CONCEPT MAP

Concept Map

As visual representations of information, **concept maps are a cross disciplinary active learning technique** that help students manage concepts into sub-concepts, synthesize information, see a larger picture and develop higher-order thinking skills and strategies (Lee et al, 2013). A concept map can be used as a small group activity, whole class activity or a way to summarize information at the end of a class. Concept maps provide a way to quickly look through **students' thinking process** and understanding of concepts. It was Novak who developed concepts maps as a way to prompt meaningful learning (Novak and Gowen, 1984).
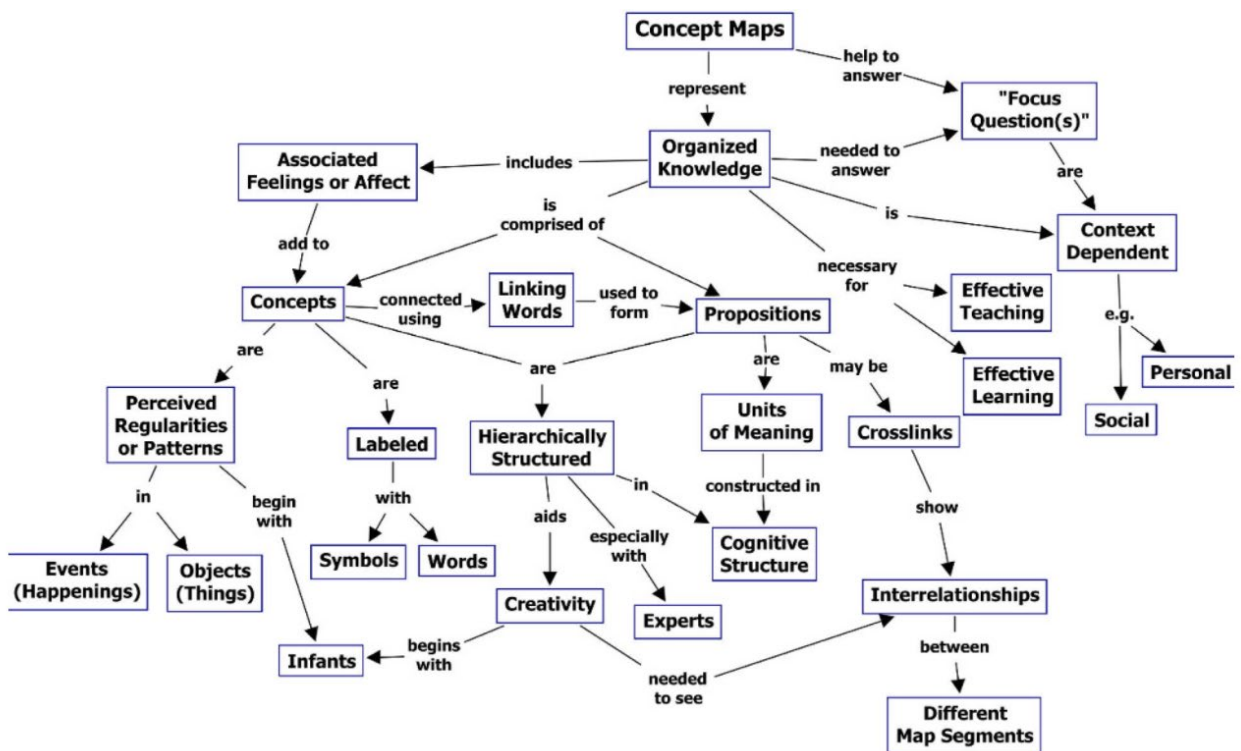
Figure 1. A Concept Map Showing The Key Features of Concept Maps. (Novak & Cañas, 2008).

As seen in Figure 1, concept maps are made up of concepts connected together by arrows or lines. Arrows or lines are labelled with the relationship between the concepts. The concepts are often indicated in boxes or circles.

Concept maps can be conveniently used in classes or for content that contain visual elements or when instructors wish to see whether students understand relationships between different things. You can also use concept maps to **enable students to analyze information** and compare and contrast things, ideas or theories.

Concept maps can be used in various contexts such as connecting events in history, detailing the process of food chain, making a description of how a certain business is run, summarizing a book chapter, discussing the causes and effects of climate change, explaining the similarities and differences between Series and Parallel Circuits and etc. Instructors can benefit from concept maps as an **in-class small group activity**, whole class brainstorming activity, pre-class assignment activity or to wrap the information up for that day's class.

Implementation of Concept Maps

- Before class, **determine the topic**, question or problem you want to concept map.

- During class, **share an overview of a concept map** on a subject that students are familiar with. It can also be introduced by providing the concepts, and asking the class to discuss the relationships between them.

- **Place students** in groups of 2-3, or students can form a concept map individually.

- **Instruct students to create a concept map** to represent their understanding and provide an explanation of the question or problem they have been given. They may benefit from the steps provided in Figure 2.

- **Notify students** about the time period, requirements, guidelines, and grading.

- At the end of the activity, you can allow students to examine the maps created by their classmates, then **encourage students to extend their thinking** by finding links between concepts across different maps that have been generated.

Students can create virtual concept maps using the applications listed below;

- **Mindomo:** All-in-one visual tool to help you make mind mapping, concept mapping, and outlining accessible for students.
  https://www.mindomo.com/

- **Miro:** Online collaborative whiteboard platform that enables distributed teams to work effectively together, from brainstorming with digital sticky notes to planning and managing agile workflows.
  https://miro.com/concept-map/

- **CmapTools:** Online tool that empowers users to construct, navigate, share and criticize knowledge models represented as concept maps.
  https://cmap.ihmc.us/

- **VUE:** Flexible concept mapping tools for managing and integrating digital resources in support of teaching, learning and research.
  https://vue.tufts.edu/

- **Visme:** Free concept map maker for custom concept maps.
  https://www.visme.co/concept-map-maker/

- **Canva:** Graphic design platform, used to create social media graphics, presentations, posters, documents and other visual content.
  https://www.canva.com/graphs/concept-maps/

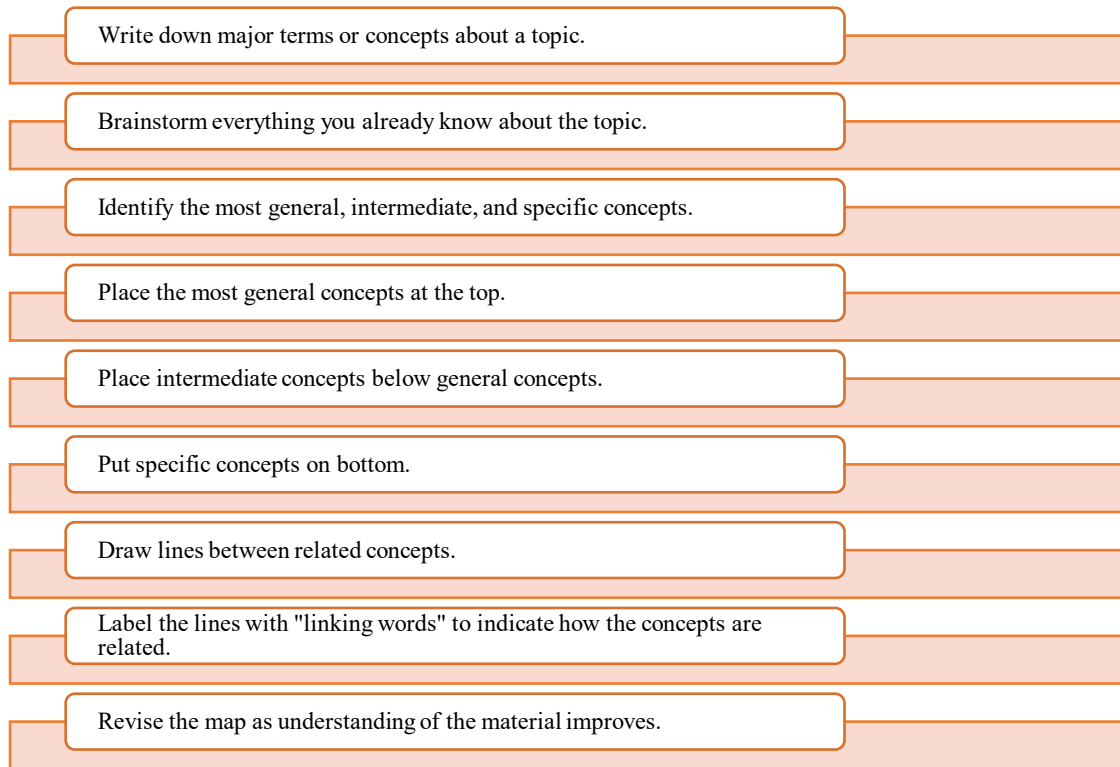| |
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| Write down major terms or concepts about a topic. |
| Brainstorm everything you already know about the topic. |
| Identify the most general, intermediate, and specific concepts. |
| Place the most general concepts at the top. |
| Place intermediate concepts below general concepts. |
| Put specific concepts on bottom. |
| Draw lines between related concepts. |
| Label the lines with "linking words" to indicate how the concepts are related. |
| Revise the map as understanding of the material improves. |

Figure 2. Steps in Making a Concept Map

Concept maps can be used to;

☐ **assess prior knowledge** (i.e. ask students to create a visual representation of what they know about a topic)

☐ show how experts in a field **organize knowledge** (i.e. on the board, draw a concept map that shows students how you conceptualize a difficult topic in your field of study)

☐ **summarize** main points in a text (i.e. let students make a summary of the theme of a novel, or the fundamental ideas in an article)

☐ **conduct assessment** (i.e. require students to display what they have learned at the end of a unit, module or course)

Concept mapping has powerful utility for the demonstration of understanding. It can be used to display individual knowledge structures for comparison at different stages in the learning process (Kinchin, Streatfield & Hay, 2010).

References

Kinchin, I. M., Streatfield, D. & Hay, D.B. (2010). Using concept mapping to enhance the research interview. *International Journal of Qualitative Methods,* 9 (1), 52-68.

Lee W., Chiang C., Liao I., Lee M., Chen S., and Liang T. (2013). The longitudinal effect of concept map teaching on critical thinking of nursing students. Nurse Education Today. 33: 1219–1223.

Novak, J. D., & Cañas, A. J. (2008). The Theory Underlying Concept Maps and How to Construct Them (Technical Report No. IHMC CmapTools 2006-01 Rev 01-2008). Pensacola, FL: Institute for Human and Machine Cognition.

Novak J.D., & Gowin, D.B. (1984). *Learning How to Learn*. Cambridge, UK: Cambridge University Press.

Active Learning Concept Maps. Kent State University Center for Teaching and Learning. https://www-s3-live.kent.edu/s3fs-root/s3fs-public/file/Teaching%20Tools%20In%20a%20Flash%20-%20Concept%20Maps.pdf

Concept Mapping. The Learning Strategies Center, University of Cornell. https://lsc.cornell.edu/how-to-study/studying-for-and-taking-exams/concept-maps/

Concept Mapping. Brigham Young University, Center for Teaching and Learning, https://ctlg-d7prd-01.byu.edu/tip/concept-mapping-0

Further Reading and Resources

- [Using Concept Maps. Teaching Excellence & Educational Innovation, University of Carnegie Mellon.](#)

- [Novak, J. D. & Cañas, A.J. (2008). The Theory Underlying Concept Maps and How to Construct and Use Them. Technical Report. Institute for Human and Machine Cognition, Florida.](#)

- [Concept Maps. Centre for Higher Education Research and Scholarship, Imperial College London](#)

- [Concept Mapping Tools. Centre for Teaching Excellence, University of Waterloo.](#)

- [Dr. Mark Morton, Concept Maps: How Instructors Can Use Them to Support Student Learning](#)