Meanings of the Term 'Subject'

1. Overview

In Chapter 2, we have introduced the concept of the subject from the perspective of Subject-oriented Business Process Management and detailed in the subsequent sections. In addition, the term is used in many other disciplines and contexts in different meanings. A short glance at Wikipedia reveals the following interpretations of the German word ‘Subjekt’ ([www.wikipedia.org](http://www.wikipedia.org), March 24, 2011):

* Role of a civil person:
  + Until the French Revolution: that of the Vassal
  + After the French Revolution: that of the free and self-conscious citizen
* Colloquial speech: person, often used pejoratively
* Term of philosophy:
  + Reference point within subject-object splitting
  + Position of a term in a statement of the traditional logic
* Concept of social science: individual, consciously acting person
* Concept of law: a legal entity, having rights and obligations
* Concept of international law: having rights and obligations
* Concept of Linguistics (grammar): a phrase or word
* Definition of economics: economic subject, a single economic entity acting
* Concept of the Russian Federation: federation object, administrative unit

A translation into English leads to ‘subject’, by which ‘theme’ is to be understood. This is evident for example in e-mail programs. Figure 1 lists common meanings in English (http://www.websters-online-dictionary.org/definitions/subject, download March 23, 2011).



Figure 1: Possible meanings of ‘subject’ in English

The multitude of different interpretations of the term ‘subject’ can lead to misunderstandings. Therefore, we will explain below, the understanding of the term in selected areas, such as mathematical logic and computer science, in order to single out its meaning in S-BPM.

2. Subjects in Mathematical Logic

The terms subject and predicate are also used in mathematical logic, but unlike in the natural language. The following discussions of the two terms in mathematical logic are mainly based on [Detel 2007].

"Logic is a special theory of argumentation" [Detel 2007]. The logic examines the validity of an argumentation in terms of its structure without referring to the content of statements. Statements are sentences dominated by descriptive use and their truth values. True and the false, abbreviated as t and f are called truth values. Sentences used for description aim to transmit information and the statement of facts [Detel 2007].

In comparison, sentences used with an expressive intention mainly transmit feelings, while sentences with evocative transmit appeals. Speech acts denote the nature and manner how sentences are used. The predication is a speech act, namely, a statement that specific items have a particular property or relationships to each other. A predication is performed in two steps: First, an item is picked out, and in a second step it is classified by assigning a property. In predication, two types of words are used.

One type helps single out objects. These words are termed nominators or, in older treatises on logic, referred to as subjects [Detel 2007]. The second part of speech items helps classifying objects with specific properties. These words are denoted as predicators or, in older philosophical texts, as predicates [Detel 2007]. There is a difference between single- and multi-predicators. Multi-predicators refer to relationships between multiple objects.

The meaning of the terms subject and predicate in logic is completely different from the grammatical categories of the same name. Some nouns, all verbs, and all adjectives are predicators. Nouns are also reserved terms and consequently, nominators. Labels and demonstrative pronouns are different types of nominators. "The predication-theoretical distinction between different types of nominators and between single- and multi-predicators has no correspondence in the grammar" [Detel 2007].

Since Subject-oriented BPM is inspired by the concept of subjects in the grammar of natural languages, the terms subject, predicate, and object of S-BPM have nothing in common with the same concepts in logic, and derived from this, the Semantic Web.

3. Subjects in Computer Science

3.1. Subjects in Subject-Oriented Programming

In computer science, the word ‘subject’ in connection with the subject-oriented programming has a special meaning. This is shown in Figure 2.



Figure 2: Definition of subject-oriented programming (http://www.websters-online-dictionary.org/definitions/subject)

The German translation is ‘subjekt-orientierte Programmierung’, although the English word ‘subject’ rather refers to the German term ‘theme’ (wikipedia http://de.wikipedia.org/wiki/Subjektorientierte\_Programmierung, download May 08, 2008).

Subject-oriented programming is an extension of object-oriented programming, and was first published in 1993 by William Harrison and Harold Osher [Harrison et al. 1993]. It has the goal to compensate the deficiencies of object-oriented programming in the development of large applications and when merging independently developed applications. In addition, different views on a program (subjective views) are supported. The theme ‘subject-oriented programming’, however, has not been pursued in research. At least there are no publications after 2000. The issue seems to be more or less absorbed by aspect-oriented programming.

3.2 Subjects in the Semantic Web

Another meaning of ‘subject’ in computer science exists in the context of the Semantic Web. The data on the Web are currently interpreted by humans exclusively. However, they are increasingly overloaded due to the flood of information available on the Internet. The aim is therefore to increasingly let machines interpret and process information. This requires the so-called Semantic Web, in which data is structured and prepared in a form allowing computers to relate it and to process it as an overall entity, similar to the database query.

In order to achieve that, the available knowledge needs to be represented formally. This allows the retrieval and processing by computer programs. An important concept in computer science in this context is ontology. Ontologies define relevant objects in a particular field of knowledge, their properties, and mutual relationships.

Ontologies are now often described with the language RDF (Resource Definition Framework). The central idea of ​​RDF is to describe binary relations between clearly identified resources [Stuckenschmidt 2011]. These binary relations are represented as a triple with subject, predicate, and object. Here, the predicate describes the relation between specified resources, denoted as subject or object. Hence, the predicate in RDF corresponds to a binary predicator from logic, and the subject or object in RDF are nominators. The use of the terms subject, predicate, and object in the field of the Semantic Web, the terms correspond to their use in mathematical logic.

4. References

[Detel 2007]

Detel, W.: Grundkurs Philosophie, Band 1, Logik, Ditzingen 2007

[Harrison et al 1993]

Harrison W., Osher, H.: Subject-Oriented Programming - A Critique of Pure Objects, Proceedings of the 1993 Conference on Object-Oriented Programming Systems, Languages, and Applications, Washington 1993

[Stuckenschmidt 2011]

Stuckenschmidt, H.: Ontologien - Konzepte, Technologien und Anwendungen, 2nd Edition, Heidelberg 2011