

Function and construction

The distinction between the function and the construction of a system is of utmost importance. In a truly ontological sense, a system is its construction.

The function of a system is in the eye of the beholder. So, a system's function is not an inherent system property but a relationship between a stakeholder and the system.

By definition, a conceptual model of the construction of a system, also called a constructional model of the system, is a white-box model, and a conceptual model of the function of a system, also called a functional model of the system, is a black-box model.

A white-box model of a system shows the construction and operation of the system.

A black-box model of a system shows the function and the behavior of the system from the point of view of a stakeholder.

The technique to hide or reveal detail in a conceptual model is called composition and decomposition respectively. Related to white-box models we speak of constructional (de)composition. Related to black-box models we speak of functional (de)composition.

The fundamental difference between function and construction explains why there is only one constructional decomposition (i.e. the most detailed one, showing all elementary parts) of a system and numerous functional decompositions. So, there is exactly one (fully decomposed) constructional model of a system, whereas there are in principle as many functional models as there are stakeholders.

It also explains why discussions about the 'rightness' of a functional model are useless. A functional model is always 'right' in the eye of the beholder, and probably (but not necessarily) 'wrong' in the eye of another stakeholder.

Having understood this, it is also important to note that people may agree on the function of a system. Only on the basis of such an agreement is it possible to design a system, starting from a functional model.

It is also important to note that the relationship between function and construction will never be trivial, and that there can never be a 'mechanical' transition. Conceiving a construction that will realize a function, once it is engineered and installed, and put into operation, will always remain a creative act.