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Terminological Competence and Enhanced Knowledge Acquisition[1]

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Abstract:
One of the essential elements in the translator's understanding of scientific texts is the ability to link terminological units to their corresponding conceptual categories within the specialized domain. This entails extending conceptual networks and knowledge configurations to more specific levels. It also signifies enriching conceptual structures with different types of connections that situate the concept in question in a complex network of relations with other concepts. This is part of the terminological competence of the translator of specialized texts.
One of the main objectives of ONCOTERM (PB98-1342), research project funded by the Spanish Ministry of Education, is the elaboration of a bilingual termbase on Oncology, based on the information extracted from specialized texts as well as medical dictionaries. In order to design the underlying conceptual structure, knowledge parameters have been extracted by means of corpus analysis. In this way, medical concepts are organized in categories, each of which is represented by a template of conceptual relations. This template is systematically applied to all of the members of a category. The resulting concept description is thus coherent with the representation of other concepts within the same category.

0. Introduction

The study of cognitive processing, and more specifically, the study of translation as a cognitive process, is a relatively recent phenomenon in Translation Studies. Insights from cognitive neuroscience have shed light on text processing, hemispherical dominance in the brain, and the activation of language areas in the mental lexicon, all of which are highly relevant in translation and terminology (Conlan 1999; Danks et al. 1997). Cognitive Psychology has given us a better understanding of the functional types and modules of memory, how information is processed in each one, as well as the access and storage mechanisms that operate in long-term or permanent memory (Rose 1993; Baddeley et al. 1996; Posner and Raichle 1994). Thanks to Cognitive Linguistics, we also now have a more flexible perception of category organization and consequently, of word meaning (Rosch 1978; Lakoff, G. 1987; Langacker 1987, 1997). There is presently a growing consensus of opinion that this knowledge should be integrated into the concept of translation competence in order to obtain a deeper understanding of the translation process (Gile 1995; Hurtado Albir 1999).
When researchers propose models of translation competence, what they are really working towards, whether they are aware of it or not, is the modeling of the translator's mind, and therefore, the study of how knowledge, both semantic and procedural, is acquired, used, and represented. One of the major challenges in this kind of modelling lies in the creation of an explicit representation of the specialized knowledge acquired and accessed by a technical translator. In this sense, research initiatives in translation studies can undoubtedly profit from advances in artificial intelligence and knowledge engineering (Sager 1994).

1. Knowledge representation and terminological competence

According to Brachman and Levesque (1985), the notion of knowledge representation is actually a relatively simple one. It has to do with writing down in some language or communications medium descriptions or pictures that correspond to the world or a state of the world. However, before creating such a representation, one must first have a very clear idea of the world to be portrayed.

In this sense, the actual representation of expert knowledge in specialized translation would necessarily include processes such as the rapid acquisition and assimilation of specialized knowledge into previous cognitive structures by extending them to more specific levels. It would also involve the ability to accurately relate this knowledge to specialized linguistic representations in one or various languages. This is part of what might be provisionally called *terminological competence,* a module of translation competence that would comprise the storage of specialized knowledge in memory, automatisms pertaining to terminological access, creativity related to term formation, as well as the translator's ability to solve problems of knowledge acquisition during the translation process, all of which directly affect the creation and establishment of links between conceptual and linguistic representations.

According to Clancey (1993), in order to model knowledge acquisition of any type, it is necessary to establish a correspondence between a knowledge base and two separate subsystems: the agent's behavior (i.e. the problem-solving expertise) and the environment or problem-domain in which this behavior takes place. A model of knowledge specific to expert translation would therefore have two principal components: a knowledge base and an inference engine to perform the reasoning which would account for the translator's ability to carry out tasks specifically related to interlinguistic and intertextual mediation. It goes without saying that it would also incorporate a coherent approach to knowledge representation, whether it be in form of semantic nets, frames, and logic and rule-based systems (Ringland and Duce 1988: 5).

2. Terminological competence and termbases

One of the tests of any translation-specific knowledge representation is its implementation in the design of translation tools, such as terminological databases. Nevertheless, up to the present, a major drawback in many termbases is that they are not encoded as knowledge. Although they tend to promise a great deal, the end result is often disappointing because they are generally conceived in the form of a series of term entries, each with a corresponding set of data categories. However, the term entries themselves are not related to each other conceptually, nor is there a systematic approach to the type or quantity of information that should fill the data categories.

This kind of organization is clearly divorced from what actually goes on in the mind/brain, where conceptual representations have a high degree of connectivity and are based on input from different perceptual systems. Mental representations are interconnected to form a semantic network. in which connections between concepts point to different types of conceptual relations. The more connections that a concept has with others, the more things we know about it.

According to Givón (1995: 395), the conceptual lexicon is a repository of relatively time-stable, culturally-shared, well-coded knowledge about our external-physical, social-cultural and internal-mental universe. It is a network of interconnecting codes, in which the activation of one node activates other related nodes in what neurologists refer to as a spreading activation pattern. Such concepts are types of conventionalized experience, which can be divided into the categories of entities, events, properties, and relations.

In this respect, the translator's knowledge base, represented as a semantic network reflecting associative structure, would be similar to non-experts, though with significant differences. For example, as studies have shown, the brains of expert translators are less lateralized, which means that language is processed in the right hemisphere of the brain as well as the left (Sussman et al 1982; Vaid 1983). Since the right brain is good at grasping wholes, perceiving patterns, and generating emotional and intuitive response, the knowledge base of a translator would presumably have more context-dependent associations and patterns of global text correspondences, something that should be reflected in any model of translation competence.

However, all of this information would still be integrated into an underlying conceptual hierarchy, comprising the structural foundation of the knowledge base. Any type of knowledge acquisition or understanding naturally implies the generation, extension, and linkage of a structure in which new knowledge is integrated into old, and the set of relations between concepts made explicit. To the extent that learning means forming conceptual links, it can be viewed as the reorganization of the translator's knowledge structure resulting from his/her interactions with the environment. The fact that such structure is essentially hierarchical is to be expected, given that hierarchies are central to human cognition. Jackendoff (1997: 16) writes:

> From the point of view of psychology and neuroscience, of course, redundancy is expected. Moreover, so are multiple sources of infinite variability, each with hierarchical structure. One can understand an unlimited number of hierarchically organized visual scenes and conjure up an unlimited number of visual images; one can plan and carry out an action in an unlimited number of hierarchically organized ways; one can appreciate an unlimited number of hierarchically organized tunes.

When this type of organization is applied to the organization of a specialized domain, the resulting structure is an *ontology* (in the artificial intelligence sense rather than the philosophical sense), defined by Gruber (1993), as an explicit specification of a conceptualization. Although there is much talk about how necessary and useful such a structure is in the representation of expert knowledge, it has not as yet been incorporated in main stream termbases. Not surprisingly, such termbases often have limited usefulness in translation because of the poverty of the conceptual description that they contain, which, if present at all, is generally limited to natural language definitions of concepts, copied in a cut-and-paste fashion from other sources.

3. ONCOTERM

All of these considerations and the desire to create a terminological product which would contribute to the enhancement of terminological competence in the translation process, and at the same time incorporate insights from psycholinguistics and neuroscience, led to ONCOTERM, an interdisciplinary research project on medical terminology, funded by the Spanish Ministry of Education and Culture.

The principal objective of the project is the elaboration of an information system specifically designed for translators about a specialized domain. The operational objectives of the project are focused on the creation and configuration of an extensive terminological database with an integrated conceptual system[2], in which theoretical premises from artificial intelligence have been integrated in order to make it into an authentic knowledge base for translators.

The operational objectives are:

- The elaboration of a corpus of medical texts in Spanish and English
- The specification of a language for terminographic definitions in which the vocabulary used for conceptual description as well as the representation of conceptual relations is controlled and clearly defined.
- An inventory of conceptual relations, characteristic of what we have called the Medical Event
- The creation of a multilingual termbase

The creation of a multilingual termbase with an integrated conceptual system is an important step forward in creating a psychologically adequate terminological product, based on a partial model of translation competence.

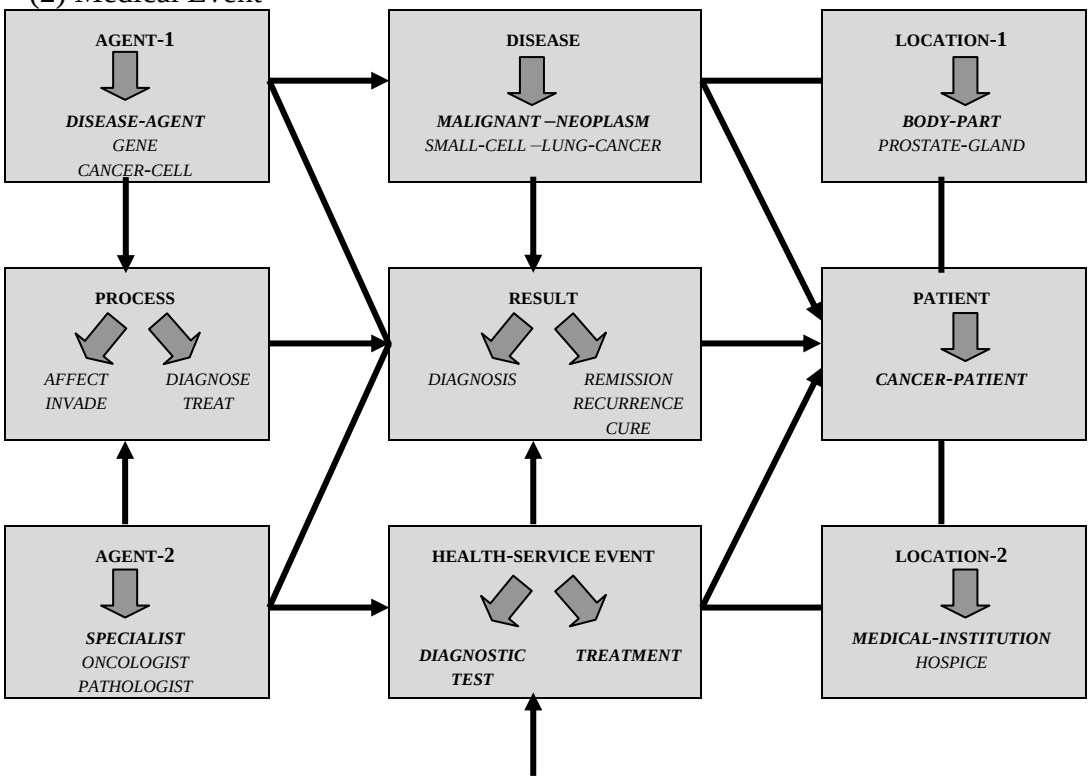
So far, the conceptual categories established for ONCOLOGY by means of corpus analysis are the following:

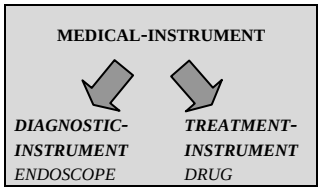
(1) Categories in Oncology

➢ HEALTH-SERVICE-EVENT → DIAGNOSTIC-PROCEDURE → TREATMENT	➢ MEDICAL-INSTRUMENT → DIAGNOSTIC-PROCEDURE-INSTRUMENT → TREATMENT-INSTRUMENT
➢ DISEASE-AGENT	➢ SPECIALIST
➢ BODY-PART	➢ PATIENT
➢ DISEASE	➢ MEDICAL- INSTITUTION

However, it is far from being the case that these categories are configured in list form. On the contrary, we have also taken into account larger structures of memory (or memory organization packets), and have organized these categories in the following relational schema of the MEDICAL EVENT:

(2) Medical Event





In this general schema, there are two types of agents that initiate processes. The first is an agent that causes a disease in a body-part of the patient. The second agent is a health professional, who initiates a process related to a health service event (diagnose, treat, etc.) in which a medical instrument may be used and which takes place in a certain context or physical space (hospital, outpatient clinic, etc.). Both processes lead to a result that directly affect the physical condition of the patient (diagnosis, remission, recurrence, cure, etc.).

Each of these subcategories can be extended to more specific levels, representative of the knowledge that translators must acquire in order to understand specialized texts in the source language. Conceptual relations can be classified as structuring or non-structuring (Guarino 1995) in order to distinguish between the logical relations that contribute to the taxonomic structure of the domain and those which do not.

The question that will be explored here is how one goes about elaborating such a knowledge representation. Although there is a general consensus of opinion in terminology literature that conceptual representations and trees are a fundamental part of terminology management, little is said about how the methodology involved in creating them, apart from the commonsense and intuition of the terminologist.

3.1. Knowledge extraction for conceptual structure

The basis of ONCOTERM is the representation of the conceptual structure of the domain of MEDICAL ONCOLOGY, its relevant concepts, characteristics and relations, This structure underlies all of the other components and constitutes the link between terms in different languages.

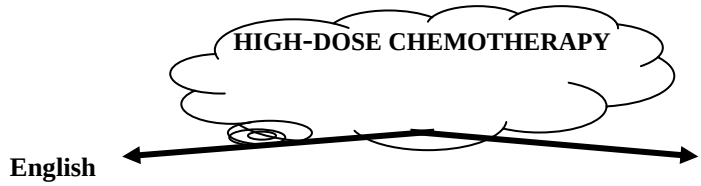
In ONCOTERM we use both the information extracted from medical dictionaries as well as an extensive corpus of specialized texts for the elaboration of a termbase whose concepts are linked to a previously existing knowledge source or ontology in order to obtain a truly multidimensional representation. LSP Texts are the primary source for extraction of specialized concepts because according to Wilss (1996:22):

> The characteristic feature of LSP texts is normativity, the unambiguous correspondence between notional aspects and linguistic (superficial) realizations. By its very nature, LSP is regimented, standardized, subject to conceptual hierarchization and ostentatious neutrality.

Nevertheless, it is also true that LSP is rather less standardized than technical writers would like to believe. In medical language, we have found that there is a wide range of variation in designations of the same concept.

The example of HIGH-DOSE CHEMOTHERAPY in (3) is just one of many which show that medical concepts can have a proliferation of designations in English as well as Spanish:

(3) Designations for HIGH-DOSE CHEMOTHERAPY



English	Spanish
high-dosage chemotherapy	quimioterapia a alta dosis
high-dose chemotherapy	quimioterapia a altas dosis
high dose chemotherapy	quimioterapia a dosis altas
intense chemotherapy	quimioterapia con altas dosis
high intensity chemotherapy	quimioterapia de alta dosis
dose-intensive chemotherapy	quimioterapia de dosis alta
dose intensive chemotherapy	quimioterapia de dosis altas
dose-intense chemotherapy	quimioterapia de dosis elevada
intensified chemotherapy	quimioterapia de dosis elevadas
dose-intensified chemotherapy	quimioterapia en dosis elevadas
dose intensified chemotherapy	quimioterapia en dosis elevada
intensive chemotherapy	quimioterapia intensiva
aggressive chemotherapy	quimioterapia agresiva

Another problem is that though all of the terms (3) frequently appear in texts, none of them are included in specialized medical dictionaries. The lack of standardization means that specialized translators would find it useful to have a resource at hand which acquaints them with a description of the concept, the various ways to activate it and the contexts that different linguistic representations can appear in. Precisely for this reason, corpus analysis is such a valuable data source. Given the rapid development of specialized language, the only way to obtain an up-to-date account of the behavior of terms in context is to analyze their use in different textual environments. This can best be achieved by means of corpus analysis.

3.2. Corpus analysis and knowledge parameters

According to L'Homme et al. (1999: 32-33), context is important because it helps to highlight associated terms, definitional information, synonyms, and explicit conceptual relations. Contextual information also facilitates the verification of conceptual and grammatical data extracted from reference works, the specification of the meaning of abbreviated terms, as well as the enhancement of conceptual description with encyclopedic information not included in the term definitions. In order to obtain contextual information, it is useful to have a corpus of texts as a data source for the generation of word frequency lists, key words, and concordances. However, in order to truly profit from such data, it must be interpreted within a coherent framework of text-based linguistic analysis (Bourigaut y Slodzian 1999: 29; L'Homme et al. 1999: 35).

As is well-known, a corpus constitutes an empirical basis, not only for identifying elements and structural patterns in the systems used in language, but also for mapping out the use of these systems (Kennedy 1998: 4). Fundamental aspects are the composition of the corpus, criteria for the extraction of terms (linguistic representations of concepts), and the posterior analysis conducive to the specification of conceptual relations. The information derived from this type of analysis can be used to order concepts vertically as well as horizontally, and greatly enhance the informativity of the terminographic entry. Gamper et al (1999) write:

> The new form of corpus-based terminology acquisition improves the quality of terminological research and its output by opening new doors for empirical investigations: exhaustive search for new terms, decreased risk of errors or overlooking, possibility to provide more contextual information to the user by providing direct links between the terms in a term bank and the corpus.

We have used both a parallel corpus as well as a comparable corpus of texts on oncology in English and Spanish of approximately 43 million words that represent a variety of communicative situations. The texts are taken from various medical journals[3], webpages of the principal health organizations[4], and extracts from medical textbooks for students at an advanced level[5]. Parts of encyclopedias, semi-specialized articles, and public health pamphlets for the general public[6] have also been included (Tercedor Sánchez 1999; Pérez Hernández 2000; López Rodríguez 2001). The concordances generated from this corpus offer important data concerning word frequencies, collocational patterns, and also other terms to be included. All of this information was conducive to establishing the initial candidates for starter concepts and relations, and supplied us with other related concepts, not included in the initial inventory .

The extraction of relevant terms was carried out through top-down as well as bottom-up processing. From a top-down perspective, we began with a core inventory of 2,500 cancer terms taken from *The Cancer Dictionary.* For the bottom-up analysis, concordances for these terms were extracted from our corpus by means of WordSmith Tools, a program for corpus analysis.

Central issues in corpus analysis are conceptual meaning and category design, as reflected in the exhaustive list of occurrences and contexts of linguistic representations. For example, an analysis of concordances, frequencies, and collocates for *chemotherapy* supplies the following types of information:

- superordinate and subordinate concepts
- knowledge parameters that structure the category
- conceptual relations with concepts of other categories
- systems of combinatorial patterns

Evidently, one of the first decisions required when carrying out a corpus-based analysis is to determine the unit of analysis (Biber, Conrad and Reppen 1998: 269). It is not enough merely to say that the unit of analysis is the *term* because of the inherent fuzziness of the concept. For example, our corpus shows over 15,000 concordances for *chemotherapy*, most of which appear with qualifiers. The first problem is how to decide which of these compound forms constitutes a terminological unit, and the second is how to relate each terminological unit with others. I shall now demonstrate how corpus analysis offers an empirical basis for making these decisions as well as the establishment of conceptual relations.

4. Conceptual templates and translation

Conceptual categories are formed in our minds by basic modeling strategies involving the following assumptions about the world:

1. The existence of boundaries, allowing us to perceive portions of reality and treat them as separate or separable units.

2. The existence of enduring objects.
3. A basic difference between objects and processes
4. The existence of categories of such objects, processes, and relationships

(Lamb 1998: 105-106).

This is actually what allows us to label things and pack our mind with representations of the outside world. As Carter (1998: 227) points out, we are then able to pluck out these representations at will and juggle and juxtapose them, creating new ideas in the process. This results in the formation of a *template* according to which ideas can be ordered and structured, giving shape and stability to notions that would otherwise remain nebulous. This is in line with Jackendoff's (1997: 41) idea that the mind/brain encodes information in some finite number of distinct representational formats or "languages of the mind".

One of the objectives of ONCOTERM is to facilitate the understanding of medical concepts. In other words, it helps the user to integrate new concepts in previously existing conceptual structures by making the new structure explicit and showing its relation with the old. For this reason, the internal structure of each conceptual category is represented by a template in the form of a set of conceptual relations. When this template is mapped onto the concept, the values obtained are not only indicative of the characteristics of the concept, but also act as a description of entities in the real world that can belong to the category. This template is the basic format or model of the category.

A conceptual template can thus be conceived as a meta-entry that represents the core meaning of all concepts within the same area of semantic space. On the basis of this template, it is possible to predict the inventory of syntactic-semantic configurations within a class, and also establish the relations between the conceptual template and the different linguistic representations relevant to each concept. In this way, each terminological class is characterized by a rule-governed set of parameters (both syntactic and semantic), thus becoming a grammar in itself, a conceptual grammar.

5. Chemotherapy/Quimioterapia: a case study

The way in which templates can be specified and mapped onto specialized concepts can be seen in CHEMOTHERAPY. I will show how knowledge parameters can be extracted from corpus information. The resulting template is valid for terms in both English and Spanish, and helps to mark the difference between compound terminological units and collocations.

5.1. Knowledge parameters

According to medical dictionaries, *chemotherapy* has only two or three very general subtypes. However, the information in specialized texts shows that there are multiple conceptual dimensions within the category. These conceptual dimensions constitute a set of basic knowledge parameters that are recurrent in other subsystems of terms within the same area of specialized knowledge. These knowledge parameters are TIME, INSTRUMENT, FUNCTION, and LOCATION, as well as their corresponding subtypes.

5.1.1. Time

CHEMOTHERAPY is an event and as such, involves temporal duration. As the concordances in (4) show, CHEMOTHERAPY has a temporal duration, defined in terms of a specific time period (*multiple-day chemotherapy, quimioterapia de 17 semanas*) or in terms of a perceived duration (*brief-duration chemotherapy, quimioterapia de corta duración*).

(4) Chemotherapy [temporal duration]

44	rate to high-intensity, *brief-duration* **chemotherapy** with cyclophosphamide, meth
45	ty to infection, a *short duration* **chemotherapy** protocol lasting approximat
4781	is highly emetogenic *multiple-day* **chemotherapy** regimen from days 2-3 onwar
4782	R, et al.: Eight drugs in *one day* **chemotherapy** for brain tumors: experienc
14428	assessment of patients receiving *weekly* **chemotherapy** compared to that of patient
13999	al trials.[35] In one study, a *12-week* **chemotherapy** regimen induced menopause
2	mentable que no se utilice y propugne la **quimioterapia** *corta de seis meses* en lo
3	te tra- tamiento es más fácil debido a la **quimioterapia** *corta*, los errores
5	a sido fundamental la introducción de la **quimioterapia** *de corta duración* (QCD) q
7	nicas.[36] En un estudio, un régimen de **quimioterapia** *de 12 semanas* indujo la m
9	siones hasta 7 fármacos, y obliga a una **quimioterapia** *durante 18-24 meses*; recidi

Nevertheless, there are other dimensions or perspectives within this parameter from which CHEMOTHERAPY can be viewed, and which constitute alternate ways of structuring the category. In (5) CHEMOTHERAPY can also be viewed sequentially in the context of other cancer treatments, such as radiation therapy or surgical procedures, which it may enter into combination with (*preradiation chemotherapy, quimioterapia posquirúrgica)*:

(5) Chemotherapy [sequence (in relation other treatments)]

80	though experience with *pre-irradiation* **chemotherapy** has shown that the majority
99	y alone, and 18 received *post operative* **chemotherapy**. The numbers of pts w
115	interest in administering *preoperative* **chemotherapy** to these patients. The purp
116	children and rationale for *preradiation* **chemotherapy**. Journal of Clinical Oncol
118	event free survival [EFS] with *presurgical* **chemotherapy** [PRE] for non-metastatic
16	s con aquellas pacientes en el grupo de **quimioterapia** *posoperatoria* (68% contra
20	sfactoria, se continuó con un régimen de **quimioterapia** *posquirúrgica* similar. En
21	on candidatos para ensayos clínicos, **quimioterapia** *postoperatoria* de
4	Group está investigando la factibilidad de **quimioterapia** *preoperativa* más radioter
10	sobre la existencia de respuestas a la **quimioterapia** *prequirúrgica* con agentes s

Still another temporal subdimension of CHEMOTHERAPY is the context of the stage of the disease during which it is applied (*stage IIIA chemotherapy, quimoterapia de fase I)*:

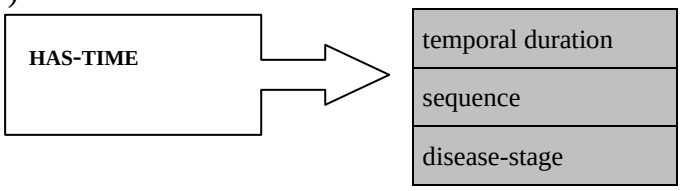
(6) Chemotherapy [disease-stage]

53	for more information. *Stage IIIA* **Chemotherapy** with or without radiation t
126	ther criteria are given *post remission* **chemotherapy**. Post remission chemothera
6	controlada. 5. Pruebas clínicas de **quimioterapia** *de fase I o II*. Carcinoma
11	favorablemente estas conclusiones. La **quimioterapia** *en el estadio III-B* En el
1	rior a otros esta- dios más precoces. La **quimioterapia** *en el estadio IV*

This type of classification necessarily implies a knowledge of the various staging systems used to designate phases of tumoral development.

All of these subparameters together form the following conceptual template for TIME:

(7)



5.1.2. Instrument

Chemotherapy also involves an instrument, which in this case, are the cancer-killing drugs that constitute the treatment. These drugs are object-concepts and thus can vary in TYPE (*single* or *multiple*), INTENSITY, and NUMBER. Although there are a variety of ways that this parameter is linguistically activated, the underlying conceptual meaning is the same and refers to the drug (*cisplatin chemotherapy, quimioterapia basada en cisplatino*) or drugs (*CHOP chemotherapy, quimioterapia BEP*) used in the treatment:

(8) Chemotherapy [drug type: single]

61 of testicular cancer after *cisplatin* **chemotherapy** who suffered hearing
95 d continuous infusion *doxorubicin* **chemotherapy**: a report from the Children
1º pacientes con respuesta favorable a **quimioterapia** *a base de platino* y mejor
3 cionados al azar para tres ciclos de **quimioterapia** *basada en cisplatino* seguida de
10 aún si ha recibido tres ciclos de **quimioterapia** *con clorambucil*. En definitiva,

(9) Chemotherapy [drug type: multiple]

1 of a *doxorubicin/cyclophosphamide-based* **chemotherapy** and local radiation t
2 results of ABVD, the authors find *ABVD* **chemotherapy** effective as first-li
21 lecular basis for the failure of *CDDP based* **chemotherapy**. The CDDP-resistance in two
26 of a *doxorubicin/cyclophosphamide-based* **chemotherapy** and local radiation t
58 bid illness can tolerate full dose *CHOP* **chemotherapy**. Future strategies ho
162 aluate any toxicity related to *VNB/CDDP* **chemotherapy**.
4 de enfermedad después de **quimioterapia** *BEP(bleomicina-etopósido-*
5 número de lesiones. El empleo de **quimioterapia** *(bleomicina, metotrexate, vinblas*
8 ivo de la ne- oplasia se inició **quimioterapia** *con adriamicina, vincristina* y
11 evaluadas después de 3 ciclos de **quimioterapia** *de cisplatino y ciclofosfamida*.
12 fer- mos pueden curarse usando **quimioterapia** *(QT) del tipo CHOP 11 .*
13 mer paciente fue orquiectomía y **quimioterapia** *con régimen COP-BLAM/*

In (10), however, the focus is slightly different, since what is highlighted is not the type of drug used in the treatment, but rather the number (*multi-drug chemotherapy, quimioterapia con multifármacos*):

(10) Chemotherapy [drug number]

96 endocrine versus endocrine plus *five-drug* **chemotherapy** in postmenopausal women wit
98 ated with very high doses of *multi-drug* **chemotherapy** similar to the treatment re
99 s. 92 patients were given *multiple-drug* **chemotherapy** according to the CHOP

100	superior than that to *single-drug* **chemotherapy**, the survival period did ne
3	e si se someten a cirugía agresiva, y **quimioterapia** con multifármacos.[8,9] Se
4	istencia tumoral observada a pautas de **quimioterapia** con múltiples agentes. El
5	to indicado para todos los pacientes es **quimioterapia** con múltiples fármacos a
6	rol de los síntomas es corta.[4,5] La **quimioterapia** de agente único y la quimi

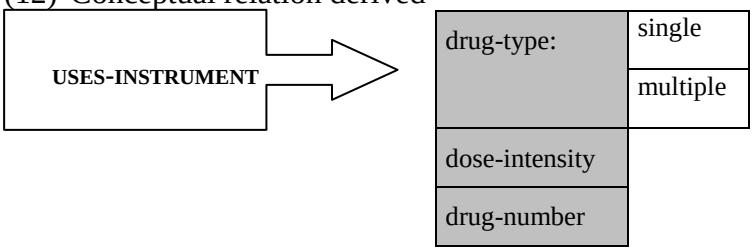
In contrast, the terminological units in (11) underline the administration of the drug and the intensity of the dosage (*full dose chemotherapia, quimioterapia a altas dosis*):

(11) Chemotherapy [dose-intensity]

34	on therapy (for 59-70 G) and *full dose* **chemotherapy** have been employed (Barteli
35	eated patients prior to *high-dose* **chemotherapy**. We investigated the VECD p
36	tumors.[13] Studies using *higher-dose* **chemotherapy** prior to radiation and chem.
37	iated with standard vs. *intensive-dose* **chemotherapy**. XIII. Determine the neur
38	ncer. 3. A clinical trial of *low-dose* **chemotherapy** with or without radiation
39	intensification treatment. *Lower-dose* **chemotherapy** that is generally continued
1	hiperfraccionamiento ace- lerado y de **quimioterapia** *a altas dosis* con soport
5	STÁSICOS 963 TABLA 3 Toxicidad de la **quimioterapia** *con altas dosis* y trasp
6	más intensivas a base de citarabina, **quimioterapia** *con dosis elevadas* o quimi
7	n MACOP-B pasaron después al grupo de **quimioterapia** *de alta dosis* debido a que
8	del contexto de un ensayo clínico, la **quimioterapia** *de dosis baja* debe tenerse
9	una combinación de ifosfamida [5] o **quimioterapia** *de dosis elevada* y rescate

These parameters are represented in the following template:

(12) Conceptual relation derived



5.1.3. Function

There are also types of chemotherapy that are directly related to the function of this treatment, the elimination of disease. The first group of concordances points to the disease targeted (*lymphoma chemotherapy, quimioterapia de cancer de pancreas*):

(13) Chemotherapy [disease-target]

85	prior biological therapy for *lymphoma* **chemotherapy**: No prior chemotherapy fo
87	ells. In the treatment of *mesothelioma* **chemotherapy** is still being evaluated.
95	in 3 days of beginning assigned *myeloma* **chemotherapy**, patients are randomly ass
102	a SP, Carrasco CH, et al.: *Osteosarcoma* **chemotherapy** effect: a prognostic
131	Increased systemic toxicity of *sarcoma* **chemotherapy** due to combination wi
169	cilo ha sido es el agente nuclear en la **quimioterapia** *de cáncer de páncreas*, que
219	mes mielodisplásicos, aplasia medular, **quimioterapia** *de las neoplasias linfoide*

221	svaginal. En general, la respuesta a la **quimioterapia** *de los tumores vaginales*
233	ión de proteína p53 y la respuesta a la **quimioterapia** *de tumores avanzados de ca*

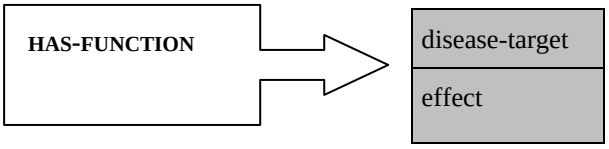
The second group of terms centers on the effect that the treatment has on the patient (e.g. *curative chemotherapy, quimioterapia paliativa*):

(14) Chemotherapy [effect]

26	wrongly counseled to receive *curative* **chemotherapy** No CNS or pulmonary leukos
105	probably are best treated by *palliative* **chemotherapy** in clinical trials.
130	I S TI - Is CPT-11 useful as a *salvage* **chemotherapy** for recurrent ovarian
11	ngs suggest that such an *angiocytotoxic* **chemotherapy** might be promising fo
30	to cytoreductive surgery and *cytotoxic* **chemotherapy**, but long-term survival is
50	between ovarian function after *gonadotoxic* **chemotherapy** for Hodgkin's or non-
141	previously received *stem cell-toxic* **chemotherapy**, including (a) nitrogen mus
171	son tratadas: con enfermedad evidente (**quimioterapia** *de carácter paliativo* o n
129	n algunos casos, la cirugía, junto a la **quimioterapia** *con fines citorreductores*
227	a HMM administrada oralmente como **quimioterapia** *de rescate* después del f
298	pleado para reducir la toxicidad de la **quimioterapia** *mielosupresora* en pacient
299	de 3 a 5 h. La dosis recomendada tras **quimioterapia** *mielotóxica* es de 5 µg/kg/
302	ltart S, Slevin ML, Terrel C et al. La **quimioterapia** *paliativa* apropiada del cá

This gives rise to the following template:

(15)



5.1.4. Location

CHEMOTHERAPY is also carried out in a certain context, and has both an internal and external location. Within the patient, it is administered at a certain BODY-PART, (e.g. veins, arteries, mouth or skin), which is the via of access to the final target (*intravenous chemotherapy, quimioterapia intraarterial)*:

(16) Chemotherapy [administration-via]

76	a. The other way of giving *intravenous* **chemotherapy** is via a plastic line (call
100	to several weeks. Some patients on *oral* **chemotherapy** take smaller doses of chemo
106	problem, we developed a liver *perfusion* **chemotherapy** via the hepatic artery
140	imen of local hyperthermia and *topical* **chemotherapy** in patients with multifocal
278	ón y radioterapia intersticial.[8,9] La **quimioterapia** *intraarterial* con floxur
291	xcluyó angiomatosis bacilar. Se inició **quimioterapia** *intravenosa* con adriamicin
313	al grupo control. Algunos estudios con **quimioterapia** *por vía portal* han de- mo
314	en trabajos que apoyan el empleo de la **quimioterapia** *por vía intravenosa* jun
315	colorrectal mediante administración de **quimioterapia** *por vía intraarterial* o p

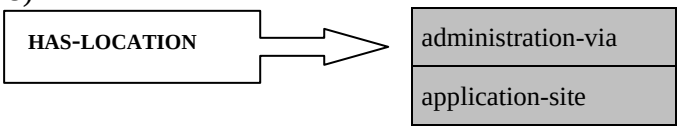
It can also be classified according to the body cavity where it is administered (*intrahepatic chemotherapy, quimioterapia hepatica)*:

(17) Chemotherapy [administration-site]

65	nical evaluation: 1. *Intracavitary* **chemotherapy** following resection.[3,4]
66	rate in patients treated with *intrahepatic* **chemotherapy** but demonstrated no improve
68	r pelvis (intraureteral or *intrapelvic* **chemotherapy**). Biological therapy tri
69	tration of other drugs, *intraperitoneal* **chemotherapy**, autologous bone marrow tra
70	directly into the chest (*intrapleural* **chemotherapy**). Intraoperative photody
72	treated with systemic and *intratheca*l **chemotherapy**, 44% of those who presented
258	tas implantables de infusión.[2-6] La **quimioterapia** *hepática* intraarterial con
281	el crecimiento tumoral intrahepático. **Quimioterapia** *intrapericárdica*. El mejor
282	ina y 5-fluorou-racilo (hexa-CAF). La **quimioterapia** *intraperitoneal* basada en
285	árdico sin evacuación de su contenido. **Quimioterapia** *intrapleural*. El derrame p
287	su vida. Se requiere la profilaxis con **quimioterapia** *intrateca*l como parte de
292	medad extensa o multifocal. 3. **Quimioterapia** *intravaginal* con crema de
294	adio T1 y grado lll. Por otro lado, la **quimioterapia** *intravesical* reduce la tas

The location template would be the following:

(18)



5.2. Conceptual templates and term status

These four relations, derived from specialized texts, constitute a template that can be used to define and recognize other subsystems of terms. In this regard, the primary criterion for recognizing a linguistic expression as a term is the systematicity of its behavior.

For example, *combination chemotherapy* is regarded as a term because its concordances point to the existence of a subsystem in which the same basic group of knowledge parameters can be applied recursively:

(19) Template mapping

CONCEPTUAL CATEGORY	CONCEPTUAL RELATION
TREATMENT	IS-A
	HAS-TIME
	USES-INSTRUMENT
	HAS-FUNCTION
	HAS-LOCATION

CONCEPTUAL CATEGORY	CONCEPTUAL RELATION	EXAMPLES OF VALUES GENERATED	
CHEMOTHERAPY	IS-A	⇨ TREATMENT	
	HAS-TIME	⇨ SHORT DURATION CHEMOTHERAPY	(duration)
		PRESURGICAL CHEMOTHERAPY	(sequence)
		STAGE IIIA CHEMOTHERAPY	(disease-stage)
	USES-INSTRUMENT	⇨ CISPLATIN CHEMOTHERAPY	(drug-type)
		MULTIPLE-DRUG CHEMOTHERAPY	(drug-number)
		HIGH DOSE CHEMOTHERAPY	(dose-intensity)

	HAS-FUNCTION	⇨ SARCOMA CHEMOTHERAPY (disease-target) SALVAGE CHEMOTHERAPY (effect)
	HAS-LOCATION	⇨ ORAL CHEMOTHERAPY (administration-via) INTRAHEPATIC CHEMOTHERAPY (application-site)

CONCEPTUAL CATEGORY	CONCEPTUAL RELATION	EXAMPLES OF VALUES GENERATED
COMBINATION CHEMOTHERAPY	IS-A	⇨ CHEMOTHERAPY
	HAS-TIME	⇨ SHORT-TERM COMBINATION CHEMOTHERAPY (duration) POSTOPERATIVE COMBINATION CHEMOTHERAPY (sequence) STAGE IIIB COMBINATION CHEMOTHERAPY (disease-stage)
	USES-INSTRUMENT	⇨ CISPLATIN-BASED COMIBINATION CHEMOTHERAPY (drug-type) 10-DRUG COMBINATION CHEMOTHERAPY (drug-number) HIGH DOSE COMIBINATION CHEMOTHERAPY (dose-intensity)
	HAS-FUNCTION	⇨ NO EXAMPLE FOUND (disease-target) SALVAGE COMBINATION CHEMOTHERAPY (effect)
	HAS-LOCATION	⇨ ORAL COMBINATION CHEMOTHERAPY (administration-via) NO EXAMPLE FOUND (administration-site)

As shown in (19), when this template is mapped onto COMBINATION CHEMOTHERAPY, it reproduces all or part of the subsystem as terms generated by the superordinate concept. This type of conceptual productivity is one of the criteria used to distinguish compound terminological units from collocations. Needless to say, it is related to, but hardly synonymous with frequency since a collocation can have a high frequency without necessarily having term status.

The complete template for chemotherapy would thus be the following:

(20) Category template

CONCEPTUAL CATEGORY	CONCEPTUAL RELATION	
CHEMOTHERAPY		
	IS-A	
	HAS-TIME	
		TEMPORAL –DURATION
		SEQUENCE
		DISEASE-STAGE
	USES-INSTRUMENT	
		DRUG-TYPE
		DRUG-NUMBER
		DOSE-INTENSITY
	HAS-FUNCTION	
		DISEASE-TARGET
		EFFECT
	HAS-LOCATION	
		ADMINISTRATION-VIA
		APPLICATION-SITE

6. Conclusions

Despite the fact that *templates* undoubtedly exist in our cognitive structure, they have not as yet been integrated into Translation or Terminology Theory. As schematic representations of categories, they lend greater flexibility to conceptual representation and supply a basis upon which terminologists can model specialized domains. It also goes without saying that this is highly important for translation, since a template provides a basis for interlinguistic and intertextual correspondence, based on the same underlying conceptual representation.

The specification of such templates as part of the framework of the conceptual modeling of specialized domains greatly facilitates the elaboration of conceptual structure by lending it greater coherence. In this way, information in term entries can be reduced to a minimum and important generalizations can be posited across different classes of terms within the same specialized domain.

Notes:

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[1] This research is part of the project *ONCOTERM: Sistema bilingüe de información y recursos oncológicos* (PB98-1342), funded by the Spanish Ministry of Education.

[2] The representation of specialized concepts and terms is possible thanks to *Ontoterm*, computer application which is a terminological database with an integrated conceptual system. It was created by A. Moreno Ortiz, a member of our research team. For a description of how it works, see Faber, López Rodríguez, and Tercedor Sánchez (in press) and Moreno Ortiz and Pérez Hernández 2000. A demo version can be downloaded at the following website: www.ontoterm.com.

[3] The English texts are published in the *British Medical Journal, Lancet, New England Journal of Medicine, Cancer, CANCERLIT, C-A.* and a *Cancer Journal for Clinicians*. Spanish texts were taken from *Medicina Clínica, Revista Clínica Española, Neoplasia, Revisiones en Cáncer, Revista Española de Anestesiología y Reanimación, Archivos Bronconeumológicos, Revista Española de Enfermedades Digestivas, Anales Otorrinolaringológicos Ibero-Americanos, Anales Españoles de Pediatría* and *Actas Urológicas españolas.*

[4] For example, CancerNet, CancerBacup, Medscape, MedicineNet, Oncoweb, Virtual Hospital, Alcase, Atheneum and Diario Médico.

[5] *Harrison's Principles of Internal Medicine, Cancer: Principles and Practice of Oncology, Medicina Interna de Farreras-Rozmán, Cancer: Principios y Práctica de Oncología* and *Oncología Médica-Guía de Oncología Médica.*

[6] *The Merck Manual of Diagnosis and Therapy / Manual Merck*, andy Mosby's *Medical Encyclopedia for Health Consumers*. Texts have also been extracted from the *Enciclopedia Microsoft Encarta 97*. Other sources for semi-specialized and non-specialized texts were *Scientific American/Investigación y Ciencia, Oncolink, Reuters Health, TIME,* QUO and the Spanish newspapers, *Blanco y negro, El Mundo, El Semanal* and *Ideal*).

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