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# Subject-field components as integrated parts of LSP dictionaries

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The dividing line between specialised lexicography and terminography is non-existent. The focus of preparing dictionaries for a particular subject-field should be the needs of its user group in specific situations. This is catered for by the modern theory of dictionary functions and includes the introduction of subject-field components in dictionaries. Dictionary functions are communication-orientated or cognition-orientated, and the lexicographers must identify the relevant functions and select and present the data so that the dictionary satisfies the needs of the users. The optimal dictionary contains aided fully integrated subject-field components that supplement and complement the data included in the articles.

**Keywords:** specialised lexicography, terminography, subject-field component, dictionary functions, distribution structure, user needs, multifunctional specialised dictionaries, factual and linguistic data

## 1. Isolated terms as part of a system?

The call for papers for this special issue explicitly mentioned a dividing line between lexicography and terminology. Certainly a few similarities were also mentioned, but the emphasis was on two differences, both of which are problematic. The first is simply wrong: “lexicography aims at providing descriptions for lexical units while terminology focuses on terms.” This is only true if constituent parts of one system are compared with the totality of parts of another system. Lexicography can be divided into two branches:

- L(a): General language (LGP) lexicography; and
- L(b): Specialised field (LSP) lexicography.

Terminology may be divided into three branches:

T(a): The vocabulary of a specific subject field;

T(b): The set of practices and methods used for the collection, description and presentation of terms; and

T(c): Terminography, i.e., the recording, processing and presentation of terminological data acquired by terminological research.

L(b) and T(c) are synonyms, as they have the same or nearly the same meaning. Different methods and theories can be found within L(b) and T(c) as well as between L(b) and T(c), but both have specialised (LSP) dictionaries as their object. The difference presumed in the call for papers is misleading, especially if LSP lexicography is compared with terminography. “Finally, terminological and lexicographical resources are increasingly used in natural language processing (NLP) applications. However, contrary to lexicography, in terminology, these changes have had a profound impact on the way we view the discipline as a whole and its theoretical standpoints.” A number of other arguments have been cited in support of the distinction, but they can all be — and have all been — refuted (Bergenholtz 1995; Kromann et al. 1999), the most important of them in Bergenholtz and Tarp (1995: 10–11):

1. Lexicography deals with the description of general-language words, whereas terminography concentrates on the description of LSP terms.
2. As opposed to lexicographers, who work with an alphabetic macrostructure, terminologists prefer a systematic macrostructure.
3. Terminology is prescriptive, whereas lexicography is descriptive.
4. The target group of terminology is the expert, whereas in lexicography it is the layman.
5. While terminologists aim to help users encode texts, lexicographers aim to help users decode them.

None of these arguments is valid as far as LSP lexicography is concerned because:

1. As a special part of lexicography in general, LSP lexicography certainly does work with LSP terms.
2. LSP lexicography works with both systematic and alphabetic macrostructures, deciding in each individual case which is the more appropriate.
3. LSP lexicography must necessarily to a greater or lesser extent be both descriptive and prescriptive.
4. LSP lexicography addresses itself to laypeople and experts alike.
5. LSP lexicography prepares dictionaries for both encoding and decoding purposes.

However, there is another difference between parts of LSP lexicography which, in contrast to terminography, do not merely perceive LSP dictionaries as utility products, but have as their basis the functional theory of lexicography, which is fundamental to all theoretical issues and all lexicographical decisions relating to the conceptual basis for a dictionary and the specific dictionary itself. In our opinion, terminography, apart from the few cases in which this has been done (e.g., Humbley 2002), could benefit from this part of lexicography and should draw the necessary conclusions in general and in connection with specific projects. Dictionaries are tools made for the purpose of fulfilling specific user needs.

This also applies to a special component of modern LSP dictionaries, the subject-field component, whose purpose corresponds to the systematic principles prevalent in terminography. Modern lexicography and terminography both share this systematic basis and it therefore constitutes no dividing line between the two disciplines, in contrast to what many terminologists have erroneously claimed, for instance:

For specific subject fields terminography provides conceptual relationships and classifications in terms of concept sign — concept in systems of concepts with descriptions of characteristics (logical concept systems) or relations based on contiguity in ontological systems (e.g., partitive concept systems) or relationships between topics in subject concept systems structured in alphabetical or thematic order on conventional or electronic media carrying information. (Felber and Budin 1989: 139) [Our translation]<sup>1</sup>

If we disregard the use of the term *concept*, this statement may be summarised as follows:

Terminography — but not specialised lexicography — has a special field systematic as starting point for the selection of the empirical basis, the macro-structure and the definitions.

This description fits most LSP dictionaries of the type called multi-field dictionaries, which may cover up to 150 different subject fields and whose data often lead the user astray rather than guide them to the correct solution.<sup>2</sup>

As a matter of fact, well-conceived LSP dictionaries are the exception rather than the rule. Most existing dictionaries contain no systematic presentation of their subject field(s), and it is only reasonable to presume that the lexicographers did not prepare such systematic outlines as each individual subject field in a multi-field dictionary would require its own systematic presentation. It is usually possible to present such field introductions only in single-field or sub-field dictionaries (Nielsen 1994: 98–105). Terminologists have called for such

systematic presentations for the last 70-odd years and have occasionally put the theory into practice. But so have lexicographers, albeit only explicitly for the last 15–20 years (Bergenholtz et al. 1990; Svensén 1994; Bergenholtz and Tarp 1995). Interestingly, the inclusion of systematic presentations of subject fields is not new to lexicography. Encyclopaedic works of the Middle Ages and the Renaissance were always thematically and mostly systematically arranged (Yeo 2001: 22–35). We see a shift during the Enlightenment, where the choice of alphabetical order gave scientific dictionaries the flexibility to absorb the new findings of the Scientific Revolution without using time to describe the new systems (Yeo 2001: 25).

The demand from terminographers can thus be seen as a resumption of the systematic approach to dictionary making. A sure sign of this development is the publication of the plan for a series of 21 voluminous LSP dictionaries (so far) dealing with linguistics- and communication-related subject fields such as lexicography, communication science, grammar, lexicology and pragmatics (Schierholz and Wiegand 2004). Each volume will contain a systematic presentation of the relevant subject field, which at the same time is intended to form the basis of the work of the lexicographers, be cross-referenced from individual articles, and be suitable as an introduction to the field. In terms of lexicography, such systematic presentations are referred to as *integrated outside matter*: an independent dictionary component supplemented by cross-references to and from individual articles in the word list.

Many LGP dictionaries already contain such a component in the outside matter, but addressing other issues. Dictionary grammars are the most widely known of these components and can be found in, for instance, English learner's dictionaries and in a few bilingual dictionaries with dictionary grammars for each language, written in both languages concerned and supplemented by cross-references from the articles in the word list (e.g., *Rakibolana Malagasy-Alama* (Bergenholtz et al. 1991)). Similarly, some dictionaries contain outside matter components dealing with routine formulae with cross-references to contrastive presentations of language usage and gestures applying to culture-bound acts of communication (e.g., *Rakibolana Alama-Malagasy* (Bergenholtz et al. 1994)).

The dictionary component that we call the subject-field component, and which is also referred to as an encyclopaedic section, a systematic introduction and subject field term system, must be analysed from two perspectives. First, it is part of a tool, a dictionary component, with a genuine purpose. Dictionaries may have different genuine purposes and should accordingly have subject-field components that are arranged and presented differently. Secondly, as a subject-

field component, it contains data that are either contained in individual articles in full, in part or not at all. The placing of the data in the articles and/or in the dictionary components is based on the lexicographical structure referred to as the distribution structure. This is the most important of all lexicographical structures and will briefly be introduced in Section 3 below, after the description of the most fundamental of all issues underlying dictionary making: Which need is the dictionary designed to satisfy?

## 2. The fundamental nature of dictionary functions

Like any other researcher or producer of utility products, lexicographers and terminographers study — or ought to study — human activities in order to detect possible needs that can be satisfied by means of a dictionary.<sup>3</sup> But human needs must not be viewed as abstract concepts, leading their own independent lives. The needs are always linked to a specific group of people and a specific situation. It is therefore necessary for lexicographers and terminographers to draw up a profile of the intended user group and a typology of the use situations involving problems or needs that can be solved or satisfied by providing lexicographical data in a dictionary. On this basis, the functions and genuine purpose of a dictionary can be determined.

A number of important characteristics must be taken into account in order to draw up a profile of a specific user group, although they are not all relevant for each and every dictionary:

1. Which language is their native language?
2. At what level do they master their native language?
3. At what level do they master a foreign language?
4. How extensive is their experience in translating between the languages in question?
5. What is the level of their general cultural and encyclopaedic knowledge?
6. At what level do they master the special subject field in question?
7. At what level do they master the corresponding LSP in their native language?
8. At what level do they master the corresponding LSP in the foreign language?

Of course there may be other relevant types of characteristics for a particular dictionary, but those mentioned above are the most important for drawing up a profile of a specific user group. Determining user characteristics is the first task

the lexicographer has to complete to determine the user needs. These, however, are not abstract phenomena but related to concrete situations. Therefore, these situations should be detected, distinguished from one another and analysed in order to identify which type of needs a specific type of user may have in each type of situation. The functional theory of lexicography distinguishes between two main groups of use situations. The first group corresponds to types of situations where, for one reason or another, the user wants to obtain additional information on some topic, e.g., general cultural and encyclopaedic information, specialised information regarding a scientific discipline (biology, geology, etc.) or information about a specific language related to the language-learning process (for example the learning of a foreign language). It is then up to the lexicographers to study the special needs for information in each case and in terms of each type of user so that they can decide which of these needs may be satisfied by consulting a dictionary and identify the corresponding data to be included in the dictionary.

The above-mentioned types of use situations are called *cognition-orientated*. In these situations, the only communicative act taking place is between the lexicographer — as author of the dictionary — and the users of the dictionary. The users want knowledge and the lexicographers provide it at a cognitive level, nothing more. There is, however, another main group of use situations where an existing — or planned — written or oral act of communication is going on between two or more persons and where the lexicographer only intervenes indirectly (through the dictionary) when some kind of communication problem pops up that can be solved by consulting a dictionary. This group of use situations is called *communication-orientated*.

Once the lexicographers have established the characteristics of the user group and types of use situations, they can proceed to a characterisation of the users' needs. At a general level, these needs will comprise the following main categories of information:

1. Information about the native language;
2. Information about a foreign language;
3. Comparison between the native and a foreign language;
4. Information about culture and the world in general;
5. Information about the special subject field;
6. Comparison between the subject field in the native and in the foreign culture;
7. Information about the native LSP;
8. Information about the foreign LSP; and

## 9. Comparison between the native and foreign LSP.

On the basis of these needs, lexicographers can determine which kind of data to prepare and incorporate in the dictionary in order to assist each specific type of users in each type of use situation. When the lexicographers have established the user group and its specific characteristics, the types of use situation and specific user needs related to these situations, they can then proceed to determine what are referred to as *lexicographical functions*. The lexicographical function of a given dictionary is to provide assistance to a specific user group with specific characteristics in order to cover the complex of needs that arise in a specific type of use situation. A dictionary can have one or more functions, i.e., it can be mono- or multifunctional. As any other utility product, dictionaries also have a *genuine purpose*, which is made up of the totality of functions of a dictionary and the subject field(s) that it covers.

Experience shows that the determinant in a dictionary function is the use situation. For example, the difference between a dictionary designed for text production in the user's native language and one designed for translation into a foreign language is much greater than the difference between a native-language production dictionary designed for adult users and one designed for school children. For that reason, functions are frequently named after the corresponding types of use situation.

Consequently, lexicographical functions may be subdivided into communication-orientated and cognition-orientated functions corresponding to the respective main types of use situation. The most important types of communication-orientated functions are:

- to assist the users in solving problems related to text reception in the native language;
- to assist the users in solving problems related to production of texts in the native language;
- to assist the users in solving problems related to text reception in a foreign language;
- to assist the users in solving problems related to production of texts in a foreign language;
- to assist the users in solving problems related to translation of texts from the native language into a foreign language; and
- to assist the users in solving problems related to translation of texts from a foreign language into the native language.

The most important types of cognition-orientated functions are:

- to provide general cultural and encyclopaedic information to the users;
- to provide special information about the subject field to the users; and
- to provide information about the language to the users.

The functions are the basic elements of lexicographical theory and practice and constitute the leading principle underlying all dictionaries. Everything in a dictionary — and we really mean everything — is to some extent influenced by its respective functions. Neither the content nor the form of a dictionary can be properly conceived without taking the functions into account.

A user consults a dictionary in order to obtain information that allows him or her to solve a specific problem or raise his or her general level of knowledge. The dictionary must be able to meet the needs that arise in such situations. Often the needs are very simple and can be met by only one piece, or a few pieces, of lexicographical information. In other situations, the needs are very complex and can only be met by a combination of different sorts of lexicographical data. When the lexicographical functions and the genuine purpose of a dictionary have been determined, the lexicographers can proceed to the next step, i.e., to deciding which data must be prepared and included in the dictionary in order to meet its various functions or, in case of reviewing, to analyse whether the data incorporated in the dictionary actually make it live up to its declared function or functions. According to the functional theory of lexicography, no data whatsoever should be included in a dictionary if the inclusion cannot be justified on the basis of the dictionary's respective functions. The presentation and structures of these data should follow the same principles.

### 3. The distribution structure and its options

The distribution structure is the structure of the linguistic and encyclopaedic data distributed across or occurring in different places in the dictionary.<sup>4</sup> Basically, these data may be found in the individual articles or in a subject-field component.

The distribution structure will be at its simplest where the information contained in the dictionary is provided in the individual articles only. The structure will be more complex where all or part of the information addressed to the individual lemmata has been placed in synopsis articles, in which case there are several different structures. Again, the distribution structure will be at its simplest if all the information is placed in synopsis articles, to which cross-references are given from the other articles. A synopsis article may also consist

of a summary review, which restates the information already provided in the individual articles. Alternatively, only the most important information in the individual articles may be singled out and re-presented in the synopsis articles together with supplementary information that is given there only. In another option, the synopsis articles may give an overview of the information provided in the individual articles in addition to further information of a more general nature. Finally, completely new information may be provided in the synopsis articles without restating the information already presented in relation to the individual lemmata, whereby individual articles and synopsis articles complement each other (Bergenholtz and Tarp 2005).

The distribution structure becomes even more complex if the dictionary contains a subject-field component. The relationship between an independent component and the individual articles, as well as between the component in question and the synopsis articles, may be of the same nature as the possible relations existing between the individual articles and synopsis articles as outlined above.

The arrangement in a particular dictionary of linguistic and encyclopaedic information is the result of a number of decisions. The wish to provide, in one place, all the linguistic and encyclopaedic information presented in relation to a lemma, thereby avoiding too many lookups, points to the individual articles as the only place for this information. On the other hand, the wish to reduce the length of the articles and thus make them more accessible, to avoid repetition and thereby save space, and to provide an overall, systematic overview of linguistic and encyclopaedic aspects would point to other lexicographical solutions, including the use of synopsis articles and independent dictionary components. The lexicographer may choose to provide part of the encyclopaedic information in synopsis articles or in the subject-field component, with the result that this information can be considerably cut down in the individual articles. This also applies to illustrations, which, for a number of practical reasons including layout and space, are often placed in a separate dictionary component. Other priorities may point to a combination of these options, the information being provided in the individual articles, in synopsis articles — if any — as well as in a separate component. In this way, the information presented in relation to individual lemmata may appear together at the same time as a systematic overview of linguistic and encyclopaedic issues of a more general nature is provided. For a discussion of other examples illustrating the options and implications of the distribution structure adopted and the data contained in the subject-field component and word list, see Nielsen (1999).

#### 4. Subject-field components in recent LSP dictionaries

The subject-field component as a separate dictionary component can have a cognition-orientated function: it can give an introduction to or a detailed, systematic exposition of the subject field covered by the dictionary. In providing information over and above that contained in the articles, the subject-field component may be seen as an ideal way of introducing the user to the subject field covered in the dictionary. In particular, the layman user looking for quick access to a particular subject field will benefit from the inclusion of a subject-field component. The subject-field component may also support communication-orientated functions, albeit less directly. In the case of text reception, it may supplement the encyclopaedic information provided in the individual articles; again this is particularly beneficial to the layman.

Below we will present the solutions adopted by selected LSP dictionaries. However, because many dictionaries contain little information about their functions, we will only briefly address this issue; much is left to subjective — though qualified — interpretation. Having said that, it should be pointed out that the users' guides in the *Gene Technology Encyclopaedic Dictionary* (Kaufmann et al. 1998) and in the *Nordisk leksikografisk ordbog* (Engl. Nordic Dictionary of Lexicography) (Bergenholtz et al. 1997) both state that the subject-field component has a primarily cognition-orientated function for semi-experts and deals secondarily with the communication-orientated functions of text reception, text production and translation.

The subject-field components studied vary considerably in size, but most contain between 25 and 40 printed pages. Other differences are more significant, however. Some provide an overview of the entire subject field, e.g., the *Nordic Dictionary of Lexicography*, whose subject-field component has been used as an independent textbook on lexicography, and which was also reprinted as a separate contribution in a lexicographical journal (Bergenholtz and Svensén 1994). Other components provide an overview of those parts of the subject field the lexicographers believe to be particularly relevant to the users relative to the intended dictionary functions. In the *Engelsk-dansk Juridisk Basisordbog* (Engl. Legal Dictionary English–Danish) (Nielsen 1993), the subject-field component supports text reception, which is its primary function. Consequently, it deals only with the court systems in England and Wales and in Denmark. Where dictionaries cover a culture-bound language for special purposes, for instance law, some contain a three-part subject-field component with information about the legal system in each of the two countries involved, supplemented by comparative information about the differences between the

two legal cultures. This is the case in, for instance, the *Juridisk ordbog spansk-dansk* (Engl. Legal Dictionary Spanish–Danish) (Henriksen 1991). This dictionary has a non-integrated subject-field component, i.e., the individual articles contain no cross-references to the subject-field component. This cannot be commended, however. A partly or a fully integrated subject-field component will be more helpful for all kinds of dictionary function. The former contains cross-references in the word list from the most important, but not necessarily all, terms to the subject-field component, e.g., in the first article from the *Gene Technology Encyclopaedic Dictionary* (Kaufmann et al. 1998: 199), which contains a cross-reference (§ 25), but not in the second:

**gene family** *familia f de genes*

Eukaryotic protein genes occur primarily in one copy per haploid genome. Some mRNA genes, however, occur in multiple copies in most species. Repeats of mRNA genes may be identical or show individual variation, and they may be clustered or scattered in the genome. When variations occur in coding sequences among a group of repeated protein genes, the group is known as a gene family. Individual members of a gene family encode distinct but related polypeptides. Repeated genes coding for histones, tubulins, actins and hemoglobin proteins, among others, are examples of gene families. The genes in gene families typically code for abundant proteins. Histones, tubulins and actins are for example abundant in most cell types.

J It has also made it possible to isolate members of this same gene family from a variety of other organisms, including humans.

→ multigene family; § 25

**gene fragment** *fragmento m génico*

A gene fragment is a piece of a gene.

A fully integrated subject-field component is linked to the word list by cross-references to the subject-field component from every single dictionary article, which is actually the case in the *Nordic Dictionary of Lexicography* (Bergenholtz et al. 1997). In the same way you can have a non-integrated subject-field component with no kind of markers or structural indicators (such as bold face) highlighting the terms used in the subject-field component, but you will find them all lemmatised in the word list, as in the *Magyar–Német/Német–Magyar Nyugdíjbiztosítási Szakaszótár* (Engl. Dictionary of Annuity Assurance Hungarian–German) (Ildikó 2005). An integrated subject-field component marks all terms used in the component and which have also been lemmatised in the word list, e.g., in the following way in *Gene Technology Encyclopaedic Dictionary* (Kaufmann et al. 1998: 20):

### § 2 The Chemistry of Cells and the Origin of Life:

The cell is the smallest structural and functional unit of living organisms. The smallest organisms consist of single cells, whereas larger organisms are multicellular. The higher multicellular organisms contain many different types of cells with specialized functions. The various cell types cooperate in a tightly coordinated way, although each cell retains a certain independence.

The **plasma membrane** defines the periphery of the cell. It is composed of a large number of lipid and protein molecules and is very flexible, allowing changes in the shape and size of the cell. All cells, with a few exceptions, contain a **genome**, i.e. a complete set of genes, consisting of DNA. A few highly differentiated and specialized cell types lose part or all of the genome. As an example red blood cells have no DNA and no cell nucleus.

The corresponding Spanish dictionary, *Ingeniería Genética Diccionario Enciclopédico* (Kaufmann et al. 1998: 22), contains the following subject-field component in Spanish:

#### § 2. La química de las células y el origen de la vida

La célula es la unidad estructural y funcional más pequeña de los organismos vivos. Los organismos más pequeños se componen de una sola célula, en tanto los más grandes son multicelulares. Los organismos multicelulares superiores contienen muchos tipos diferentes de células, que realizan funciones especializadas. Los distintos tipos de células cooperan de forma estrechamente coordinada, aunque cada una de ellas conserva una cierta independencia.

La **membrana plasmática** define la periferia de la célula. Se compone de gran cantidad de moléculas de lípidos y proteínas y es muy flexible, lo que le permite a la célula cambiar de forma y tamaño.

Salvo algunas excepciones, todas las células contienen un **genoma**, o sea, un juego completo de genes, compuestos de ADN. Algunos tipos de células muy diferenciadas y especializadas, pierden todo su genoma o parte de éste. Por ejemplo, los glóbulos rojos no poseen ADN ni núcleo celular.

By integrating the word list the lexicographers will support the cognition-oriented functions in particular. Integration may be further strengthened by adopting an aided integrated subject-field component, i.e., a subject-field component containing structural indicators that help the user navigate the text and find what he is looking for. A simple aided integrated subject-field component is one where the relevant terms are highlighted by the use of bold face as in the example from the *Gene Technology Encyclopaedic Dictionary* (Kaufmann et al. 1998). A subject-field component that contains bold face terms as well as a separate index of all the terms found in this dictionary component similar to a subject index in a manual or textbook is called an *extended aided integrated subject-field component*. Subject-field components with no structural indicators

highlighting the terms and with no index of terms are called *unaided integrated subject-field components*.

## 5. Suggestions for improvement

The planning and writing of subject-field components require careful consideration. Lexicographers need to balance their text according to the findings of the user profile, both in terms of factual information and the language in which it is written. It is important to appreciate that a systematic introduction to a subject field should be written differently depending on whether its addressees are experts, semi-experts or laypersons interested in a particular field (see e.g., Nielsen 2002). If a dictionary's user group contains both experts and semi-experts, lexicographers may have to write two subject-field components, one for each sub-group according to their relevant competences. In a bilingual dictionary, lexicographers also need to consider whether the systematic presentation of the subject field should appear in one or the other language, or in both.

Before embarking on the practical work, lexicographers need to have a clear idea of the elements affected by the distribution structure. We propose that the best solution is to prepare an extended aided integrated subject-field component, and this will require careful planning of the distribution of the lexicographical data. Furthermore, the data items in the dictionary components — for instance the data contained in two or more articles, that contained in a synopsis article and one or more individual articles, and that contained in the articles and the data contained in the subject-field component — may overlap.

There are six possible general distribution relationships available to lexicographers:

1. All data are placed in the subject-field component.
2. The data in the subject-field component are all restatements of the data found in the articles.
3. The data in the subject-field component are partly restatements of the data in the articles.
4. The data in the subject-field component complement the data in the articles.
5. The data in the subject-field component are restatements of all the data in the articles as well as new and supplementary data.
6. The data in the subject-field component are partly restatements of some of the data in the articles and partly new and supplementary data.

These options are not equally well suited for all dictionaries. We propose that the best option for a multifunctional LSP dictionary for laypersons and semi-experts is option number 6. In choosing this option, the lexicographers may omit very specific data about a particular term in the subject-field component and place these data in the article in which they rightly belong; very specific information about a particular term should be included in the relevant article treating this — and only this — term and not in the more general systematic presentation of the subject-field. Furthermore, option 6 is clearly appropriate for communication-orientated functions such as text reception, text production and translation as illustrated below. As far as cognition-orientated functions are concerned, option 1 is a possibility because it caters for the user's need for knowledge about sporadic phenomena as well as the need for systematic knowledge. If this option is chosen, the result will be a reference work that is usually not called a dictionary, however. Options 2 to 4 require that the user of the dictionary has at all times in-depth knowledge of the data contained in each individual article and are therefore not really viable solutions. By choosing option 5, the lexicographers must include considerably detailed supplementary information in the subject-field component, which will make it difficult for the user to get the systematic overview required. Accordingly, option 6 is recommended.

Our proposal for a multifunctional LSP dictionary designed for laypersons and semi-experts will contain an aided fully integrated subject-field component in two versions written in the relevant language and style; a bilingual dictionary covering a culture-independent subject field, e.g., language for science and technology, requires four versions, two in each language. A dictionary covering a culture-dependent subject field, such as law and accounting, complicates matters, because three-times-two subject-field components are required: one in L1 about L1, one in L1 about L2, one in L1 about differences between L1 and L2, one in L2 about L1, one in L2 about L2, and one in L2 about the differences between L1 and L2. We are not aware of any dictionary with more than one subject-field component, so the proposal for three different components constitutes a fundamental departure from previous lexicographical thinking, both in theoretical and in practical terms; in reality, however, an even larger number of different subject-field components can be envisaged for a particular dictionary designed to fulfil specific functions and to cater for the needs of a specific user group in specific use situations.

The lexicographers also need to consider the function(s) of the dictionary so that the data contained in the subject-field components support one or more of its functions. In connection with cognition-orientated functions, the

subject-field component may be used as a stand-alone section, i.e., as a genuine text in its own right. This may be the case in use situations involving a layperson, for instance a journalist, who plans to write an article about a company using gene technology in its production process. The journalist may benefit significantly from consulting a subject-field component in a dictionary on gene technology written for laypersons, as he will be able to get a general idea of the technology, terminology and LSP involved; this will enable him to write a well-documented article for a quality newspaper or journal (Tarp 2005). This example illustrates the fact that the subject-field component may function in a self-study context, which may be extended to a learning context involving laypersons such as students of a particular subject at an introductory level. However, even experts may need to consult a reference work in order to refresh their memory or confirm an opinion held; in such cases a dictionary component containing a systematic presentation of a subject field may be helpful.

The same subject-field component may also be appropriate for communication-orientated functions. In preparing for his article, the journalist may read a text about gene technology and therein encounter several field-specific terms that are not familiar to him and therefore consult the subject-field component in order to understand the text. Alternatively, a word list that has been fully integrated with the subject-field component will allow the user to look up a term in the word list and there be referred to the systematic presentation in the subject-field component where he can acquire the conceptual and factual knowledge necessary to properly understand the text. The point is that this consultative act is not made purely in order to acquire knowledge but to solve a specific problem that the journalist has encountered in the text he is reading, i.e., in a text-reception situation.

The position is somewhat similar if a translator is working on a text on gene technology and he needs to consult the subject-field component (directly or through a fully integrated word list) in order to understand the text he is translating. In this type of situation two subject-field components, one written in the translator's native language and one in the relevant foreign language, may not only provide the translator with factual knowledge enabling him to understand the source text as a necessary condition for making the translation, but also with knowledge about the foreign LSP (Tarp 2005). This illustrates the use potential of the subject-field component in two distinct phases of a translation process, viz. the first phase where the translator acquires knowledge prior to the actual translation process (the cognition-orientated function), and the second phase where the translator uses the data in the component to help translating the text (the communication-orientated function). Any translator

of specialised texts into a foreign language will at best be a semi-expert and the subject-field component will be very valuable for this type of user in this type of use situation. Even in connection with translations made by field experts from a foreign language into the translator's native language, such three-times-two systematic presentations will be helpful because they provide factual and LSP information, something that is particularly important if the subject field is culture-bound.

The distribution structure may cause the location of data to be radically different from that ordinarily expected in connection with culture-bound subject-fields. An example can be found in the *Legal Dictionary English–Danish* (Nielsen 1993), as some of the articles contain no factual information on, definition of or explanation about the lemmata. The reason is that some of the culture-bound English terms have no equivalents in Danish, but they may be explained in Danish for the benefit of the intended Danish user group. As the English terms are relevant in such a dictionary, they had to be lemmatised. Otherwise the dictionary would not be able to fulfil its intended functions: primarily understanding English legal texts, and secondarily translating English legal texts into Danish. Consequently, the articles treating these culture-bound lemmata are all cross-reference articles, referring the user to one or more numbered sections in the subject-field component. The three articles below and the relevant excerpt from the subject-field component in the *Legal Dictionary English–Danish* (Nielsen 1993: 16, 68, 81) illustrate this. (Note that the dictionary was intended for Danish users and the subject-field component is written in Danish, but has for practical reasons been translated into English.)

**House of Lords** *s* → § 1; § 13

**Lord Chancellor** *s* → § 1; § 6; § 19

**Lord of Appeal in Ordinary** *s* → § 1

**§ 1 House of Lords**

This is the highest civil court in England and Wales, and the House of Lords thus corresponds to the Danish Højesteret, cf. § 20. In addition to hearing civil appeal cases from England and Wales, the House of Lords is also the highest court hearing civil appeal cases from Northern Ireland and Scotland. The president of the court is the **Lord Chancellor**, and the ordinary judges are called **Lords of Appeal in Ordinary**. Appeal cases are normally heard by 5 judges, and only cases of major importance for the English legal system are heard by the House of Lords.

These three articles are the entire articles as they appear in the dictionary, and only contain cross-references to relevant sections in the subject-field component, where the necessary factual information is given. § 1 in the subject-field

component explains the concept of the House of Lords and the relevant judges, thereby fulfilling a cognition-orientated function, but the original Danish text also suggests possible translations of the culture-bound English terms written in bold face, thereby fulfilling a communication-orientated function (*corresponds to...*, *president* and *ordinary judges*).

The fact that the original text is written in Danish is important for communication-orientated functions for two reasons. First, the intended user group of Danish laypersons and semi-experts will be able to understand the explanations given in the subject-field component as it explains unfamiliar foreign and culture-bound concepts in their native language (text reception). Second, the Danish text also provides the translator with possible explanatory equivalents of the culture-bound legal terms that may be inserted into a translation into Danish. In a Danish-English law dictionary designed for translation by Danish users, the layperson and the semi-expert would need two language versions of the subject-field component. The Danish text would be readily understood by the Danish users, and the English text would provide the translator with grammatical and syntactical information that will assist the user in his attempt to produce an acceptable translation. This means that two language versions of the subject-field component constitute the optimal solution in relation to the communication-orientated function of foreign-language translation involving one native language and one foreign language. The optimum solution would be to present the language versions in two parallel columns, as this will facilitate comparison of LSP terms and usage (Bergenholtz and Tarp 1995: 158–159).

It is more difficult to assess the value of subject-field components in connection with text production. Most texts produced about a specialist subject are written by experts, and they are not likely to consult a specialised dictionary during this process, unless they need information about a subject field related to their own. However, the systematic presentations may help laypersons such as students of the relevant subject field and science writers producing texts in their native language (or perhaps in a foreign language), as they need the proper understanding of the factual world involved. In connection with the communication-orientated function of production of a text in a foreign language, two language versions of the subject-field component may be necessary. The native-language text will provide the user with the understanding of the subject necessary to produce the text, and the foreign-language text will provide the user with grammatical and syntactic information that facilitates the production of the text.

Finally, it should be emphasised that a systematic presentation of a subject field has an important methodological function during the planning and production phases of a modern LSP dictionary. The lexicographers should

seriously consider preparing such a systematic presentation during the initial stages of a dictionary project because it can then form the basis for writing the individual articles and be used as a separate front matter component. A well-written systematic outline of the subject field also helps the lexicographers make decisions relating to the distribution structure, in that they have a clear picture of which data are contained in the subject-field component and can therefore write the articles accordingly, depending on the function(s) of the dictionary.

Moreover, lexicographers should carefully consider the potential of the medium involved. Printed dictionaries more or less automatically limit the number and size of the subject-field components that can be incorporated, but it does not seem unreasonable to suggest that a multifunctional, printed monolingual LSP dictionary can contain up to two subject-field components; neither does it seem unreasonable to suggest that a similar bilingual (single-field or sub-field) dictionary can contain up to three-times-two subject-field components if its functions so warrant. If lexicographers incorporate more subject-field components they may fall into the trap of producing a large and unwieldy dictionary, which will hardly ever be used to its full potential. On the other hand, electronic dictionaries, whether Internet-based or on CD-ROM, allow lexicographers to incorporate a larger number of systematic presentations, as they provide ample space for different language versions of the components. This is particularly relevant for bilingual multifunctional dictionaries designed for laypersons and semi-experts, as they may have very different factual and linguistic competences that can best be catered for in different components. As this illustrates, the electronic medium allows lexicographers to design and produce multilingual, multifunctional LSP dictionaries, as there is almost no limit as to the different languages the subject-field components may be translated into or written in.

## 6. Concluding remarks

Our criticism of part of the existing terminological literature deals with its failure to give sufficient attention to the fact that practical work involved in dictionary making must take into account real user needs. Almost every specialized dictionary claims to have taken these needs into consideration, but in reality most of them have not done so. Moreover, the existing theoretical contributions do not give the discussion of user needs the central position and attention it deserves. The Wüster-inspired terminology (see Hoffmann

et al. (1999: 2096–2254) with 16 representative papers in the seminal work *Fachsprachen. Ein internationales Handbuch zur Fachsprachenforschung und Terminologiewissenschaft* (Engl. International Handbook of Special-Language and Terminology Research)), is in fact an expert-oriented terminological discipline that has a primarily cognitive focus, or perhaps rather a knowledge-orientated focus. The scholarly writings in this discipline resemble a Popper-like search for the truth, which fails to take into account the fact that different users with different competences in different use situations need to have their lexicographical needs satisfied in different ways by dictionaries. This is not only relevant for subject-field components, and we propose the inclusion of several versions in one and the same dictionary, or at least one for laymen and one for semi-experts. Moreover, we do not propose a static conceptual system (as in classical terminography), but principally an epic, explanatory text written for a particular dictionary function. A few examples from an electronic dictionary in which the user may select a specific function when “opening” the dictionary may make our arguments clearer. The first possible situation is:

I am a layman and have difficulty understanding part of a text on gene technology.

This layman searches for the term *gene* and gets the following article (in which § 3, 21 are cross-references to numbered sections in the subject-field component written for laymen):

**gene**  
the basic unit of inheritance which is transmitted from parents to offspring.  
→ § 3, 21

The second possible situation is:

I am a layman and want to know more about the terms of gene technology.

This layman also searches for the term *gene* and gets the following article (in which § 3, 21 are cross-references to numbered sections of the subject-field component written for laymen; the terms following the first arrow refer to articles that, in this context, may provide further information):

**gene**  
the basic unit of inheritance transmitted from parent to offspring.  
An organism contains many genes — in humans more than 100,000. Each gene has a specific characteristic, e.g., one out of the potential blood groups. In chemical terms genes are small sections of big complex molecules, the nucleic acids. In bacteria these are coiled aggregates and in higher organisms they are constituents of chromosomes.

- bacterium, chromosome, molecule, nucleic acid
- § 3, 21

The last possible situation is:

I have a science degree, but I am not an expert in molecular biology and therefore need exact definitions of terms within the subject-field of gene technology.

This semi-expert also searches for the term *gene* and gets the following article (in which § 21B is a cross-reference to a numbered section of the subject-field component written for semi-experts, and *Johannsen 1909* informs the user that the term was invented by Johannsen in 1909):

**gene** (Johannsen 1909)

A gene is a DNA sequence ending a mRNA (protein), tRNA or rRNA. For eukaryotes a gene can also be defined as a transcribed DNA sequence or transcription unit. In prokaryotes two or more proteins are often encoded in the same transcription unit, and such a transcription unit plus its associated regulatory sequence is termed an operon.

- bacterium, chromosome, molecule, nucleic acid
- § 21B

It should be noted that the last article is completely different from the first two articles for laymen. It was written using the correct scientific terms, and this makes it impossible for laymen to understand. This is not a question of short or long articles, but of completely different text genres. It is important to appreciate that the examples are taken from the same dictionary, and that the user defines his status himself. The statement that “Practical work for dictionary making taking into account user needs has already been described” does not apply to metalexigraphy, practical lexicography, terminology or terminography.

As this paper shows, and as argued in Section 1, there is no real difference between LSP lexicography and terminography. Both aim to develop principles for the design and production of a tool that can help a potential user group fulfil specific needs in specific types of situations. We have put forward a number of suggestions concerning the design and compilation of such a tool and emphasised the need to provide a high degree of systematically arranged factual data so that these data are not exclusively related to specific, isolated terms. We hope that our suggestions will lead lexicographers to prepare and include a separate component whose function is to fulfil the users’ need for a relatively short systematic presentation of a particular subject-field in future LSP dictionaries.

## Notes

1. Original text: “in der Terminographie werden für bestimmte Fachgebiete Begriffszusammenhänge und Zuordnungen Begriffszeichen — Begriff in Begriffssystemen mit Begriffsbeschreibungen in Sachfolge (Begriffssystematik) bzw. Gegenstandszusammenhänge in ontologischen Systemen (z.B. in Bestandssystemen) in ontologischer Folge oder Themenzusammenhänge in Themensystemen in strukturierter Abc-Folge oder Sachfolge auf konventionellen oder elektronischen Datenträgern dargeboten.” (Felber and Budin 1989: 139).
2. However, the above summary does not apply to all LSP dictionaries, such as a number of Scandinavian LSP dictionaries, several of which have been prepared by or in cooperation with the Centre for Lexicography in Aarhus, Denmark. The Centre does not limit its focus to general language dictionaries, but primarily deals with specialised dictionaries; strictly speaking, the Director of the Centre is not a Professor of Lexicography but a Professor of Bilingual Lexicography for Specialised Languages.
3. This discussion on dictionary functions is based on Bergenholtz and Tarp (2003).
4. This discussion of distribution structure is based on Bergenholtz and Tarp (1995, 2005).

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