LSP Dictionaries and Their Genuine Purpose: A Frame-based Example from MARCOCOSTA*

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A dictionary is written and designed for a specific addresse (user group). Primary considerations in this respect are users' profiles and the special needs of the user group *(Bergenholz and Nielsen 2006). User needs are inevitably linked to the knowledge level of potential readers, who have a situational context and engage in activities, which can be facilitated by lexicographic data. Such information significantly affects both the micro and macrostructural design of the lexical resource, and is directly related to Wiegand's conception of genuine purpose (Wiegand 1998:52). These theoretical parameters dealing with users' profiles, users' needs and use situation should necessarily be reflected in the way information is packed in lexicographical entries, i.e. in the way definitions are organized and structured. This article examines how LSP dictionaries deal with this issue. The example chosen is the term* aquifer. *After a brief overview of how this term appears in current dictionaries, we show how it is represented in MarcoCosta, a frame-based lexical resource that facilitates the acquisition of specialized knowledge.*

1. Introduction

A dictionary, in the same way as any other text, is written with a specific user group in mind. Specialized (LSP) dictionaries focus on a specific subject field, and can be classified in three types: a multi-field dictionary broadly covering several knowledge areas, a single-field dictionary narrowly covering one particular subject field (e.g. law), and a sub-field dictionary covering a subfield within a broader knowledge domain (e.g. constitutional law) (Bergenholtz and Tarp 1995: 58).

At the function level dictionaries implicitly define their user groups by making choices regarding the amount and types of information provided both inside and outside each lexical entry. Primary considerations in this respect are the user profile and the special needs of the user group (Bergenholz and Nielsen 2006).

In specialized lexicography user needs are inevitably linked to the knowledge level of potential readers, who have a situational context, and engage in activities, which can be facilitated by lexicographic data. Such information significantly affects both the micro and macrostructural design of the lexical resource, which should be tailored to what the dictionary will be used for. This is directly related to Wiegand's conception of *genuine purpose* (Wiegand 1998:52), which is defined by Bergenholtz and Tarp (2003: 176) as the totality of functions of a given dictionary and the subject field(s) that it covers.

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2. Pragmatic context

As suggested by Abel and Ralli (2006), the description of pragmatic context can be approached by combining the concepts of *use situation* (Wiegand 1998) and *user situation* (Bergenholtz and Tarp 2003, Bergenholtz and Nielsen 2006—inter alia) so as to enjoy the best of both worlds.

LSP dictionaries are generally written by experts for other experts, who may be experts in their technical or scientific field, but who are not experts in specialized lexicography. They do not make allowances for the fact that such dictionaries are often consulted by lay or semi-specialized users, who have little or no mastery of the subject field. An important issue in specialized lexicography is how technical and scientific concepts should be represented so as to provide a non-expert user with an adequate understanding of their meaning as well as sufficient knowledge of their location within the general knowledge structure of a scientific or technical domain. One of the ways to help users to do this is to reconsider the scope of user guides (Nielsen 2006), and relate them to the communication and/or cognitive functions of the dictionary.

2.1. *The genuine purpose of an LSP dictionary*

Dictionaries have been defined as *utility products* (Weigand 1998). As such, they must be designed and compiled to provide assistance to a specific user, who faces complex needs that arise in a specific type of use situation. This is known as their lexicographic functions[1] which, together with the subject field they cover, make up their *genuine purpose*.

2.1.1. *User group and use situation*

In order to create a profile of a specific *user group*, relevant characteristics need to be taken into account (native and foreign language, level of proficiency, level of general and/or subject-field knowledge, etc.). This is particularly relevant in the case of LSP dictionaries, since, contrary to what one might think, the group of potential users can be very heterogeneous and may include translators with very little or no previous subject field knowledge or even a lay readers who wish to find out the meaning of a term that they have come across, for instance, in a newspaper article. However, this user profile must also be related to specific situations in which users interact with a particular lexicographical resource.

According to the functional theory of lexicography, there are two main groups of *use situations*: cognition and communication-oriented situations (Bergenholtz and Tarp 2003, Bergenholtz and Nielsen 2006)[2]. In cognition-oriented situations, users seek additional information to widen their knowledge about the conceptual structure of a particular subject-field (biology, geology, engineering, etc.). Bergenholtz and Nielsen (2006: 286) explain that in these situations, the only communicative act taking place is between the lexicographer and the users of the dictionary. The users want knowledge and the lexicographers provide it at a cognitive level, nothing more. The most difficult task is then, for the lexicographer to decide *how much* information is to be included and how to represent its underlying structure to make the dictionary suitable to meet users' needs.

On the other hand, in communication-oriented situations, two or more persons are engaged in producing or receiving a piece of language. This is the case of a translator who receives and must subsequently produce a text, as well as scientific writers, proofreaders, etc. Here the lexicographer acts as a kind of mediator who helps to solve communication problems.

In this sense, each potential LSP user who may access a specialized lexicographical resource corresponds to one of these two use situations: a lay user taking part in a cognition-oriented

[1] The concept of lexicographic functions has been developed mainly by researchers from the Center for Lexicography of the Aarhus School of Business since the early 1990s (Bergenholtz and Tarp 2003, Bergenholtz and Nielsen 2006).

[2] Bergenholtz and Tarp (2003: 174) term these functions as "knowledge-orientated".

process and a translator or scientific writer involved in a communication-oriented situation. However, even if this clear-cut distinction is widely accepted and quoted in the literature, both use situations are dialectically related (Tarp 2005: 9) and are often found intermingled in a single user-type. This is certainly the case of the translator, who must simultaneously deal with both situations, since there is no *communication* without *cognition*. In order to successful achieve communicative goals, translators need to be provided with knowledge about the conceptual structure underlying the subject field they are working with.

2.1.2. *User needs*

The description of user needs naturally depends on the characteristics of the user group and types of use situations. In an LSP dictionary with translation equivalents, which are aimed primarily at text producers such as scientific writers and translators, these needs may require the inclusion of information about the special subject field, the comparison between the subject field in the native and foreign culture, and both native and foreign LSP information (Bergenholtz and Nielsen 2006: 286).

Nevertheless, all these theoretical parameters dealing with user profile, use situation and user needs must be translated into practice. They should be reflected in the way information is packed in lexicographical entries, i.e. in the way definitions are organized and structured. That is the most difficult task a lexicographer has to come to terms with.

We shall now examine how LSP dictionaries deal with this issue. The example chosen is the term *aquifer,* a natural concept which has an important functional component. Its capacity of holding water is actually the feature that distinguishes it from other similar or coordinate concepts. In Table 1, we show the definitions of this term from various glossaries and dictionaries classified according to the type of information conveyed:

Construction Term Glossary
1. Strata [GENUS] of porous permeable rock or soil [MATERIAL] that is capable of holding a large quantity of water [FUNCTION].
Life Science Dictionary
2. A subsurface [LOCATION] layer [GENUS] of rock [MATERIAL] permeable by water. Although gravel, sand, sandstone and limestone [MATERIAL 2] are the best conveyers of water [FUNCTION], the bulk of the earth's rock is composed of clay, shale and crystalline [MATERIAL 3].
3. A saturated permeable material [GENUS] (often sand, gravel, sandstone or limestone) [MATERIAL] that contains or carries groundwater [FUNCTION]
4. An underground [LOCATION], water-bearing [FUNCTION] layer [GENUS] of earth, porous rock, sand, or gravel [MATERIAL], through which water can seep or be held in natural storage [FUNCTION]. Aquifers generally hold sufficient water to be used as a water supply [FUNCTION 2].
Glossary of Technical Terms: Office of Underground Storage Tanks
5. A geologic formation [GENUS] capable of transmitting significant quantities of groundwater [FUNCTION] under normal hydraulic gradients.
6. A geologic formation, group of formations or part of a formation [GENUS] that contains saturated permeable material [MATERIAL] that yields sufficient, economical quantities of groundwater [FUNCTION].
A Dictionary of Technical and Legal Terms Related to Drinking Water
7. A natural underground [LOCATION] layer [GENUS] of porous, water-bearing [FUNCTION] materials sand, gravel) [MATERIAL] usually capable of yielding a large amount or supply of water [FUNCTION 2].
Drinking Water Glossary
8. A natural underground [LOCATION] layer [GENUS], often of sand or gravel [MATERIAL], that contains water [FUNCTION].
Guide to Environmental Issues: Glossary of Terms & Acronyms

9. A water-bearing [FUNCTION] layer [GENUS] of rock (including gravel and sand) [MATERIAL] that will yield water in usable quantity to a well or spring [FUNCTION 2].
Ecoview Glossary
10. An underground [LOCATION] bed or stratum [GENUS] of earth, gravel or porous stone [MATERIAL] that contains water [FUNCTION].
Terms of Environment: Glossary, Abbreviations, and Acronyms
11. An underground [LOCATION] geological formation, or group of formations, [GENUS] containing water [FUNCTION]. Are sources of groundwater for wells and springs [FUNCTION 2].
Defining Our Terms: a Superfund Glossary
12. An underground [LOCATION] rock [MATERIAL] formation [GENUS] composed of sand, soil, gravel, or porous rock [MATERIAL 2] that can store and supply groundwater to wells and springs [FUNCTION].
General Multilingual Environmental Thesaurus: European Environment Agency
13. Layers [GENUS] of rock, sand or gravel [MATERIAL] that can absorb water and allow it to flow [FUNCTION]. An aquifer acts as a groundwater [LOCATION] reservoir [FUNCTION] when the underlying rock is impermeable. This may be tapped by wells for domestic, agricultural or industrial use [FUNCTION 2]. A serious environmental problem arises when the aquifer is contaminated by the seepage of sewage or toxins from waste dumps. If the groundwater in coastal areas is over-used salt water can seep into the aquifer.
UST Terminology Explained
14. Geological formation, group of formations, or part of a formation [GENUS] that is capable of yielding a significant amount of water to a well or spring [FUNCTION]
Glossary: Office of Solid Waste
15. Underground [LOCATION] layer [GENUS] of rock or sand [MATERIAL] that stores water [FUNCTION]. Humans use wells to get drinking water [FUNCTION 2] from aquifers.
Water Science Glossary of Terms
16. A geologic formation(s) [GENUS] that is water bearing [FUNCTION]. A geological formation or structure [GENUS] that stores [FUNCTION] and/or transmits water, such as to wells and springs [FUNCTION 2]. Use of the term is usually restricted to those water-bearing formations [GENUS] capable of yielding water [FUNCTION] in sufficient quantity to constitute a usable supply for people's uses [FUNCTION 3].

Table 1: Definitions of *aquifer*

In this sense, all the definitions of *aquifer* contain a *genus* (or generic term that designates its membership in a conceptual category) and a description of its function (or how it works). Other important definitional elements (which only appear in some of the definitions) are its *location* and the *material* it is made of, since this is also a part of its function. In other words, its capacity for holding water mainly depends on the nature of its materials and underground location. As a result, in order to get an overall view of the concept, suitable definitions satisfying both lay and semi-specialized user needs should account, to a certain extent, for these four elements. Only seven definitions meet this criterion (definitions 2, 4, 7, 8, 10, 12 and 15), although none of them seem to follow a specific pattern in consonance with the needs of potential users.

Most definitions express an aquifer's basic natural role in the same way: *bearing, holding* or *containing water*. Definition 2 is the only exception, where the function is reflected in a very implicit way. It refers to materials as "conveyers of water", rather than focusing on the actual function of an aquifer. Obviously, such a definition would not be useful in any of our use situations.

On the other hand, no consensus can be found concerning its *genus*. *Aquifer* appears to be defined as a *stratum*, a *layer* or a *geological formation*. In the first case (definitions 1 and 10), the term *stratum* would need further clarification, especially for a lay-user, as opposed to the case of *layer* (definitions 2, 4, 7, 8, 9, 13, 15), which would be too generic for a semi-specialized one. *Geological formation* (definitions 5, 6, 11, 12, 14, 16) seems to be the most

appropriate *genus* as it frames the concept, placing it in a concrete specialized field and constitutes what Rosch et al. (1976) call the basic level (the best example of a category which is related to the best designation of any referent). An example of a *genus* that may even confuse the reader can be found in definition 3, where an aquifer is described as being a type of the material of which it is composed.

Moreover, another functional aspect of the concept is based on what an aquifer can be used for. This is why the concept can be linked to artificial contexts and may be part of very different specialized dictionaries (i.e. life sciences, geology, construction, engineering, water supply, environment, etc). In this sense, different functions can be encountered as a focalization of information derived from its main natural role, *holding water* (definitions 4, 7, 9, 11, 12, 13, 14, 15, 16). Based on the specialized domain covered by each dictionary, this focalization occurs in different ways. For instance, definitions 5 and 6 are taken from a technical dictionary made by an office in charge of extracting natural resources. This is why aquifer functions are only described in terms of human profit. The definitions focus on groundwater as an economical resource. They do not focus on the natural holding capacity of the aquifer, but rather on the possibility of transferring it to the surface. Yet, neither of the two definitions shows any information about the type of materials or the location.

The rest of definitions that include aquifer functions, apart from mentioning the natural role of the aquifer, focus on how to use it at three different levels of specialization: as a source of water supply in general (4, 7, 13, 15, 16), how it can yield water to wells and springs (9, 11, 12, 14), and how stored water can be used for human purposes (16): domestic, agricultural, industrial uses (13).

However, none of them covers all the four necessary elements for a suitable definition. They all lack certain accuracy in terms of pragmatic needs. As a consequence, an optimal combination of all these definitional components has been used to design our proposal according to our user profiles, needs and situations.

3. Frame-based dictionary macrostructure in MARCOCOSTA

MarcoCosta (Multilingual Specialized Knowledge Frames for Integrated Coastal Management) is a research project that has generated the conceptual representation of the specialized domain of *Integrated Coastal Management* in the form of a visual thesaurus of specialized concepts organized in a constellation of interrelated dynamic knowledge frames. This multilingual (Spanish-English-German) resource, which will eventually include various access modes, provides information about the Andalusian coastline for different user profiles (e.g. experts in environmental studies, writers of scientific books and articles, university students, translators, and even tourists).

According to Grinev and Klepalchenko (1999), the description of specialized domains can in many cases be based on the events that generally take place in them, and can be represented accordingly. As a result, most generic categories in coastal engineering have been configured in a prototypical domain event or action-environment interface (Barsalou 2003: 513, Faber et al. 2005), which provides a frame for the organization of more specific concepts.

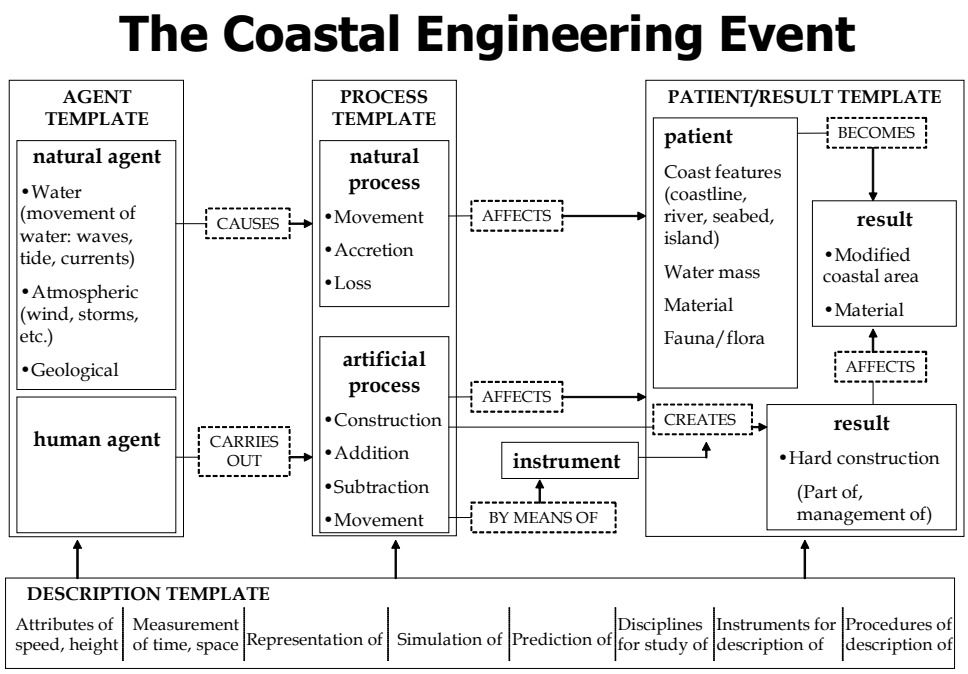

Figure 1: Coastal Engineering Event

Based on the cognitive use situation, term entries are organized according to these macrocategories so that users can browse the application from an overall view of the field to a particular understanding of each concept. In the case of *aquifer*, it can be found in the geological category within the *Agent Template*.

3.1. Term entry structure: the example of aquifer

Each lexicographic entry in our specialized knowledge resource meets both cognitive and communication needs. First of all, every concept is linked to a conceptual network that provides the user with knowledge about its underlying structure. Secondly, the concept is described in a frame-based microstructure where different pieces of information activate the set of most relevant conceptual relations codified in its definitional statement.

The organization of concepts on both conceptual levels is based on the qualia roles offered by the Generative Lexicon (Pustejovsky 1995): (1) the formal role (the basic type distinguishing the meaning of a word); (2) the constitutive role (the relation between an object and its constituent parts); (3) the telic role (the purpose or function of the object, if there is one); (4) the agentive role (the factors involved in the object's origins or "coming into being") (Pustejovsky et al. 2006: 3).

Qualia structure can be used to describe terms because it is based on a set of basic building blocks that can be combined to describe complex conceptual structures. It allows for a rich semantic description because concept types, according to GL, (natural, artifactual and complex) give rise to a variety of subtyping relations, resulting from their underlying qualia structure. For example, natural concepts are defined in terms of natural tangible discriminants, whereas artifact concepts are defined in terms of functional behavior. The values of each qualia role can thus represent a particular conceptual dimension, enhancing the systematic representation of multidimensional models.

As a result, all concepts are linked to others through domain-specific relations represented in terms of these possible combinations:

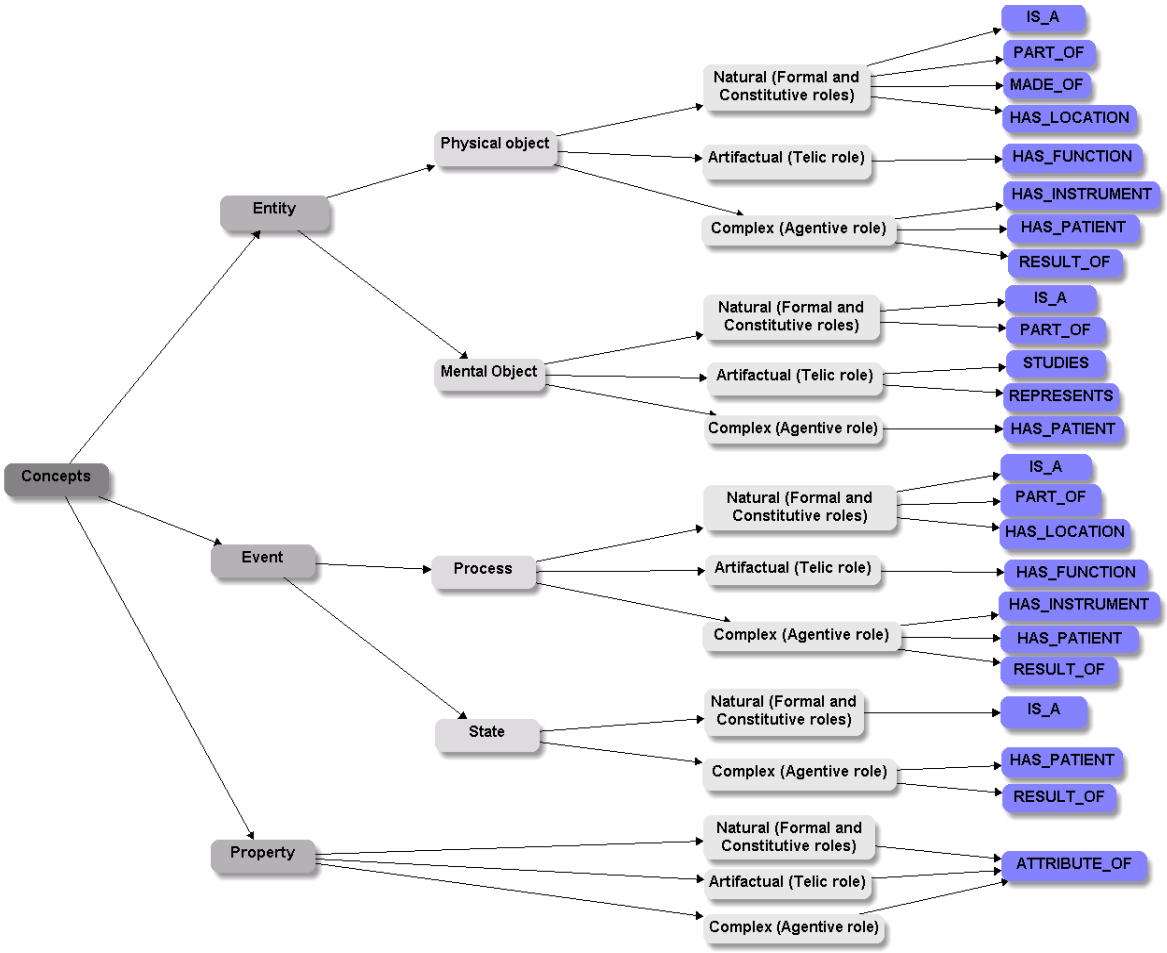

Figure 2: Combination of the concept typology and conceptual relations with Pustejovsky's qualia roles

3.1.1. *Aquifer within a conceptual network*

Once concepts are ascribed to a particular category, they are organized in a conceptual network in which they are linked by both vertical (hierarchical) and horizontal (non-hierarchical) relations in accordance with conceptual nature and their underlying qualia structure. In the database, these concepts can be accessed by clicking the hyperlink in the relevant conceptual category:

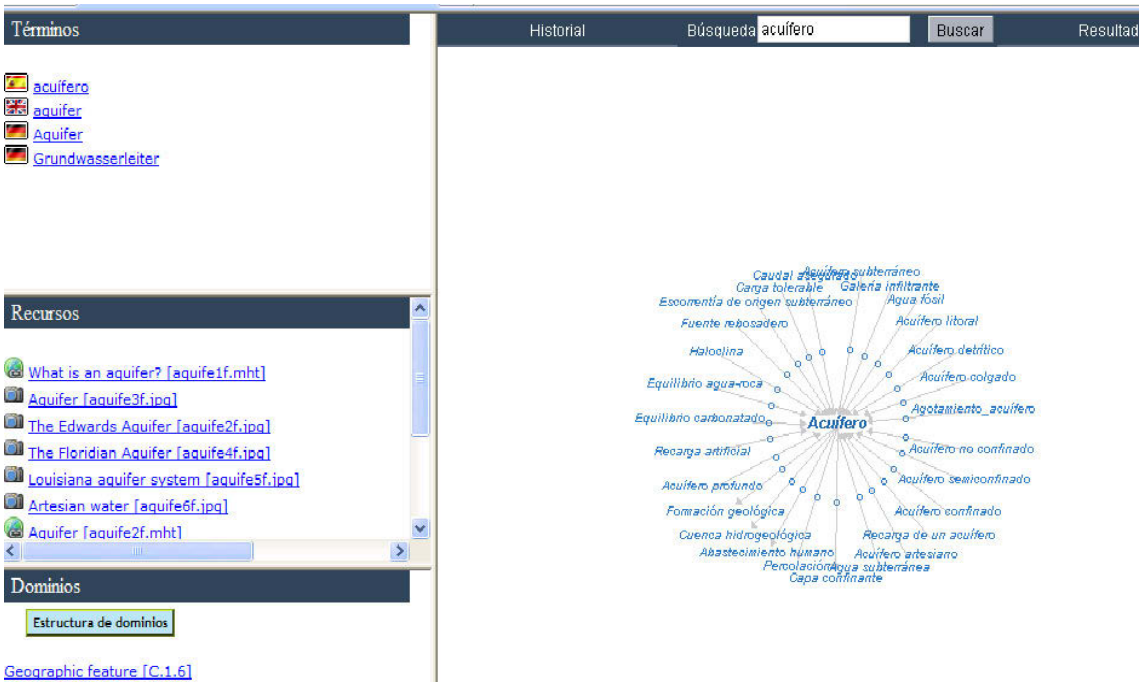

Figure 3: *Aquifer* in the MarcoCosta database

In the main window other concepts, such as *perched aquifer* and *confined aquifer* are related to the *aquifer* by the TYPE-OF relation. The hyperlink of each concept maps back to its own one-level hierarchical network and, as the user browses the application, the conceptual structure of the whole network takes shape. At the same time, translation equivalents are displayed on the left of the screen every time a concept is clicked on.

In this way, both lay and semi-specialized users can widen their knowledge as much as they need, whether they deal with cognitive or communicative situations.

3.1.2. *Definitional microstructure*

According to Strehlow (1993) the representation of concepts by means of definition statements alone is inadequate for many scientific terms. He highlights the fact that the representation of a definitional structure is comparable to a conceptual representation. In consonance with this, we have extracted four definitional elements from existing definitions and elaborated a definition, which is further enhanced with the inclusion of its associated conceptual microstructure:

AQUIFER	
Linguistic definition for both lay and semi-specialized users	
Underground geological formation composed of *[permeable material, such as]* rock, sand or gravel that holds water *[and may serve as a source of water supply to springs and wells for domestic, agricultural or industrial use of groundwater]*.	
Conceptual microstructure	
FORMAL ROLE	Geological formation [IS_A] Underground [HAS_LOCATION]
CONSTITUTIVE ROLE	*[Permeable material]* [MADE_OF] • Rock • Sand • Gravel

TELIC ROLE	Hold water [HAS_FUNCTION] • [*Source of water supply to springs and wells* o *Domestic use* o *Agricultural use* o *Industrial use]*

Table 2: Aquifer: linguistic representation

With this type of representation, both communicative and cognitive use situations are again covered. Not only does it facilitate communication, but it also offers new information about the way the concept is related to others in the same field, since it makes explicit category organization. The definitional structure of *aquifer* shows the formal, constitutive and telic roles through four conceptual relations: *is_a, has_location, ,made_of, has_function*.

On the other hand, two different types of information have been included according to our different user needs. The content in italics represents the knowledge a semi-specialized user would need as opposed to a lay user. The two elements fall into different categories. The first one adds topicalized information about a specific property of materials whereas the second one focalizes its function. This would be in consonance, again, with the basic level conceptual categories of Rosch et al. (1976). *Permeable material* constitutes the superordinate level of *rock, sand* and *gravel*. Lay users have no need of knowledge about this physical property since they will not necessarily link the permeability of materials with the capacity of holding water.

On the contrary, the different types of artificial uses of water make up the subordinate level of the natural function "hold water", which is the only information lay users need to understand the concept *aquifer*. A semi-specialized user, however, needs to relate the concept to several specialized contexts, and particularly, in the case of Marcocosta, the one linked to coastal engineering.

A subject-field component (Bergenholtz and Nielsen 2006) could then be added to the dictionary in the form of an appendix to offer complementary information. Doubtlessly, when belonging to the particular context of coastal engineering, the concept *aquifer* would accordingly require different information to be included in its description.

4. Conclusions

This article has focused on Wiegand's conception of *genuine purpose* (Wiegand 1998: 52) in relation to LSP lexicography, more specifically in the domain of Coastal Engineering. We highlight the importance of creating a resource that corresponds to the profile of a specific *user group*, and which is also related to cognition and communication-oriented situations in which users must interact with a particular lexicographical resource. As has been shown, the characteristics of the user group and types of use situations are directly related to user needs. On a more pragmatic level, we show these theoretical parameters can be translated into practice, more specifically in the way information is organized in lexicographical entries in the *MarcoCosta* visual thesaurus of specialized concepts organized in a constellation of interrelated dynamic knowledge frames.

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