Chapter 5
Visual Logic Maps (vLms)

ABSTRACT

This concluding chapter describes and analyses a concept map based, Visual Logic Maps (vLms). Essentially the vLms maps differ from the Thinking Maps discussed in the last chapter in that the Visual Logic Maps shifts its emphasis from map structure to map glyphs. In Thinking Maps it is the structure of the eight specific maps that determine how information is going to be organized and mentally process. The Visual Logic Maps reduces each of the maps to seven specific glyphs that operate as constant logical operators. In the conclusion of the chapter and the book it is argued that both the Thinking Maps and Visual Logic Maps are essentially non-verbal spatial maps that find the cognitive origins in the logical/mathematical diagrams of Venn and Euler. Unlike Venn an Euler Diagrams, however, Visual Logic and Thinking Maps are not domain specific nor mathematical in the numeric sense.

DISCUSSION

As indicated in the previous chapter, the concept of "concept maps" has become quite popular in education, largely because J. D. Novak, a constructivist educator (Piaget, 1969) scholar who developed Ausubel's idea of schemas and their construction in a research program when he and his colleagues at Cornell tried to trace and understand changes in children's knowledge of science in a less linear and more holistic way. During the course of this study Novak came up with the idea of representing children's knowledge in diagrams where concepts are linked together by arrows or lines that indicated

DOI: 10.4018/978-1-5225-2184-6.ch005

that a logical relationship existed between connected concepts (Novak, 2008). The phylogeny of Novak's maps are generally from top down and by following one branch of the map that tries to define concept mapping in figure n of the previous chapter. Through deductive reasoning a student learns that "concept maps represent [the] organized knowledge needed to answer focused questions that are context dependent." Following another branch, "concept maps represent organized knowledge comprised of concepts [and] propositions [that] are . . ." etc., compressing a large amount of meaningful information in a small amount of space.

From the previous chapters it was also found that concept maps can range from the very intuitive, heuristic and free flowing on one hand to the very analytical, arcane and formulistic on the other with mind maps on one end of an intellectual style scale and computer ontology on the other. On the highly analytical end computer science concept maps depict complex systems in visual diagrams that define and logically sort out steps, types, properties, and interrelationships of concepts needed to solve a computational problem (Guber, 1993; Katifori, 2007; Story, 2013) to the very concrete, colorful and visual Bazun Maps as shown in Figure 3 (left).

In addition, the previous section on cognitive styles showed that O. Blazhenkova and M. Kozhevnikov's theory can serve as a frame for guidance to understand concept maps from a neuropsychological perspective. That frame led to a taxonomy of concept maps associating Buzan's Mind Maps with the object style of learning, Novak Maps with verbal learning and, to a certain, degree, Hyerle's Thinking Maps with spatial learning.

For the past three or four years, researchers at the University of Colorado Denver's College of Engineering and Applied Science have been investigating concept maps as a philosophy and technique to improve learning among science and engineering students. In pursuing that goal, the investigators conducted their own experiments with concept mapping using their own concept maps called Visual Logic Maps (vLms).

These experiments at the University of Colorado Denver (UCD) on the the use of Visual Logic Maps show that they increase concept comprehension and content knowledge in STEM disciplines. In an undergraduate college general chemistry course students enrolled in the experimental classroom (n = 60) were asked to develop their own visual logic concept maps to better understand the content of readings in their chemistry textbook. Students who were enrolled in the control classroom (n = 58) studied the same learning content,