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# New Applications for Cognitive Maps

by Lynn D. Anderson-Madaus

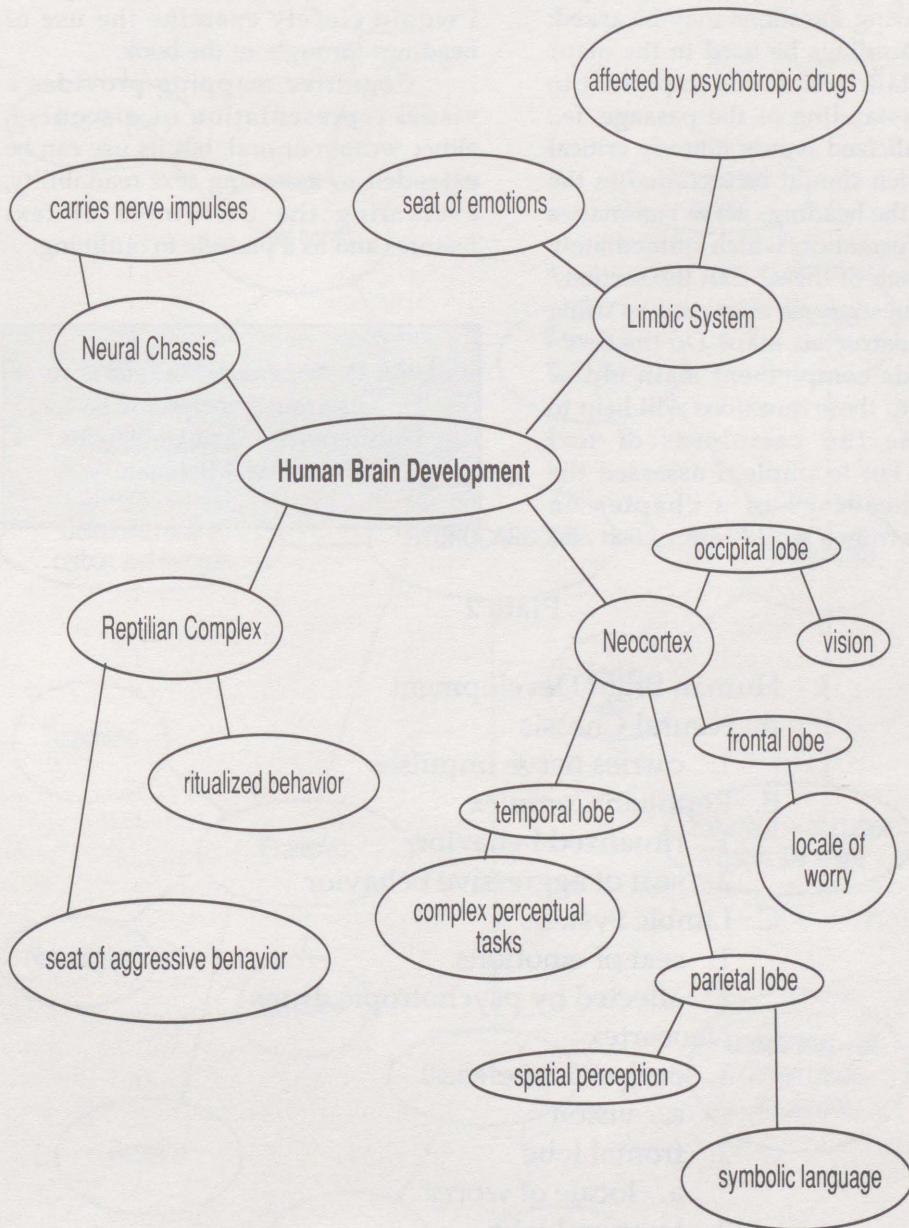
Cognitive mapping, also called semantic mapping or webbing, is widely used in elementary schools to create a visual representation of text as an aid to learning. It is ordinarily used to represent narrative text. Mapping has not found wide acceptance in secondary schools, but should be used at the secondary level also to facilitate learning of expository text or lectures. In addition to the 'traditional' use of mapping, that is, providing a visual framework for text, cognitive mapping is useful for a) providing a 'bridge' or prelude to outlining, b) evaluating text readability, and c) assessing the effectiveness of text clues.

Many secondary teachers place importance on the skill of outlining, perhaps even requiring that students produce study outlines. Outlining is a high level skill which involves identifying relationships between concepts and arranging those concepts in an order which demonstrates the superordinate and subordinate nature of the concepts involved. (Teachers often lose sight of the real goal of outlining, i.e., to create an organization tool, and force students to concentrate on deciding whether a concept should be labeled '1' or 'a', and making sure that there is always a 'b' to go with an 'a'. The original purpose of the outline becomes lost as students struggle to create the teacher's form of the outline.) If a student has been taught to create

cognitive maps, the relationships between ideas are visually obvious, and students need only to translate the visual format into a more linear format, the outline. The content, once organized, can take any shape desired. I have prepared an example of a cognitive map used to represent the concepts presented in a mini-lecture on Carl Sagan's Dragons of Eden. (See plate 1 ) The outline generated from the cognitive map is also included (plate 2). The creation of the map facilitates the outline because the ideas from the lecture have already been organized in a visual format. The translation to the linear outline is now quite simple.

Cognitive maps can also be used to assess the readability of text. Readability formulae are limited; they typically count syllables and/or sentence length. Another test must be applied to text to assess clarity and cohesiveness. I compared two physics passages, deliberately choosing a discipline I find difficult. I mapped both texts (plates 3 and 4) and found that one was much easier to map (plate 3) and thus to comprehend. Surprisingly, the text which had more surface features (plate 4) designed to facilitate learning (headings, italicized vocabulary, margin questions) was much harder to map. A cursory examination of the two passages would have been misleading. Mapping the texts more accurately assessed their comprehensibilities.

Plate 1



Mapping can be used to evaluate the usefulness of text features. In choosing a textbook, the teacher must determine if text features serve to clarify or confuse important concepts. The following questions may be asked: Can the headings be used in the map? Are the italicized words important to the understanding of the passage, i.e., do the italicized words identify critical terms which should be included in the map? Do the headings act as summaries of the information which immediately follows each of them? Can the section/chapter questions be answered by using a well-constructed map? Do the text's visual aids complement main ideas? Answers to these questions will help to determine the usefulness of text features. For example, I assessed the section headings of a chapter on feudalism from a world history text and

found that a heading entitled, "An Unwritten Arrangement", highlighted a concept which was of minor importance to the discussion which followed. If I were considering this text for adoption, I would closely examine the use of headings throughout the book.

Cognitive mapping provides a visual representation of discourse, either written or oral, but its use can be extended to assessing text readability, evaluating the usefulness of text features and as a prelude to outlining.

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## Plate 2

- I. Human Brain Development
  - A. Neural Chassis
    1. carries nerve impulses
  - B. Reptilian Complex
    1. ritualized behavior
    2. seat of aggressive behavior
  - C. Limbic System
    1. seat of emotions
    2. affected by psychotropic drugs
  - D. Neocortex
    1. occipital lobe
      - a. vision
    2. frontal lobe
      - a. locale of worry
    3. temporal lobe
      - a. complex perceptual tasks
    4. parietal lobe
      - a. spatial perception
      - b. symbolic language

Plate 3

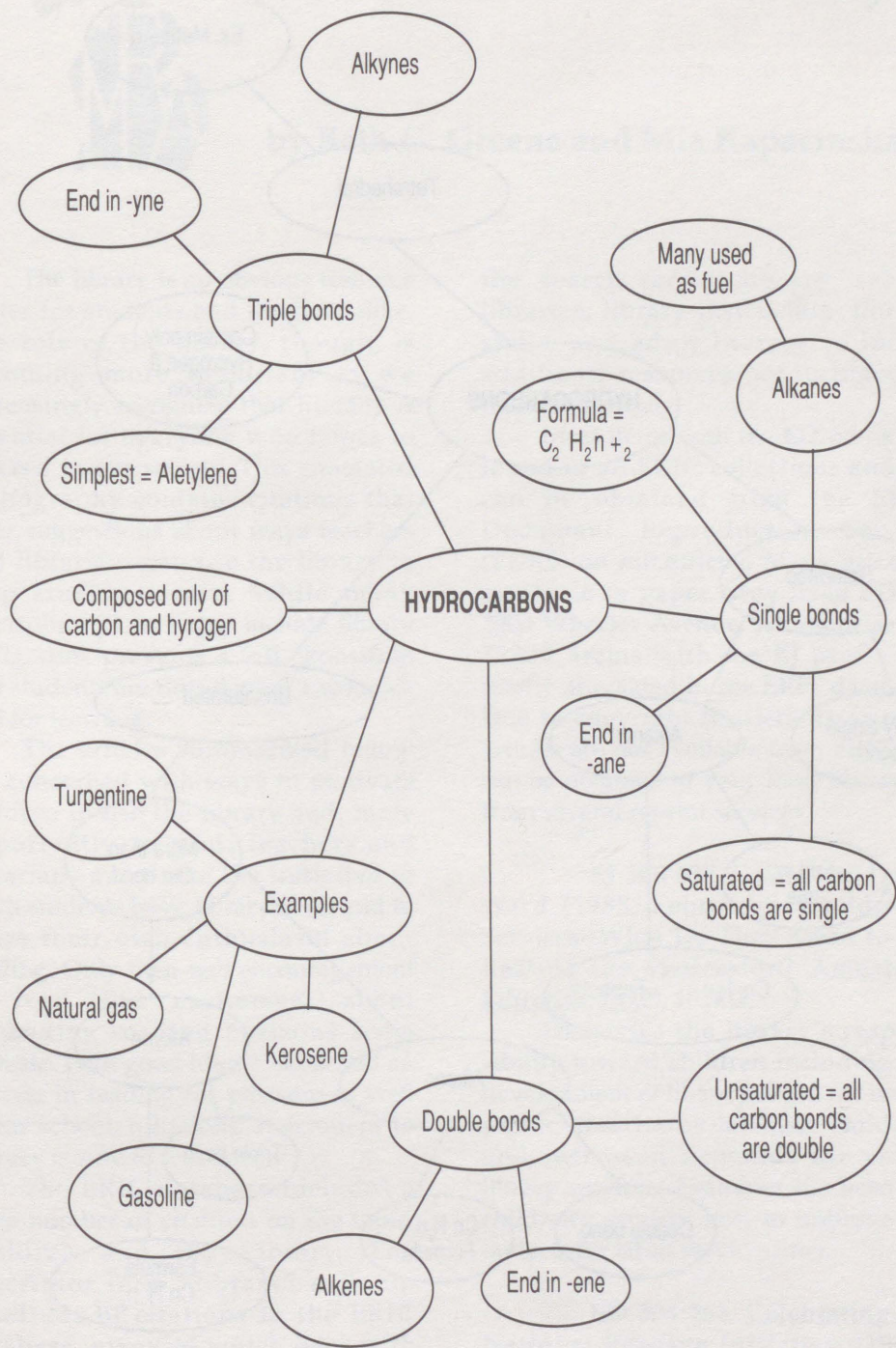


Plate 4

