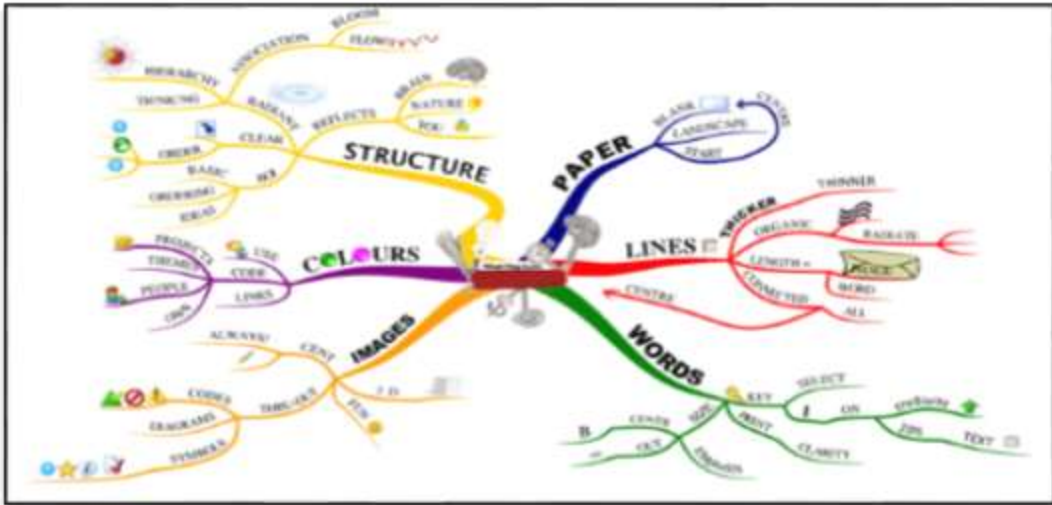
#### **Concept Map: Technique developed by Joseph D. Nvak**

- Key concepts are enclosed in boxes or oval
- Linking lines are labelled
- Node – Link – Node this triad form propositions
- Most general concepts are at the top of the map
- Connect multiple ideas
- Made up of geometric shapes and straight lines
- Expand downward from the top
- Limited use of icons and visual metaphor
- More logical than creative
- Can use for all morphologies

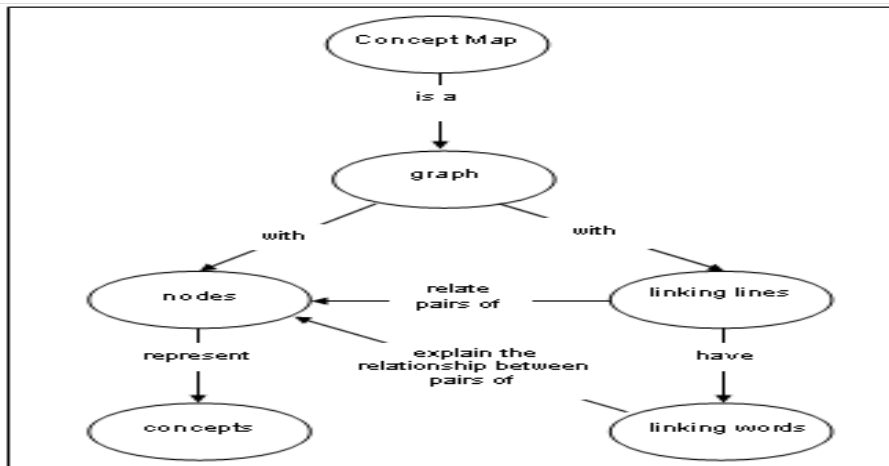
#### **Mind Map**

- Key concepts are written on branches
- Linking lines are not labelled
- Most general concepts are at the middle
- Only one central idea
- Use of wavy lines and pictures
- Build outward from the centre
- Extensive use of icons and visual metaphors
- Balance between logic and creativity
- Use for only line morphologies

### Mind map



### Concept map

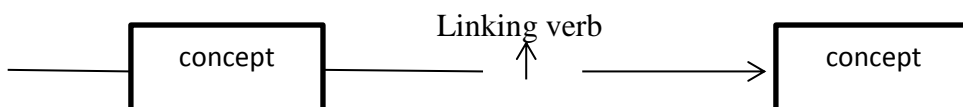


#### Components of Concept Map

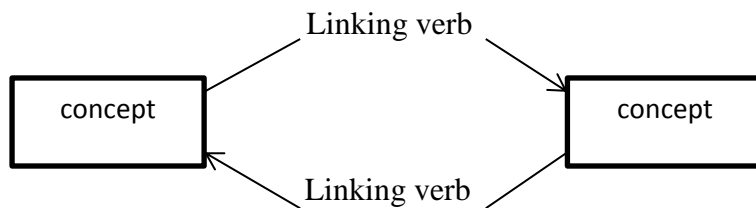
- **Nodes/ Boxes:** represent concept
- **Lines/ Links:** represent relationship between concepts
- **Labels:** linking words or phrases signify the relationships between two linked concepts.
- **Propositions:** meaningful statements with two or more linked concepts.

#### Notations of concept map

##### 1. Unidirectional Relationship



## 2. Bidirectional Relationship



### Rules to frame concept maps: Suggested by Handbook of NCERT

- Each concept must occupy one node.
- Each node must be connected to at least one another node, via a directional line.
- Each directional line must be labelled, such that one can read a complete declarative sentence by starting at a node, following the line and ending at another node.
- Each node should occupy level- those appearing at the top map should represent the most general concept

**Conclusion:** In teaching learning process concept map and mind map are the strategies of teaching and learning & evaluation. From primary to higher level teacher can use these strategies. These are constructive ways to organise content in systematic form and make the learning meaningful.

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