Topological taxonomy

The topological taxonomy classifies concept maps according to five criteria: concept recognition, presence of linking phrases, degree of ramification, depth, and presence of crosslinks. These criteria consider progressively more complex topological entities, beginning with concepts, passing through propositions, and ending with the complete concept map. We note that in order to apply the first criterion, one must consider content. Therefore, this would appear to be a semantic criterion—and it is. However, the ability to recognize individual concepts is so basic to being able to build up rich, interconnected, flexible concept map topologies that this criterion is included among the structural criteria. In other words, the focus is not on what is actually said, but on whether the mapper is able to recognize concepts in their original context and depict the way in which they are related to one another. Once nodes (concepts) have been placed in a map, they are related to one another to form larger graphic structures, usually triads, by means of any form of symbolic representation—this is the linking phrase. Ramification occurs when several relationships emanate from the same node or make use of the same linking element; this event is usually thought to be related to Ausubel's (1968) notion of "progressive differentiation;" hierarchical depth refers to the number of levels of concepts nested under the root (main) concept of the map. Though this nesting may indeed be evidence of conceptual subsumption, the two are not to be confused; this topological criterion considers only the number of levels, not what concepts are placed in each of them. The last criterion deals with crosslinks. From the perspective of spatial organization, crosslinks, when accompanied by all the other elements mentioned above, lead to topological entities of greater overall complexity. They are thought to be associated with "integrative reconciliation," another fundamental principal of Ausubelian theory.

Semantic Scoring Rubric

The semantic scoring rubric used to evaluate the maps consists of six semantic criteria: concept relevance and completeness, correct propositional structure, presence of erroneous propositions, presence of dynamic propositions, number and quality of crosslinks, and presence of cycles. As before with the topological taxonomy, in this semantic rubric content is considered at different, increasingly complex, levels. The first criterion involves the level of individual concepts, what one might call the "atomic" level of meaning present in a concept map; criterion 2 moves up a notch, to the "molecular" level, which involves being able to construct and express coherent units of meaning in the form of propositions; continuing to higher levels, criterion 4 looks at the sophistication of the relationship established between concepts in a proposition along a static–dynamic scale; further up, criterion 3 ascertains the veracity of those units, relative to external objective standards, that is, in relation to contextual elements; finally, criteria 5 and 6 involve the entire concept map; in our metaphor, this might be the level of "matter," where individual strings of meaning present in a concept map are tied together, as the mapper draws from his or her life's experiences to generate an integrated, coherent whole (Beirute & Miler, 2008, p. 465).