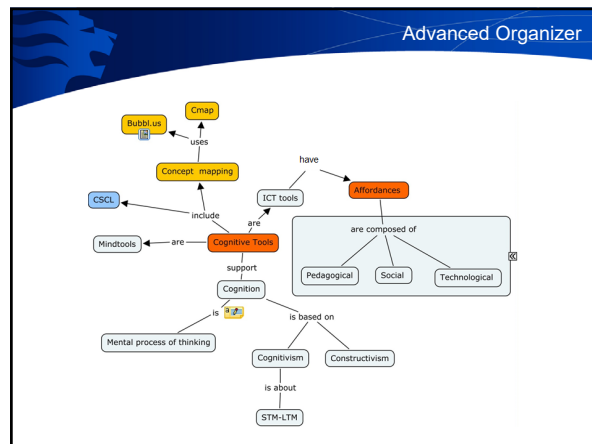




Concept Mapping

Dr. Wang Qiyun

- ### Concept Maps & Mind Maps
- Today's Agenda...
- ▣ Meaning of a concept
 - ▣ What is a concept map? – Explore some concept mapping tools
 - ▣ What is a mind map?
 - ▣ Difference between a mind map and concept map.
 - ▣ How can the tools enhance concept representation?
 - Hands-on – to create a concept map
 - ▣ Ways of using a concept map

- ### What is a concept?
- A concept is a perceived regularity or pattern in events or objects
 - War, Suicide
 - Liquid, chair,
 - A concept itself is a mental construct which usually consists of 3 attributes:
 - Intrinsic attribute
 - Functional attribute, and
 - Relational attribute (Tan, 2010, p. 170)

What is a concept (con't)?


Example	Intrinsic Attributes	Functional Attributes	Relational Attributes
Car	4 wheels and doors	To carry people or things	Related to vehicle - is a type of vehicle (another concept)
Technology			

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What is a concept map?

- A concept map is a diagram showing the relationships among concepts.
- It is a graphical tool for organizing and representing knowledge
- Concepts, usually (may not always) represented as boxes or circles, are connected with labelled arrows in a hierarchical structure



What is a concept map?

- A representation of concepts and their interrelationship that are intended to represent the knowledge structures that humans store in their minds (Jonassen et al, 1993)

A concept map about concept map

What is a mind map?

- It is a pictorial presentation of the relationships of ideas related to a **concept** only.
- Every node of a mind map does not have to be a concept.
- It does not need to label the link between two ideas or objects.
- It is like a visual representation of a thinking process that lets learners quickly generate an large number of ideas

An example of a mind map

Differences between a mind map and a concept map

Concept map	Mind map

Using concept maps for learning

1. Learning from existing concept maps
 - Study and understand why
 - Compare
2. Learning by creating new concept maps
 - Think, reflect
 - Critical thinking

Why using concept mapping tools

1. Drawing a map by hands is tedious and sometimes cognitively unproductive.
2. Use of a technology tool can help to reduce such problems and allow a learner to focus his/her cognition more on essential tasks.
3. Ease of restructuring, adaptation, conversion, storage

Using concept mapping as cognitive tools

- Computer-based tools and learning environments that have been adapted or developed to function as **intellectual partners** with the learner in order to **engage and facilitate critical thinking and higher-order learning**" (Jonassen, 1996)
- Cognitive tools are (Jonassen, 2000):
 - Cognitive amplification and reorganization tools
 - exceed the limitations of the human mind by doing things more accurately and at a higher speed.
 - Generalizable tools
 - Can be used in many settings, not specific to a purpose
 - Critical thinking devices
 - Enable learners to think, make connections, and create new knowledge
 - Intellectual partners
 - Assume part of intellectual burden: suggestion, advice
 - Become interdependent
 - Allow for hypothesis testing, answering what-if

Concept mapping as a cognitive Tool

(Jonassen, 1996)

- **Semantic Organization Tools**
 - Databases; and
 - **Semantic networking (concept mapping) tools**

```

    graph TD
      Water((Water)) -- required by --> LivingThings((living things))
      Water -- is composed of --> Molecules((molecules))
      Water -- changes --> States((states))
      Molecules -- are in --> Motion((motion))
      Molecules -- determines --> Solid((solid))
      Molecules -- determines --> Gas((gas))
      Molecules -- determines --> Liquid((liquid))
      Motion -- from --> Heat((heat))
      Solid -- as in --> Snow((snow))
      Solid -- as in --> Ice((ice))
      Gas -- as in --> Steam((steam))
      Liquid -- as in --> Fog((fog))
      Liquid -- as in --> River((river))
      LivingThings -- e.g. --> Animals((animals))
      LivingThings -- e.g. --> Plants((plants))
      Heat -- from --> MyOven((my oven))
      Steam -- in a --> Boiler((boiler))
      River -- e.g. --> Elm((Elm))
  
```

What's a good concept map?

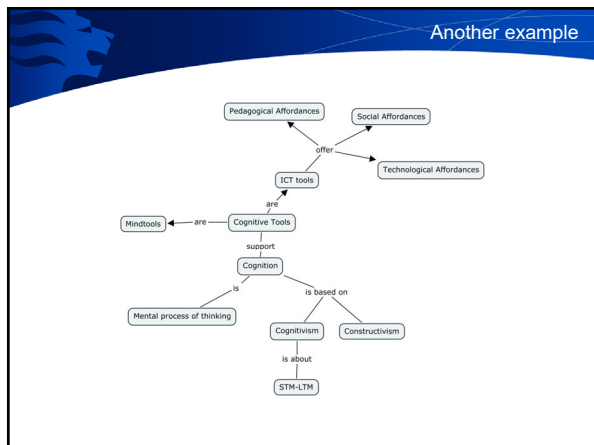
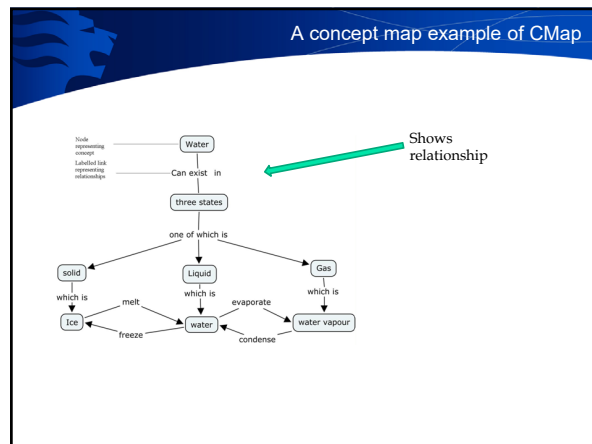
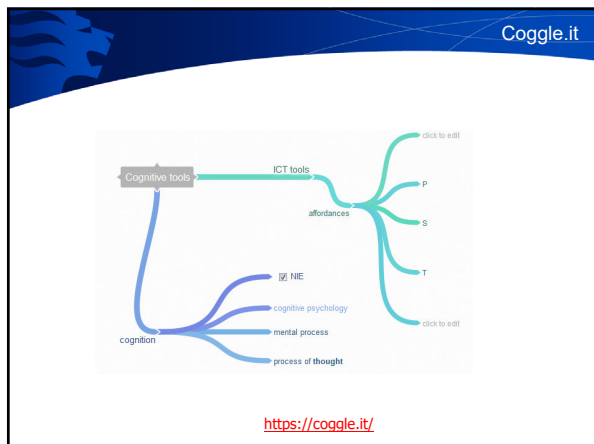
- Concepts should be brief and placed in boxes (not sentences)
- Label relationships between concepts through links
- Hierarchy of components are clear
- Relationships between components are comprehensible

Bubbl.us

- Hands-on: Bubbl.us

```

    graph TD
      Mindtools[Mindtools] -- are --> CognitiveTools[Cognitive Tools]
      Cognition[Cognition] -- is --> MentalProcess[a mental process]
      Cognition -- is based on --> Cognitionism[Cognitionism]
  
```



1. CMap Cloud:
<https://cmapcloud.ihmc.us/>
 2. CMap is also downloadable from
<http://cmap.ihmc.us/download/>
 3. If need help, go to
<http://cmap.ihmc.us/docs/cmap-cloud-help> (Videos)
-

- Demo: CMap Cloud
- Below are some functions in CMap you could try out:
 - Create a basic CMap to show a string of interlinked concepts
 - Adding links to a concept including pictures, videos or websites

- Adding Links
- Links provide extra information to complement the concept or the link descriptor
 - To add a graphic:
 - Actions-upload resources (or drag-and-drop)

Adding Websites

- To add a website link:
- Actions-New web address

CMapper

- Actions –search for Cmappers
- Share a folder (only) with Cmappers
- The folder can have cmap
- The CMapper can view/edit the folder
- Videos: <http://cmap.ihmc.us/docs/cmap-cloud-help>

Group work

- Use Cmap Cloud to construct a concept map depicting a concept that you plan to teach
- Work in groups (with online participants)

Affordances of CMap

Possible things that CMap can offer:

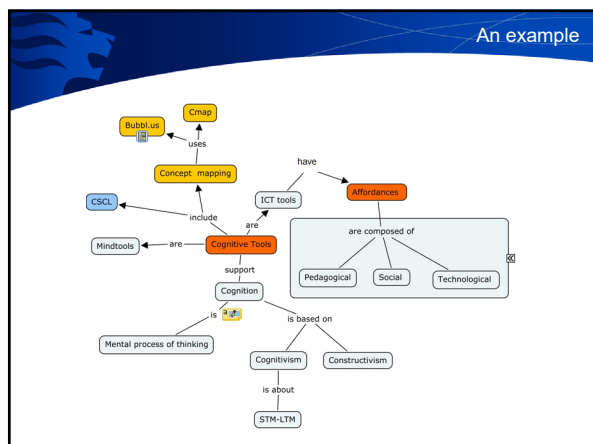
- ▣ Ease of regrouping and changing the representation (relieving learners of lower level tasks such as reconstruction of links)
- ▣ Collect ideas for brainstorming
- ▣ Allow concepts to be refined by continually adding on or modifying the map's structure and organisation
- ▣ Different maps can be compared to identify degree of understanding
- ▣ Maps can be used also as group work to promote collaborative learning

Some pedagogical uses of CMap

A CMap may be used by both the teachers and students to serve different purposes.

Used by the teachers...

- ▶ **As an Advanced Organizer**
 - Use the teacher-constructed concept map as an advance organizer.
 - Before elaborating on a new concept, show the new concept on the map and how it is related to other existing concepts.
 - The teacher's pre-organisation of the concept helps the students construct their mental models during their learning process.



Used by the students...

- As a Comparative Organizer
 - Ask students to construct their own concept maps.
 - Ask them to compare their maps with one another.
 - Identify the similarities and differences among the concepts.
 - The main thing is to allow them to articulate their inner mental models through the presentation of the map – the map is a cognitive tool.
 - Different students have different degree of aspiration to complete the map – allowing the practice of Self-directed Learning.
 - Also the sharing allows the practice of Collaborative Learning.

Wrapping up

- A concept is a mental construct that has 3 attributes
- A concept map is a visual representation of the relationship among concepts
- A main difference between a mind map and a concept map is that the former does not need to label the links between concepts and is used for capturing relationship of ideas pictorially.
- There are still other differences between a mind map and a concept map.

Next week: online learning

- Build an individual concept/mind map of your personal understanding of using ICT as cognitive tools.
- Topic: “Use of ICT as Cognitive Tools”
- You may use ‘cognitive tools’, or ‘ICT’ as a top or central concept
- At least 40 (3AU), 50 (4AU) nodes with links, and various features
- 10 marks, by 5 Mar Mid-night
- Use the CMap Cloud, and put the URL to the <http://cogtools.weebly.com/submission>