Universal Terminology

Chapter 10: Universal terminology

This chapter considers the core definition of what is a Universal terminology. This document is the chapter 10 of the book Universal Terminology which presents a global documentation on the $\mathbf{T}_{logy}$.

Contents

10.1 The Universal core

Anatomy is universal, there is no doubt about this fact. There is only one human species on Earth and elsewhere and consequently only one anatomy. We claim in our development of the $\mathbf{T}_{logy}$that an ontology must be based on the reality (and not on concepts or licornes). If the reality is universal, then we must logically develop a Universal Terminology.

The two facets of the anatomy are: the observation of the reality and the representation of the reality. We usually agree that the observation of the human species, the knowledge about the human body and the different sciences participating to the observation are not biased, are shared by all scientists and are the subject of a universal consensus. One can certainly imagine some exceptions here and there, but the global trend towards universality is certain. This is not the place to discuss this point of view and we consider it as a basis for our developments.

The other facet of anatomy is the representation of what has been observed. And now we are far from being universal. Indeed, the different populations speaking different languages, have different approaches and consequently are at risk of creating numerous bias. Or the different works are differently funded in money and in manpower and provides results of quite different quality. There are multiple reasons making the availability of an excellent terminology very variable here and there. We speak of the terminologies, we do not reach the Universal Terminology.

The question is not to find responsibilities for this situation. Most efforts when developing the terminologies have been done on a scientific basis, but with limited resources. But we must just act the fact that our terminologies have serious biases. The main bias is the language dependence.

10.2 Language independence

This is not to say that the authors of past terminologies were not aware of this dependency. For TA98, the last release before now, the reference language was Latin. This was clearly an attempt to lighten the language dependency. Latin is a declension language relatively neutral relative to the modern languages. It is convenient for the representation of the $\mathbf{T}_{logy}$.

[**Mareckova et al., 2002**]
The present paper offers an up-to-date view of the status of Latin as the language of medicine, namely in its terminological component. This is particularly true for anatomical terminology as well as pharmaceutical terminology.

However, its main problem is the fact that in many countries, the teaching of Latin is no more a priority. The result is an increasing number of anatomists with a low level of Latin. In a recent referendum by IFAA addressed to the member societies, there is no more any evident majority in favor of Latin.

A solution to the evanescence of Latin is the creation of a formal abstract language. For the domain of anatomy, this is a reasonable effort in term of manpower, due to the fact that the language is without verbs and a priori with

limited cases (nominative and genitive only) as long as usage of preposition is postpone. This abstract language can be modeled from Latin, but it must be pure from its biases and exceptions. And such a language does not need to be represented, except by mathematical formulas visible only by the persons in charge of the implementation of the $\mathbf{T}_{logy}$.

The abstract language is defined by a formal grammar, that is fully detailed in chapter 10. The grammar defines the usage of the vocabulary as presented in chapter 6.

The abstract language is only acceptable at the condition that a translation process is made available for all languages where the $\mathbf{T}_{logy}$is to be expressed. Applying this translation process to any universal formula representing a term gives this term in the selected language. Moreover, the translation is strict and allows no variation or bias issued from the traditional usage of the language. This guarantee that the terms are really equivalent in all language.

The equivalence of terms is important, because divergences have been observed in the past. For example the term LA:*neura corbiformia parva* is not equivalent to its traditional English term EN:*small basket cell*: it must EN:*small basket neuron*. This liberty of language in English corresponds to the usage, and anyway a neuron is a cell. But there is a lost of information. Of course, if the authors of the English version prefer to accept this lost, it is their decision, but in no way it must be propagated to other languages. In the TNA of 2022, the English terms with cell instead of neuron are accepted as synonym only.

The translation process of terms for all languages of the $\mathbf{T}_{logy}$has been carefully implemented, currently in 5 language: Latin, English, French, Spanish and Russian. See the chapter 18 on implementation for a documentation.

It must be noted that the abstract language does not make any shadow to Latin. The first reason is that the abstract language is modeled from Latin and remains particularly close to Latin. The second reason is that the abstract language perfectly translate to Latin, with the recommendation to validate the universal formulas through their Latin counterpart. We could even say that the abstract language is a way to promote Latin, when other trends are forgiving its existence.

10.3 Becoming universal

The challenge is to move from a language specific representation to a universal presentation to be expressed in a universal formula, which is immediately translatable in any representation language.

We consider a typical term representative of the task to be performed, neither too simple nor too complicated. We have selected the plural term LA:*neura plumosa bulbi olfactorii* that is a part of the paleocortex of the telencephalon. The universal formula is developed on the singular form of the term:

→TAH9334

LA:*neuron plumosum bulbi olfactorii*
EN:*tufted neuron of olfactory bulb*
FR:*neuron touffe du bulbe olfactif*
ES:*neurona penachada del bulbo olfactorio*
RU:

This term is made of a noun and an adjective, plus a mandatory expansion on another term also made of a noun and an adjective.

Figure 10.1: View on the database, where a term is defined in all its representation languages. Under the heading Universal is specified the universal formula together with its expansion on unit 6195. Nothing is changed in all languages but English, where we add a synonym.

We consider first the basic part *neuron plumosum*. This part is made of two lexemes. The first lexeme is on neuron which is an entity of the domain LA:*neuron*. This entity is represented by the lexeme LA:*nomen neuron* that has three instances of words: the noun *neuron*, the adjective *neuronal* and the prefix *neuro*. The lexeme is usually specified in all representation languages. The second lexeme in on the adjective *plumosus* represented by LA:*nomen plumosus* with only one instance as an adjective.

What we ask for representing this basic part is a noun corresponding to the first lexeme with identifier 12802 and an adjective corresponding to the second lexeme with identifier 12143. We specify the noun by the letter N and the adjective by the letter A. Together with the identifiers, we make the formula: N(12802),A(12183). This is exactly what we can see in the database where this term is created, see figure 10.1.

We can now consider the expansion on LA:*bulbus olfactorius*. Exactly as above

the formula is created for this entity, giving: N(12092),A(12927). But in the universal formula we do not want this value, but a pointer to it. We specify the pointer to a mandatory expansion by M. The result for the formula is: M(6195). The final formula is: N(12802),A(12183),M(6195).

The translation process is able to formally analyze the formula, to follow each pointer to a lexeme or to an expansion and to generate the term, as it will be seen below.

10.4 Syntactic rules

So far, when analysing a universal formula, we have been able to collect the lexemes - the words - to be included in the final term. At this level this gives in Latin *neuron, plumosus, bulbus, olfactorius* and in English *neuron, tufted, bulb, olfactory*. This is the raw material for the term, but this is not the final term. We still need to apply the syntactic rules.

It is well known that the syntax is peculiar to each language. Considerable differences between languages do exist. This language aspect is further discussed in chapter 6 and 18. We will now discuss the translation process for our example, considering the translation in English first, then in Latin. In the upper part of this chapter, we have explicited the transformation of a term to the universal formula. We now explicit the opposite action from the universal formula to the term.

In English, we first collect the first two words, a noun and an adjective, and we invert them because in English adjectives are preceeding the nouns. The English adjectives are invariable. The result is *tufted neuron*. Then we look at the expansion and we apply the same process, giving textitolfactory bulb. This term need to be presented at genitive, giving simply in English *of olfactory bulb*. Finally, the two parts are appended giving the correct term ¡textittufted neuron of olfactory bulb. No need in English to add articles. In the partonomy, this term is presented at plural. This means that the nominative part must be transformed to plural. This is simply done by changing the noun to plural, giving *tufted neurons of olfactory bulb*. As it can be seen from this example, the application of syntax rules is a fully documented process, totally mastered in an adequate computer program.

In Latin, we first collect the first two words giving *neuron, plumosus*, a noun and an adjective. The adjectives follows the nouns in Latin. Differently from English, the adjective is variable in gender, giving now *neuron plumosum* at nominative singular. Similarly, we retrieve the expansion entity giving *bulbus olfactorius* at nominative. The transformation to genitive gives *bulbi olfactorii*. The final term at singular is *neuron plumosum bulbi olfactorii* and at plural is *neura plumosa bulbi olfactorii*.

In French or Spanish, we may prefer to add definite articles to the term. In Russian, we have a rather similar term than the Latin term.

10.5 The benefits

An important question arises after this dual operation: language to universal followed by universal to language. Simply said it does nothing. Of course the

benefit comes from the fact that we can change of language between the two operations: we obtain a translation from the first language to the second. This is a first benefit.

On the figure 10.1, one can see that we provide one line of specification under Universal and that we get five translations in five languages of presentation of the $\mathbf{T}_{logy}$. In the abscence of the universal formula, it would be necessary to write 5 supplementary lines like the one with *tufted cell*. This means that it would multiply the by 5 the quantity of work.

A second benefit comes from the guaranttee that the terms in the different languages are equivalent. It is not possible to have divergent translations between languages with the automated translation. If it is desirable to have something different in a specific language, it is necessary to enter an explicit new term for that language that overrules the universal formula.

A third benefit is the possibility to get different variants of the same term: the automatic translation may easily accept any variation. For example, the above term at plural *tufted neurons of olfactory bulb* may be replaced by a singular term *set of tufted neurons of olfactory bulb* when needed. Another example is to replace *carotid sinus (pair)* by *pair of carotid sinuses*. An example in Latin is to replace *fornix (par)* by *par fornicum*, which shows that the generation of genitive plural words in Latin is a risky enterprise when done by casual human beings.

A fourth benefit is the centralized controle of the vocabulary: each word is defined once for all. When a word is misstyped in a language, a single correction could be applied possibly hundred of terms that are using that word. For example, the term ES:*porción capsular* is wrong in Spanish and must be corrected to ES:*porción cápsular*. This is trivial with the universal formulas, because the corresponding lexeme alone must be corrected once!

Bibliography

[Mareckova et al., 2002] Mareckova, E., Simon, F., and Cerveny, L. (2002). Latin as the language of medical terminology: some remarks on its role and prospects. *SWISS MED WKLY 2002 ; 132 : 581 – 587.* PDF.

10.6 Log of updates

05 Apr 2022 Creation of the file.

10.7 Credentials

This document is part of the book "Universal Terminology" accompanying the website on Terminologia Anatomica. It expresses the vision of the authors of the $\mathbf{T}_{logy}$about the foundations of the science of ontology, supporting the here presented terminology. Despite it is as exact as possible, close to the reality of the database of the terminology and the surrounding software, approximations, errors and ambiguities are possible and should be considered as independent of their willingness and intents.

Identified comments about the content of the website and its presentation are welcome. An appropriate answer will be given when pertinent.

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