

Critical Thinking & Concept Mapping

KIN 251
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What is Critical Thinking?

- According to Nosich (2000) critical thinking has several important features:
 - Critical thinking is reflective
 - Critical thinking involves standards
 - Critical thinking is authentic – real issues
 - Critical thinking involves being reasonable

Three parts of critical thinking

1. Asking the questions
2. Trying to answer those questions by reasoning them out
3. Believing the results of our reasoning

Part 1: Asking Questions

- Not just “solving problems”
- One might ask, for example,
 - What are some alternative ways of solving the problem?
 - What is a good way to begin?
 - Do I have all the information needed to start looking for a solution?
 - What is the purpose behind the problem?
 - How does it fit into a real context?
 - Can the problem be solved?
 - Does the problem make sense?

Part 2: Reasoning it out

- Many ways to answer a question –not all involve reasoning
 - Accept answers uncritically
 - Answer based on upbringing
 - Answer without referencing information/research
 - Answer according to one's personality
 - Answer the first thing that comes into your head!

Part 2: Reasoning it out (cont)

- Arguments can be persuasive even if they are not well-reasoned (think politicians here)
- In fact, philosophers have an entire branch devoted to this called logic and in particular – “natural language fallacies”

- Ex: Three categories of natural language fallacies: Relevance, Ambiguity, Presumption
- Relevance - Arguments that commit fallacies of relevance rely on premises that aren't relevant to the truth of the conclusion.
 - EX: Ad hominem (personal attack)
- Ambiguity - Arguments that commit fallacies of ambiguity manipulate language in misleading ways.
 - EX: Straw man (misrepresent a position to make it seem weaker)
- Presumption - Arguments that commit fallacies of presumption contain false premises, and so fail to establish their conclusion.
 - EX: False dilemma (the either/or fallacy –only presented with limited options)

- Part 3: Believing the Results**
- Not as easy as it sounds!
 - According to Nosich, there are 4 indicators of when we do not believe the results of our own reasoning:
 - I reason something out, but strong emotions arise against the result
 - I find myself believing contradictory things
 - I believe something very strongly, but find I am unable to come up with any good reasons for the belief
 - I reason something out, but my actions do not follow

- What Critical Thinking is Not**
- Critical thinking is not negativity – it is not mere “criticism”
 - Not “emotionless”
 - Not just problem solving – but finding questions to ask. In other words, recognizing that there are problems to be addressed is often the result of critical thinking

Barriers to Critical Thinking

- News distorts the truth
- Mass Media send unrealistic messages
- Binary thinking
- Personal and social fears
- Institutions often discourage critical thinking
 - Why do you think this might be the case?

Critical Thinking in Kinesiology

- With your classmates, come up with some ways that critical thinking can help to inform the debates, questions and concerns in your various subdisciplines of kinesiology.
- How do we sort this information out...

Introduction to Concept Maps

Definition: Concept maps are graphical tools for organizing and representing knowledge. They include concepts, usually enclosed in circles or boxes of some type, and relationships between concepts indicated by a connecting line linking two concepts. Words on the line, referred to as linking words or linking phrases, specify the relationship between the two concepts. We define *concept* as a perceived regularity in events or objects, or records of events or objects, designated by a label. The label for most concepts is a word, although sometimes we use symbols such as + or %, and sometimes more than one word is used. *Propositions* are statements about some object or event in the universe, either naturally occurring or constructed. Propositions contain two or more concepts connected using linking words or phrases to form a meaningful statement. Sometimes these are called semantic units, or units of meaning.

Novak, J. D. & A. J. Cañas, The Theory Underlying Concept Maps and How to Construct Them, Technical Report IHMC CmapTools 2006-01, Florida Institute for Human and Machine Cognition, 2006

Introduction to Concept Maps

- **Practical applications:**
- Handy way to take notes during lecture.
- Excellent aids to group brainstorming.
- Planning your studies and career.
- Providing graphics for your presentations and term papers
- A way to outline your term papers and presentations.
- Refine your creative and critical thinking.

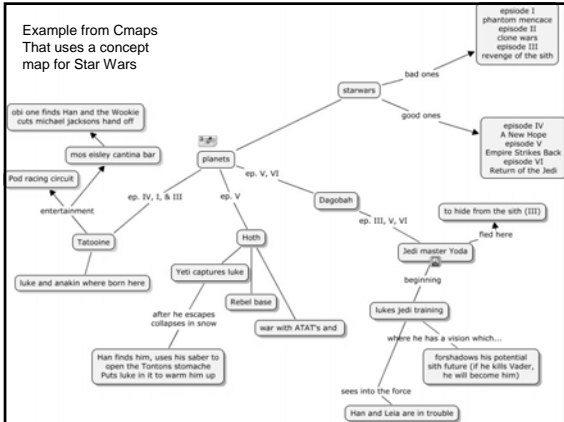
Introduction to Concept Maps

- **Purpose:** Concept maps harness the power of our vision to understand complex information "at-a-glance." The primary function of the brain is to interpret incoming information to make meaning. Often, it is easier for the brain to make meaning when information is presented in visual formats.
- It is essential to your studies and career that you can handle complex information; concept maps offer one method to do this.

Resource:

- [IHMC CmapTools](#)





4 Types of Concept Maps: Spider

SPIDER Concept Maps

The "spider" concept map is organized by placing the central theme or unifying factor in the center of the map.

- Outwardly radiating sub-themes surround the center of the map.

4 Types of Concept Maps: Hierarchy

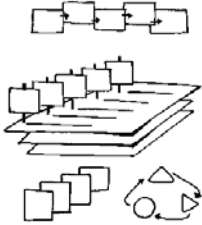
HIERARCHY

The hierarchy concept map presents information in a descending order of importance.

- The most important information is placed on the top.
- Distinguishing factors determine the placement of the information.

4 Types of Concept Maps: Flowchart

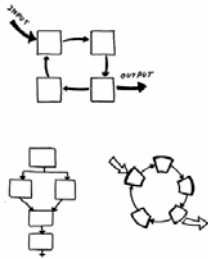
*FLOWCHART - ALGORITHM
Concept Maps*



The flowchart concept map organizes information in a linear format.

4 Types of Concept Maps: Systems

SYSTEMS Concept Maps



The systems concept map organizes information in a format which is similar to a flowchart with the addition of 'INPUTS' and 'OUTPUTS'.

How to do a Concept Map

- Print in capitals, for ease of reading. This will also encourage you to keep the points brief.
- Use unlined paper, since the presence of lines on paper may hinder the non-linear process of Mapping. If you must use lined paper, turn it so the lines are vertical.
- Use paper with no previous writing on it.
- Connect all words or phrases or lists with lines, to the centre or to other "branches." When you get a new idea, start again with a new "spoke" from the centre.

How to do a Concept Map

- Go quickly, without pausing -- try to keep up with the flow of ideas. Do not stop to decide where something should go. i.e. to order or organize material -- just get it down. Ordering and analyzing are "linear" activities and will disrupt the Mapping process.
- Write down everything you can think of without judging or editing -- these activities will also disrupt the Mapping process.
- If you come to a standstill, look over what you have done to see if you have left anything out.
- You may want to use color-coding, to group sections of the Map.

Organizational Patterns That May Appear in a Concept-Map

- *Branches.* An idea may branch many times to include both closely and distantly related ideas.
- *Arrows.* You may want to use arrows to join ideas from different branches.
- *Groupings.* If a number of branches contain related ideas, you may want to draw a circle around the whole area.
- *Lists.*
- *Explanatory/Exploratory notes.* You may want to write a few sentences in the Map itself, to explain, question, or comment on some aspect of your Map -- for example, the relationship between some of the ideas.

In-Class Project:

- Using what we have learned about concept mapping, in small teams, create a concept map of your kinesiology sub-discipline
