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BASIC TERMINOLOGY CORPUS MAPPING

Abstract

The aim of this paper is to review the categorical analysis of terms as a tool to model the basic terminology corpus in different purposes: to limit the basic terminology area, to build a conceptual hierarchy in principle from general to specific, to select the terms for the dictionary and to set the translation equivalents.

Any scientific terminology today is integrative in its nature. This fact probably reflects the tendency of society in virtually all of its manifestations. We see a convergence and interpenetration of economics, politics, and culture. In the special languages and sublanguages, the processes of terminologization and determinologization of linguistic signs are recorded and displayed continuously. Thus, the terminology of any field of science today is a conglomerate of language related areas. Figuratively a lexical subsystem can be likened to a rock containing various minerals, and the task of identifying and structuring the basic terminology - with the task of dressing fertile materials. To illustrate the integrative nature there is the environmental terminology in all its ramifications. Here is an example of the text, which illustrates the mixed nature of the terminology of "environmental audit".

For example, the text fragment "system of payments for the use of mineral and living resources, as well as dumping of wastes and other materials on the continental shelf includes penalties for exceeding the limits and the irrational use of living resources, excise taxes, charges for the reproduction of the mineral resource base" includes the following multifunctional terms:

- *materials, system, use* – **general science terms**;
- *payment, penalty, excise tax*, – **interscientific terms**, as recorded in the dictionaries of the economy, banking, accounting, business;
- *living resources, mineral resources* – **special science terms** (biological);
- *continental shelf* – **special science terms** (geography);
- *waste disposal, improper use, reproduction* – **special science terms** (environmental)?

This section of the text reflects the actual situation: **interscientific terms**, **general science terms**, **special science terms** successfully interact with one another, describing the specified inter-disciplinary area. Suppose we are interested in identifying the basic environmental terms. Yet, however, to isolate the terms which clearly belong to the terminology of environmental auditing is very difficult. In this connection the question arises: “What constitutes an environmental audit terminology and how to limit it from other terminologies”.

We actually can assume that the task of forming the base of the array of terms is solved in the standards and dictionaries. However, at present there are no specialized glossaries and explanatory dictionaries of such a progressive area of financial and industrial sector of the real economy, as environmental audits. The standards are also the most common situation for management and auditing. The terminology in the standards are not stratified, and only a small portion - about 10% of the total number of terms, the legislation included in the terminology of environmental audit - is defined.

The development of scientific terminology in any field will certainly face the need to develop principles for the selection of terms and construction terminology as a basis for term system mapping in a variety of purposes such as terminology standardization, dictionaries compiling, special languages learning and teaching. In this paper I would like to review the categorical analysis of terms as a tool to model the basic terminology corpus.

Categorical analysis begins with generic definition, i.e. the concept of a special tabulation takes the broader generic concept which can collect and classify particular types of concepts into classes and groups, classes and categories. A **term** is: *a sign, a word, a lexical unit*. A **language** – is *a sign system*. **Aerobes** are *organisms*. **Hydrophytes** are *plants*. **Abiogenesis** is a *theory*.

If we take a closer look at these generic concepts, we note that there may be different degrees of remoteness (generalization): **term** – are *a unit*

and a lexical unit and a word and a special word. That is, any term can be summed up under the direct {immediate} generic concept or a more extensive, and there may be several "steps" of generalisation: *the suffix* → *morpheme* → *derivative morpheme* → *lexical unit* → *language unit*.

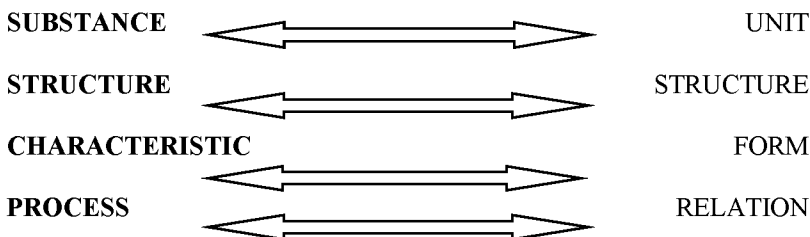
With it all the broadest concepts for any amount of specific terms make up term system "top". Thus, the broadest concept for the terms *word*, *term*, *suffix* will be *a unit*; for the terms *aerobes* and *hydrophytes* – *organisms*. If we collect all the "elite", we get the basic categorical notions of a field of knowledge. For example, the logical conceptual analysis of definitions of 3980 Russian and 5960 English environmental terms made possible to identify hundreds of categorical concepts further grouped into fields that are based on hierarchical relationships between their elements. [Kovyazina, 2006]. The categorical analysis of environmental terminology resulted into: 18 conceptual fields in English: **1) matter, 2) process, 3) space, 4) measurement, 5) science, 6) quality / property, 7) state / condition**; 8) bioecology, 9) autoecology, 10) atmosphere 11) hydrosphere, 12) lithosphere, 13) pedosphere, 14) agriculture, 15) climatology and meteorology, 16) forestry, 17) environmental economics, 18) environmental protection and 19 conceptual fields in the Russian language: **1) material, 2) process, 3) space, 4) value, 5) Science 6) Society, 7) sign, 8) state** 9) bioecology, 10) autoekologiya, 11) atmosphere, 12), the hydrosphere, 13), the lithosphere, 14) pedosfera, 15) agriculture, 16), climatology and meteorology, 17) forestry, 18), environmental protection, 19), environmental economics.

Here we dwell on two types of categorical concepts - special and general, universal. For example, from those 18 English and 19 Russian environmental concepts the first 7 English and the first 8 Russian (listed in bold) are universal (general scientific) categories. In this example we observe the presence of both general and specific basic concepts in one term system.

Because the whole world picture and the whole conceptual universe at one time had been artificially divided into different term systems, sciences and disciplines, there is nothing surprising in the fact that to define terms in different areas along with special categories we use common ones, such as *structure, process, property, method, parameter, substance*, etc. For example, the category sets of two, seemingly so different, and usually opposed term systems such as the natural science (environment) and human (linguistics) can easily be related:

**General
environmental categories**

**General linguistic
categories**



Thus, the special categorical concepts are hierarchical nodes in a term system. At the same time general, universal, categorical notions perform integrative functions that establish interdisciplinary interscientific communication and stress at the same time specific to each term system conceptual objects.

Categorical modeling makes it possible to solve practical problems, such as the selection of terms in the dictionary and vocabulary development in the amount of basic terminology. Practical lexicography has accumulated extensive experience in developing the principles and methods of selection and organization of terms. Today, it is clear that the development of vocabulary in different stages should involve both specialists and linguists-terminologists. The first - have knowledge in the area and can build virtually a term system of any fragment , or concept ("bottom up"), the second, knowing the laws of language and speech, can model terminology as a sign system ("top down").

We know that modern terminological dictionaries based on their typological parameters and functions, offer different vocabulary models: thematic, field, nesting. But all of these models largely determine the means of arranging and semantization of somehow limited vocabulary and do not focus on the development of guidelines limiting the quantitative and qualitative composition. They usually do not answer the question "What kinds of topics, fields, groups and subgroups would make up the dictionary term corpus?" Perhaps the reason that they do not limit the array of terminology "top," is their functional orientation. They are mostly intended to describe terminology, and not to build it up.

The proposed model is based on universal conceptual categories, such as substance, property, quality, process, structure, etc., which make possible to set upper limits and determine the amount of terms in a term system as a set of a certain number of categories, followed by the sub-categories - terms of different generic levels.

To illustrate the categorical analysis, let us take the environmental terminology. As shown by the logical-conceptual analysis, it is based on

four broad conceptual categories: *substance, structure, characteristic and process*. And all the ingredients environmental term system, namely, atmosphere, hydrosphere, biosphere, lithosphere, fit into this categorical grid.

Filling each category specific terms may vary depending on application purposes. Thus, applying the grid to a specific array of terms, we define the conceptual structure for each category in order to create volume and structure of particular terminology. For example, Fig. 1 shows the distribution within these categorical grids of the English terminology subsystem ATMOSPHERE, taken from the vocabulary of A Dictionary of Ecology, 1998.

ATMOSPHERE

SUBSTANCE

air (mass) (9)

Antarctic air
Arctic air
maritime air
polar air
saturated air
soil air
thermal
tropical air
warm sector

STRUCTURE

atmospheric structure (16)

atmospheric 'window'
convective cell
exosphere
free atmosphere
heterosphere
homosphere
ionosphere
mesopause
mesosphere
stratosphere
thermosphere
tropopause
troposphere
layer
 boundary layer
 ozone layer

CHARACTERISTICS

atmospheric condition (16)

- buoyancy

- humidity

 - absolute humidity

 - relative humidity

 - specific humidity

- instability

 - conditional instability

 - convective instability

 - potential instability

- inversion

 - radiation inversion

 - surface inversion

 - temperature inversion

 - trade-wind inversion

- stability

- supersaturation

PROCESS (15)

atmospheric boil
atmospheric circulation
 breeze
 land and sea breezes
 sea breeze
 direct circulation
 general circulation
 meridional circulation
jet stream
 polar-front jet stream
 subtropical jet stream
lee waves
rossby waves
shimmer (atmospheric boil)
swell

Figure 1. Category model of the subsystem «ATMOSPHERE»

Let us turn back to the investigation of environmental audit terminology and gradually consider the process of categorical modeling of terminological system with the purpose to isolate the basic terminology and to shape the term-list of the systematizing the glossary (Kantysheva, 2009). Having analyzed more than 2000 terminological units from different sources the following results were obtained:

Firstly, the related term fields of environmental audit were isolated and identified (53% of all the environmental audit terms):

- Insurance (4%): *the insurance field, the maximum damage, insurance coverage, compensation;*
- Banking (1%) *deposit account;*
- Economy (6%) *contributions, payments, costs, expenses;*
- Management (11%): *quality management, customer satisfaction, product characteristics;*

- Law (8%): *a framework agreement, contract, relationship, amendment;*
- Business (3%) *offer, investment attraction, entrepreneur, limited competition;*
- Ecology (22%): *environmental compatibility, natural resources, waste water, emissions, ozone depleting substance;*
- Geography (4%): *internal waters, water bodies, wetlands.*

These areas, along with the block of "environmental audit terms" amounted to three thematic macro-groups: ***institutional arrangements, the economic mechanism and the natural mechanism.*** Categorical analysis of the terms of environmental audit included the following steps:

a) genus-species analysis of terminological definitions in order to establish conceptual relations between terms. As a result, it received 26 general tribal specific concepts that can be put together as a pair: a genus / species, part / whole. For example, ***special audit*** is a generic term for concepts such as *proactive audit, an additional audit, the chief audit, external audit, internal audit, statutory audit, general audit, operational audit, the primary audit, periodic audits*. Special concept ***paper*** includes the following *specific concepts such as the protocol, certificate, license, passport, claim, order, agreement, conclusion*. In turn, the notion ***opinion*** is a generic concept for the auditor's opinion the registration, positive opinion, adverse opinion, conditionally positive conclusion;

b) categorical analysis of generic terms to get the conceptual fields of categorical identity. As a result of the categorical analysis of dictionary definitions of environmental audit terms **six** specific science categories (***object, process, structure, substance, subject, description***) and **six** branch categories (***the economic foundations of audit, legal framework for the audit, the audit method, the stage of the audit standards and requirements audit control parameters***) were identified.

Another terminological problem that causes conceptual and categorical analysis is the development of translation dictionaries, where the basic principle is self-contained independent modeling of a terminological system of different languages. Note that the dictionary multilingual "correspondences" of scientific terms are not "translatable" (in the literal sense of the word), they are produced as conceptual correspondences. As a clear illustration of the need of a comparative conceptual and categorical analysis serves a fragment of Russian and English subject index "air" in the thesaurus of environmental terms GEMET (2004):

Table 1

1.автомобильные выхлопы

1.acid rain

2.азот	2.aeration
3.аммиак	3.aerobiology
4.анализ отходящего газа	4.aerosol
5.аппарат респираторный за- щиты	5.afterburning
6.асбест	6.air
7.асбестоцемент	7. air movement
8.атмосфера	8.air pollutant
9.атмосферные осадки	9 air pollution
10атмосферный выброс	10.air quality
...232	...232

A fragment of Russian and English subject index "air" both lists, as we see, provide the same number of terms, which means that these lists contain the same ecological concepts, which are marked differently in different languages. Term-signs are arranged alphabetically and therefore they can, of course, not correspond in form in different languages, since the terms are formed according to certain term-shaping patterns. To arrange them according to relevant English and Russian characters, it is necessary to correlate them through the same general concept. The thematic index of "air" thesaurus GEMET we immediately note a direct correspondence between the English and Russian atmosphere/атмосфера, asbestos /асбест, asbestos cement /асбестоцемент, because they are transparent and have the same form. A little harder is to understand the terminology of correspondences with at least one component: atmospheric /атмосферный, with Russian terms numbering 6, and English – 20, correspondingly. This means that the same terminological model produced 6 terms in one language and 20 in the other, and to find all Russian correspondences for the English terms it is necessary to scrutinize all the concepts outlined by these terms, i.e. to move from a system of terms into a system of concepts. The compulsory stage of conceptual analysis here is the categorical analysis.

Thus, the categorical model of scientific terminology simultaneously solves two problems:

1. It limits the terminology array, sets the volume and the structure, followed by the necessary content.

2. It builds a conceptual hierarchy in principle from the general to specific.

In this respect, we have restricted ourselves to the examples, illustrating the benefits of **application the categorical analysis as a tool for modeling a terminological system for the two purposes**:

1. To structure the basic terminology and to select the terms for the dictionary.

2. To set translation dictionary correspondences.

We leave beyond this presentation educational possibilities of the categorical analysis of the term. More results in this area can be found in papers by V. Tabanakova and M. Kovyazina, 2007.

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Пермь

СПЕЦИФИКА РЕПРЕЗЕНТАЦИИ КОНЦЕПТА «ЦЕЛЬ» В МЕТОДИКЕ ОБУЧЕНИЯ ИНОСТРАННЫМ ЯЗЫКАМ

В современном информационном обществе, в котором во главу угла ставятся такие понятия как личность и её потребности, межличностные отношения, всё больше возрастает интерес к таким научным областям, которые так или иначе связаны с данными понятиями. Именно поэтому к методике обучения иностранным языкам наблюдается повышенное внимание. Традиционно в методике обучения иностранным языкам выделяются два субъекта учебной деятельности, учащийся и обучающий [Зимняя 2001: 124], соответственно два субъекта учебного процесса.

Следует заметить, что статус методики обучения иностранным языкам долгое время дискутировался. Возможно, это было связано с тем, что не было достаточной потребности в изучении иностранных языков по причине «закрытости» России по отношению к другим европей-