

## CONCEPT MAP ASSESSMENTS:

### WHAT IS A CONCEPT MAP?

A concept map is a hierarchical form of structure diagram that illustrates conceptual knowledge and their relationships within a specific topic from general to specific concepts. It consists of concept labels (aka nodes, cells) which are connected together by lines, these lines are labeled with directions. A concept map is often known as a flow chart, it is widely used in business to gain an insight on the overview and for brain-storming new ideas and developments.

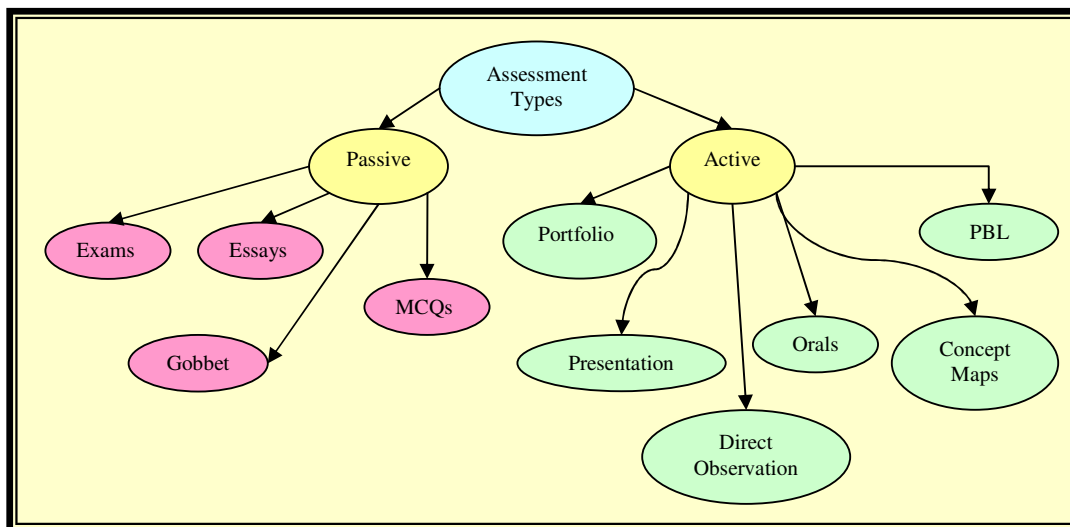
Concept map was developed by Joseph Novak based on the cognitive theories of David Ausubel (Assimilation Theory) who stressed the importance of prior knowledge in order to gain deep learning on new concepts. So by understanding what you already knew, and relating new concepts to what you knew, meaningful deep learning can easily occurs.

### STRUCTURE OF A CONCEPT MAP

The core element of a concept map is a proposition, which consists of two or more concepts connected by a labeled link. These propositions are then branched out to form a larger structure that provides the whole picture.

1. To understand the theories and concepts related to the topic.
2. To manage concepts into sub concepts for each group and category.
3. To understand the relationship of each concept, how they are related to each other.
4. To synthesize information, ideas and concepts, and see the whole picture.
5. To encourage creativity (particularly brain-storming) and develop higher-level thinking skills and strategies.
6. To provide teachers feedback of students' misconceptions and the development of students' understanding over time.

By understanding the whole picture, how each concept is related and sub-related to each other which are illustrated in a hierarchical framework, learners will find deep learning.



Y	Declarative	CHARACTERISTICS
Y	Functioning	
	Timely to Set	
	Timely to Answer	
	Timely to Correct	
	Timely to provide Feedback	
Y	Suitable for Large Class	
	Can substitute with Computers	
	Passive	
Y	Active	
Y	Process Oriented Method	
Y	Product Oriented Method	

Y	Yes
P	Possibly

Above shows the general characteristics of the assessment method and the type of skills that are *typically* assessed by the method. Both Blooms' taxonomy and Biggs' Solo taxonomy are indicated.

Y	Knowledge	Blooms Level of Taxonomy	MEASURABLE QUANTITIES	
Y	Comprehension			
Y	Application of Knowledge			
Y	Analysis			
Y	Synthesis			
	Evaluative Skills			
Y	Pre-structural	Quantitative		SOLO Taxonomy
Y	Uni-structural			
Y	Multi-Structural			
Y	Relational Level	Qualitative		
P	Extended Abstract Level			
	Leadership	OTHER QUANTITIES		
Y	Life long Skills			
Y	Creative skills			
	Writing Skills			
Y	Team Work			
Y	Communication Skills			
Y	Presentation Skills			
	Memorizing Skills			
	Practical/ Physical Skills			
Y	Think under pressure			
Y	Project Management			
	Time management			

### ADVANTAGES OF CONCEPT MAP ASSESSMENT

- It encourages collaborative learning and team knowledge mapping.
- It allows deep learning.
- “Picture tells a thousand words”; graphic representations are usually easier to understand and retain.
- It can be used in a large class setting either individually or collaboratively, by giving the students a partial filled concept maps, or a few concepts to fill on the maps.
- It mirrors what exactly real business uses and provides the students a sense of the real world.

### DISADVANTAGES OF CONCEPT MAP ASSESSMENT

- Students are often not familiar with concept mapping assessment and may find it intimidating.
- Concept mapping is often not graded, it may sometimes be used as a quick assessment in class to check students' conception on a topic or may be used as an overview of an assessment, this may frustrates some students.
- Individual feedback can be time-consuming, clear assessment criteria and grading are required for all parties so that students and assessors are fully aware of how the performance will be judged.

## HOW TO DESIGN A GOOD CONCEPT MAP ASSESSMENT?

- Introduce concept map to students if you are planning to use them as assessments. There are many ways to introduce to them, one way is by showing them an overview of a partial concept map *on a subject they are familiar with* and discuss with them during class on how to fill in the rest of the hierarchy. It can also be introduced by providing the concepts, and ask the class to discuss the relationships between them.
- Ensure the students know what the objectives of the assessment are.
- Provide students the time period, guidelines, requirements, assessment criteria and if there are items that are not to be included. The students should also be aware who is going to assess them – tutor, peers and/or self? And if peers or self are going to assess, would the weightings be the same as the tutor.
- Prepare a structured marking sheet for all assessors.
- Give sufficient time for students to respond.

## GRADING CRITERIA AND GRADING STANDARDS

Grading criteria and grading standards for a concept mapping assessment.

GRADING CRITERIA	Excellent	Proficient	Average	Poor
<b>Organisation:</b>	<ul style="list-style-type: none"> <li>• Well organised</li> <li>• Provides a very clear big picture of the ideas</li> <li>• Contains main concepts</li> <li>• Contains a appropriate number of concepts</li> <li>• Follows standard map conventions</li> <li>• Concepts are short and clear</li> </ul>	<ul style="list-style-type: none"> <li>• Thoughtfully organized</li> <li>• Provides a big picture of the ideas</li> <li>• Contains most of the main concepts</li> <li>• Contains an adequate number of concepts</li> <li>• Follows the standard map conventions</li> <li>• Concepts are clear</li> </ul>	<ul style="list-style-type: none"> <li>• Somewhat organized</li> <li>• Provides a picture of the ideas</li> <li>• Somewhat incoherent</li> <li>• Contains only a few of the main concepts</li> </ul>	<ul style="list-style-type: none"> <li>• Choppy and confusing</li> <li>• Provides a scattered picture of some ideas</li> <li>• Contains a limited number of concepts</li> </ul>
<b>Links:</b>	<ul style="list-style-type: none"> <li>• Links are precisely labeled</li> <li>• Simple and complex relationships are mapped effectively</li> </ul>	<ul style="list-style-type: none"> <li>• Links are labeled</li> <li>• Relationships are mapped</li> </ul>	<ul style="list-style-type: none"> <li>• Links are not labeled</li> <li>• Some ideas, concepts are linked but not distinctive</li> </ul>	<ul style="list-style-type: none"> <li>• No links</li> <li>• Difficult to follow relationships</li> </ul>
<b>Thinking and Ideas:</b>	<ul style="list-style-type: none"> <li>• Includes concepts that are extremely suitable for the topic and that show original or creative thinking.</li> <li>• All ideas, themes, theories and framework are well thought-full</li> </ul>	<ul style="list-style-type: none"> <li>• Most or all concepts are suitable for the topic</li> <li>• Some ideas, themes, theories and framework are thought-full</li> </ul>	<ul style="list-style-type: none"> <li>• Most concepts satisfy the basic requirements for the topic, but some do not directly relate to the topic</li> <li>• Adequate ideas, theories and framework are thought-full although not</li> </ul>	<ul style="list-style-type: none"> <li>• Many concepts are inappropriate for the topic</li> <li>• Thinking process in not clear</li> </ul>

			clearly shown.	
<b>Communication:</b>	<ul style="list-style-type: none"> <li>Clearly presented, high level of understanding</li> </ul>	<ul style="list-style-type: none"> <li>Clearly presented, good level of understanding</li> </ul>	<ul style="list-style-type: none"> <li>Information is presented but more understanding can be gained</li> </ul>	<ul style="list-style-type: none"> <li>Very difficult to understand</li> </ul>
<b>Teamwork:</b>	<ul style="list-style-type: none"> <li>Worked extremely well with each</li> <li>Respected and complemented each others ideas</li> </ul>	<ul style="list-style-type: none"> <li>Worked very well with each other.</li> <li>Worked to get everyone involved</li> </ul>	<ul style="list-style-type: none"> <li>Attempted to work well with others.</li> <li>At times "off task" and not everyone was actively involved</li> </ul>	<ul style="list-style-type: none"> <li>Little or no teamwork</li> </ul>

**WEB REFERENCES AND RESOURCES:**

**Concept Map Assessment**

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Developing Concept Maps, Starting Point, Science Education Resource Center, Carleton College  
<http://serc.carleton.edu/introgeo/assessment/conceptmaps.html> Accessed: 29 July 2008

Concept Mapping and Inspiration, the Virtual Institute  
<http://www.etc.net/techfellow/inspir.htm> Accessed: 30 July 2008

**Tips for Students**

Tips on Making Your Own Concept Maps, College of Agricultural, Consumer and Environmental Sciences, University of Illinois at Urbana-Champaign  
<http://classes.aces.uiuc.edu/ACES100/Mind/c-m3.html> Accessed: 30 July 2008

**To Reference these pages**

Copy and paste the text below

Chan C (2008) *Assessment: Concept Maps Assessments*, Assessment Resource Centre, University of Hong Kong [<http://arc.caut.hku.hk>]: Available: Accessed: DATE