Generalization

From Wikipedia, the free encyclopedia

Look up ***generalisation*** in Wiktionary, the free dictionary.

A **generalization** (or **generalisation**) is a concept in the inductive sense of that word, or an extension of the concept to less-specific criteria. It is a foundational element of logic and human reasoning. Generalizations posit the existence of a domain or set of elements, as well as one or more common characteristics shared by those elements (thus creating a conceptual model). As such, they are the essential basis of all valid deductive inferences. The process of verification is necessary to determine whether a generalization holds true for any given situation.

The concept of generalization has broad application in many related disciplines, sometimes having a specialized context or meaning.

Of any two related concepts, such as *A* and *B*, *A* is a "generalization" of *B*, and *B* is a special case of *A*, if and only if

- every instance of concept *B* is also an instance of concept *A*; and
- there are instances of concept *A* which are not instances of concept *B*.

For instance, *animal* is a generalization of *bird* because every bird is an animal, and there are animals which are not birds (dogs, for instance). (See also: Specialisation (biology)).

Contents

Hypernym and hyponym

The relation of *generalization* to *specialization* (or *particularization*) is reflected in the contrasting words hypernym and hyponym. A hypernym as a generic stands for a class or group of equally ranked items—for example, *tree* stands for equally ranked items such as *peach* and *oak*, and *ship* stands for equally ranked items such as *cruiser* and *steamer*. In contrast, a hyponym is one of the items included in the generic, such as *peach* and *oak* which are included in *tree*, and *cruiser* and *steamer* which are included in *ship*. A hypernym is superordinate to a hyponym, and a hyponym is subordinate to a hypernym.

Examples

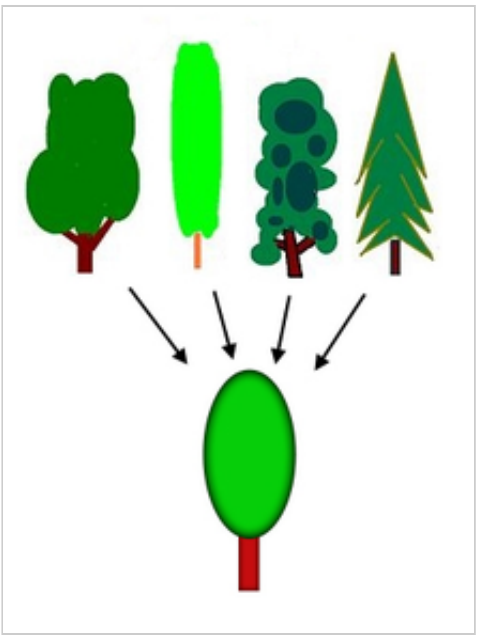
Biological generalization

An animal is a generalization of a mammal, a bird, a fish, an amphibian and a reptile.

Cartographic generalization of geo-spatial data

Generalization has a long history in cartography as an art of creating maps for different scale and purpose. Cartographic generalization is the process of selecting and representing information of a map in a way that adapts to the scale of the display medium of the map. In this way, every map has, to some extent, been generalized to match the criteria of display. This includes small cartographic scale maps, which cannot convey every detail of the real world. Cartographers must decide and then adjust the content within their maps to create a suitable and useful map that conveys geospatial information within their representation of the world.

Generalization is meant to be context-specific. That is to say, correctly generalized maps are those that emphasize the most important map elements while still representing the world in the most faithful and recognizable way. The level of detail and importance in what is remaining on the map must outweigh the insignificance of items that were generalized, as to preserve the distinguishing characteristics of what makes the map useful and important.



When the mind makes a generalization, it extracts the essence of a concept based on its analysis of similarities from many discrete objects. The resulting simplification enables higher-level thinking.

Geometric generalizations

A polygon is a generalization of a 3-sided triangle, a 4-sided quadrilateral, and so on to *n* sides. A hypercube is a generalization of a 2-dimensional square, a 3-dimensional cube, and so on to *n* dimensions.

See also

Wikiquote has quotations related to: ***Generalization***

- Abstraction
- *Ceteris paribus*
- Ethical Generalization
- Class diagram
- External validity (scientific studies)
- Faulty generalization
- Generic (disambiguation)
- Generic antecedent
- Hasty generalization
- Inheritance (object-oriented programming),
- *Mutatis mutandis*
- -onym
- Ramer–Douglas–Peucker algorithm
- Semantic compression
- Specialization (logic), the opposite process

Categories: Thought | Inductive reasoning
