



Knowledge Representation for High Quality Learning

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Future-Based Learning

- Future-based learning aims at bringing education ‘out of the box’ based on predictions of future trends and requirements in the labor market and society.
- Future-based learning involves a **holistic**, integrated approach to education.
- It is a bridge between the current state of our schools and what they may become in the future.

Knowledge Representation Tools

- The common aim of graphical knowledge representation techniques in Education is to promote a *deep approach* to Learning.
- There is empirical evidence that the use of graphical knowledge representation tools **enhances learning** and **improves knowledge** – when people are able to represent a complex set of relationships as a diagram, they are more likely to understand and remember them.

Knowledge Representation Tools

- The principle of *dual coding* underlies the functioning of most graphical knowledge representation tools – in a mind maps, for instance, information is coded in visual as well as propositional form.
- Although the objectives of all graphical knowledge representation techniques are similar, there are differences in their conception and use.

Knowledge Representation Tools

- *Mind mapping* allows people to imagine and explore associations between concepts or ideas.
- *Concept mapping* allows people to understand the relationships between concepts and hence understand these concepts.
- *Argument mapping* allows people to represent inferential connections between propositions and to evaluate them in terms of validity of argument structure.

Knowledge Representation Tools

- The main components of mind maps are images and topics, those of concept maps are concepts and relations, while argument maps summarize inferences between whole propositions.

What is a Mind Map?

- The human brain does not work as a computer but in a natural, organic way.
- Mind maps are a *visual mental tool* reflecting the natural organization of the brain. They allow one to think *laterally* (bi-dimensional thinking) instead of thinking linearly (one-dimensional thinking).
- They can be applied to all the functions of the brain, in particular to *Memory, Creation* and *Learning*.
- They were introduced by Tony Buzan in the 1970s.

Five Steps To Mind Mapping

- *Create a central idea*
- *Add branches*
- *Add Keywords*
- *Color code the branches*
- *Include Images*

Why Do Mind Maps Work?

- *Mind maps support **meaningful learning***
- *Mind maps **build on existing knowledge***
- *Mind maps **make new information more usable***
- *Mind maps **augment the brain's ability to understand and process information***
- *Mind maps promote **active engagement***

What is a concept map?

- Concept maps are a graphical tool for organizing and representing knowledge.
- They include unique **concepts**, usually enclosed in circles or boxes. Lines and linking words between concepts suggest **hierarchical** relationships.
- They were originally designed **to assist people** in visualizing the way they organized and structured their thoughts.
- They allow one to **form meaningful propositions** about the map's theme and are very much used in quantitative social research.

Five Steps to Concept Mapping

- *The **brainstorming** Step* : Write down the major terms or concepts you know about a given topic on a piece of paper. Then, write each concept or term on a post-it.
- *The **organizing** Step* : Sort through the post-its, putting terms you do not understand aside. Also put aside those that are not related to any other term or concept. The post-its left over are the ones that will be used to construct the concept map.

Five Steps to Concept Mapping

- *The **layout** Step* : Stick the post-it's on a piece of paper so that related terms are close to each other. Try to group them so as to emphasize **hierarchies**. Identify terms that represent **higher categories**, write them on post-it, then add them. Feel free to rearrange thing at any time during this phase. The most important concepts or terms should be at the center or at the top.

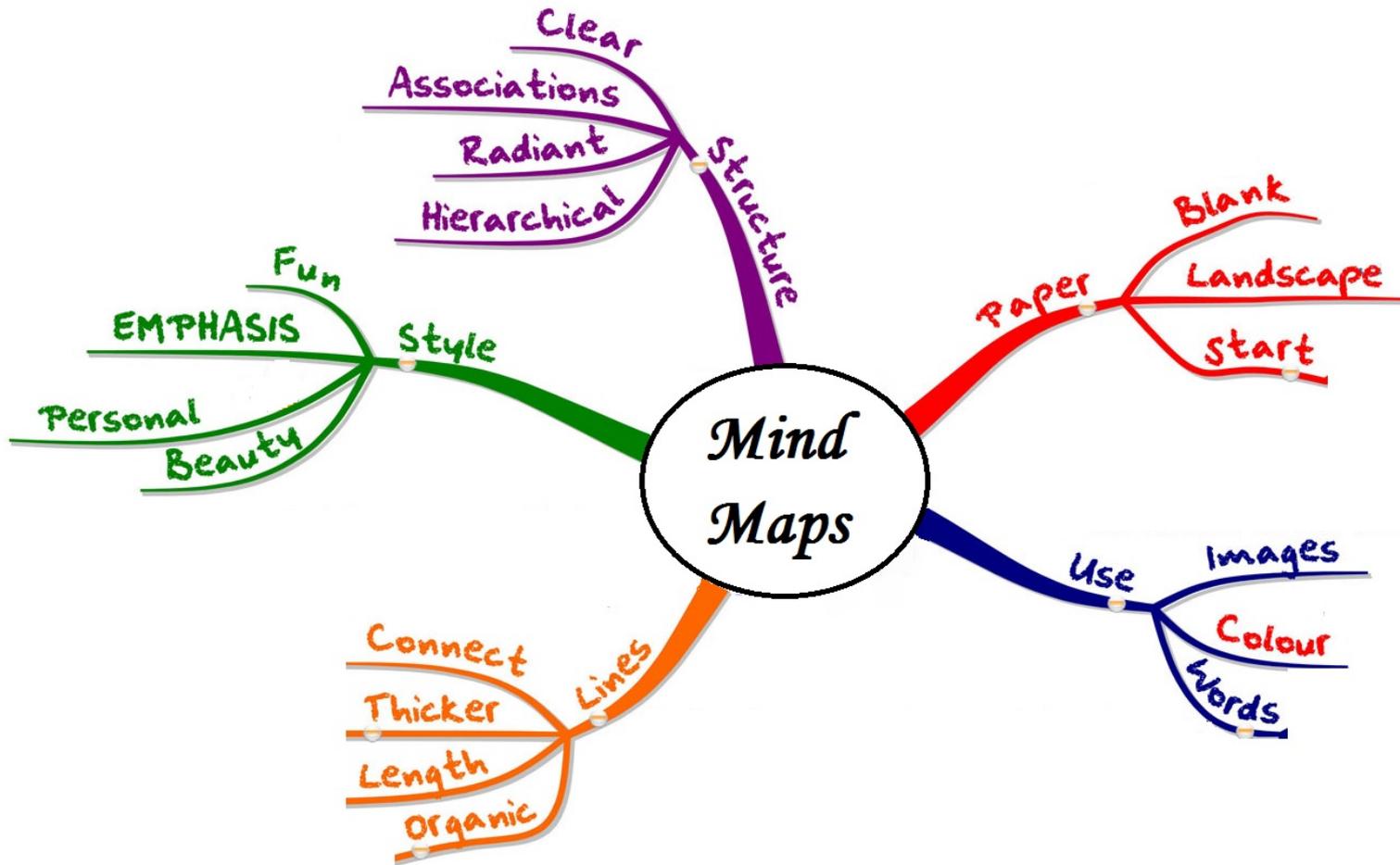
Five Steps to Concept Mapping

- *The **linking** Step* : Draw lines with arrows between the terms you think are related. Then, write on each line a word or a short sentence describing the relationships between the terms or concepts. Many arrows can originate or terminate on particularly important concepts.

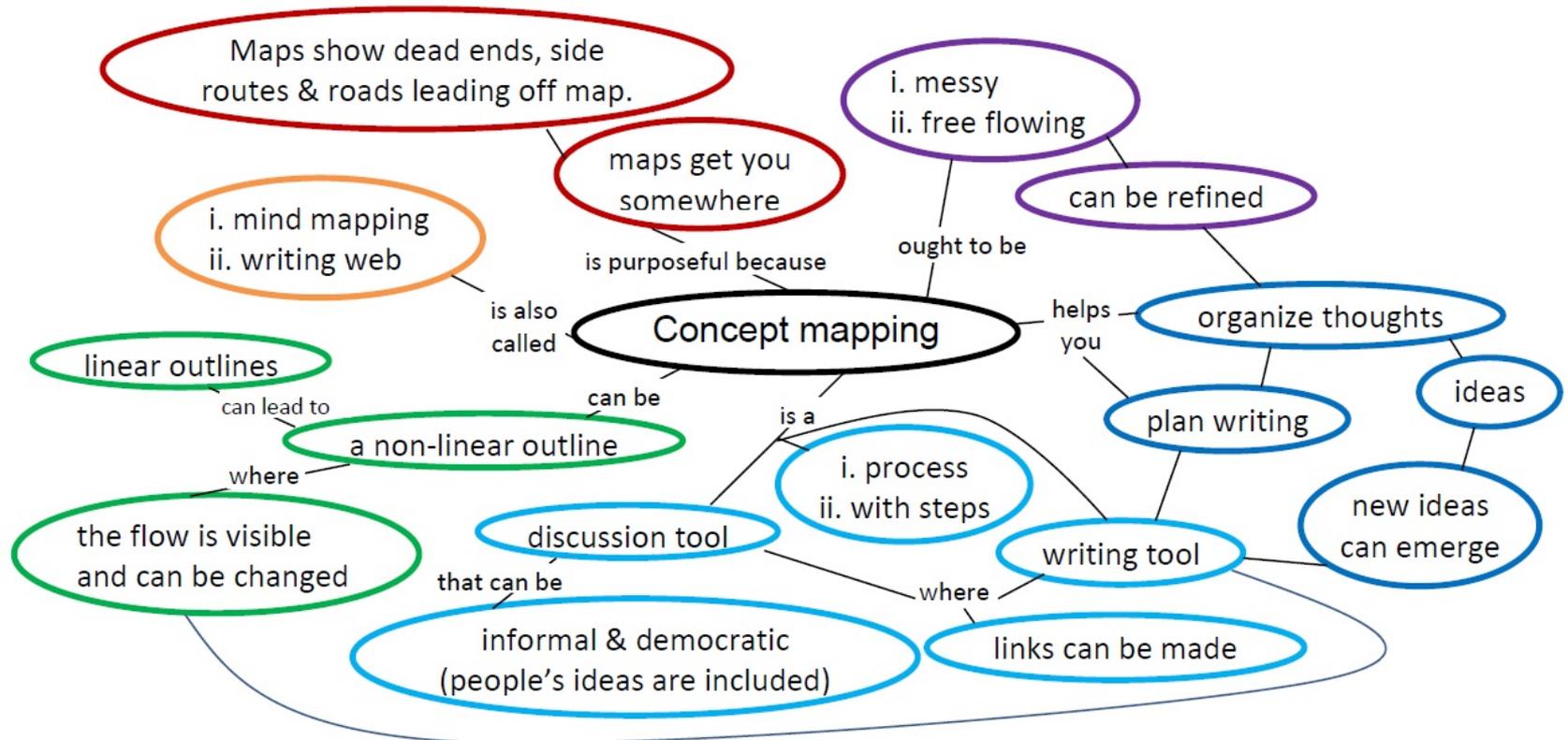
Five Steps to Concept Mapping

- *The **finalizing** Step* : If you put any post-it aside in Step 3, go back and see if some of them will fit into the concept map just constructed. If they do, add the lines and relationships corresponding to the new items. Then, convert the concept map into a *permanent* form by **drawing** it on a piece of paper or on the computer. Be creative through the use of colors, fonts, shades, border thickness, and so on. Finally, you can give a title to your concept map.

Mind Maps



Concept Maps



Argument Maps

