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Types of Lexicographical Information Needs and their Relevance for Information Science

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ABSTRACT

In some situations, you need information in order to solve a problem that has occurred. In information science, user needs are often described through very specific examples rather than through a classification of situation types in which information needs occur. Furthermore, information science often describes general human needs, typically with a reference to Maslow's classification of needs (1954), instead of actual information needs. Lexicography has also focused on information needs, but has developed a more abstract classification of types of information needs, though (until more recent research into lexicographical functions) with a particular interest in linguistic uncertainties and the lack of knowledge and skills in relation to one or several languages. In this article, we suggest a classification of information needs in which a tripartition has been made according to the different types of situations: communicative needs, cognitive needs, and operative needs. This is a classification that is relevant and useful in general in our modern information society and therefore also relevant for information science, including lexicography.

Keywords: Information need, User situation, Communicative situation, Cognitive situation, Operative situation, Lexicography

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1. THE OPTIMAL SOLUTION FOR SOLVING INFORMATION NEEDS

When someone needs information in a certain situation, this person has to decide how and where s/he can find data to solve the information problem. S/he could for example ask someone or use an information tool to get help. In the latter case, s/he has to find the most useful information tool based on his/her specific type of information need; the tool must be easy to find, and it should not be too time-consuming to get access to the place in the tool that contains the relevant data. Experiments show that many people with information needs stop their search if they have not found an answer within a few minutes (Bergenholtz, Gouws, & Bothma, 2015). However, also when the person with an information need finds relevant data, it happens that s/he does not understand the text or does not see its relevance for the given problem; it could be that the text is formulated for a user group with more specialized knowledge and therefore the information-seeking person does not understand all the terms in the text. Both information science and lexicography aim to describe the access routes for different user types and different kinds of information need as well as make proposals and conceptions for new information tools that provide quick access for a certain user group with a certain type of need. These solutions and information tools are indeed needed, but they will never be perfect. The perfect solution would be a handy tool for one or more users for each kind of information need s/he or they experience and which provides quick and easy access to the data.

This type of tool actually exists. We know it from the Disney cartoons and comic books featuring Donald Duck and his three nephews, Huey, Dewey, and Louie, who possess the *Junior Woodchucks' Guidebook*, which was introduced in a story from the 1950s and received a lot of attention especially in the 1970s, but has not appeared often in the cartoons in recent years. The *Junior Woodchucks' Guidebook* looks like a regular book, which the nephews carry around in their shirt pockets, and which is able to provide answers to almost all questions – with a few exceptions, which will be mentioned later in this section – raised by Huey, Dewey, and Louie. However, it is not very plausible that so many different kinds of information need can be satisfied with such a small book that only contains few data – but neither is this the case. In a comic book issue containing the origin of the *Junior Woodchucks' Guidebook*, "The guardians of the lost library" from 1993, we are told that the guidebook not only contains all the books from the famous library in Alexandria, but also all books from ancient and modern libraries. Apparently, it is not simply a book that somehow corresponds to Google because Huey, Dewey, and Louie do not receive millions of hits and thereby experience information overload, which is often the case with searches made with Google; instead, they receive exactly the data they need to cover their information need, nothing more and nothing less. It is no surprise that Scrooge McDuck sees great potential in making a huge profit out of such a tool. This, however, is not possible because the tool can only be used by Junior Woodchucks and furthermore, the tool appears in different versions for each woodchuck. The *Junior Woodchucks' Guidebook* is actually a handheld computer used by Huey, Dewey, and Louie, but they do not each carry around a computer (contrary to most young people nowadays, who all own a smartphone), and they do not write their questions using the computer's keyboard, as such a thing does not exist. Apparently, the *Guidebook* is able to understand the nephews' information needs simply when such needs come to their minds. The nephews hardly have to perform any lookups themselves as the book already knows what they are looking for and therefore it can easily provide them with the data that can help them solve their information needs.

In the following subsections, we will describe some of the information needs that the nephews experience in specific situations and which they use the *Junior Woodchucks' Guidebook* to solve. These descriptions will form the point of departure for the following descriptions and discussions of information needs as they are treated in information science and lexicography, respectively. When we use the word *situation*, it refers to a time at which a certain information need occurs. Such a situation may occur as a result of another situation and thereby be a part of a course of events. Of course, such a situation is related to the preceding situations in the same course of events. However, the most important point is that in a specific situation a specific information need occurs, and the person who experiences this need wants to solve it somehow.

1.1. Communicative Situations

In this first type of situation, the ducks run into problems related to communicating with other people or with animals, often as part of a larger course of events, e.g. when they search for the philosopher's stone. In the Donald Duck comic stories, these situations most often concern translation, but they could also be connected to producing or understanding texts. The following three examples illustrate situations in which communicative needs occur.

In one of the stories, Huey, Dewey, and Louie are in Scotland, and they are being chased by the criminal Beagle Boys. Suddenly, they see the Loch Ness Monster in the water. It is singing a beautiful tune and by looking in the *Junior Woodchucks' Guidebook*, the nephews are able to translate the song. The *Guidebook* also helps them ask the monster for help to get rid of the Beagle Boys; according to the book, the monster is only able to understand them if they ask simultaneously in its native language, which the book explains how to speak.

In another story, Uncle Scrooge, Donald Duck, and the three nephews are looking for a pirate ship, and their search takes them to Crete where they search for the entrance to a labyrinth. They find an inscription in a language that they do not understand, but luckily, the *Guidebook* describes this language and thereby helps them translate the text.

In a third story, Donald Duck and his nephews are in a jungle, looking for rare plants they can bring home and sell. They run into a gorilla that chases Donald, who escapes by running up a tree and hiding in it. The gorilla says something to the nephews, and they use the *Guidebook* to translate what it says and to speak with the gorilla. The animal says "zpuna zona," which means that it would like to help them pick flowers.

1.2. Cognitive Situations

In the second type of situation, the three nephews need to gain knowledge about something they are unfamiliar with as for example in the first story below where they see a bird and want to know what type of bird this is. The acquired knowledge is sometimes used later in the same story, but this is not the crucial point: Huey, Dewey, and Louie have a need for knowledge, which they want to solve in the given situation; that they remember this knowledge for later situations is a possible outcome, but this is not the actual need.

In one of the stories, Uncle Scrooge, Donald, and Huey, Dewey, and Louie are searching for gold in an Australian desert. There are numerous giant kangaroos, but at some point they also see a large bird which makes a loud noise that scares off all the kangaroos. Louie says that according to the *Junior Woodchucks' Guidebook*, it is a so-called gold vulture, and these birds feed on gold. This knowledge is very useful to them in the given situation because there is no point in searching for gold when the vulture has already eaten it.

In another story in which the ducks are looking for the philosopher's stone, Uncle Scrooge tells the nephews that pirates in the 1400s resided on Crete. This piece of information makes the nephews want to know more about Crete, so they take a look in the *Guidebook*, which tells them that pirates lived in the labyrinth, which in the old days was possible to access, but not possible to leave afterwards. After having gained this piece of knowledge, the nephews know that they should look for the entrance; and this takes us back to the second communicative situation described above in Subsection 1.1.

In a third story, the ducks are visiting an Arabic country where Uncle Scrooge wants to buy a carpet. The salesperson claims that the carpet which Uncle Scrooge is interested in buying is a flying carpet and therefore very expensive. Scrooge does not believe in the existence of flying carpets, but Huey, Dewey, and Louie read in the *Guidebook* that they are indeed real and that there is a certain way of identifying them: They have wing-shaped symbols in their pattern.

1.3. Operative Situations

The type of situation that Huey, Dewey, and Louie most often end up in is one where either they do not know how to solve a problem or they do not know how to get out of a dangerous situation. This is also the case in the story about the flying carpet mentioned above. The ducks have gotten their hands on a flying carpet, but they do not know how to make it fly. According to the *Junior Woodchucks' Guidebook*, you just need to pour water from a specific natural spring on the carpet and then you can order it to fly wherever you want it to go.

In another story, Scrooge, Donald, and the three nephews dive down to a shipwreck which Scrooge thinks contains a large amount of gold coins. However, when they reach the wreck, they find that an enormous octopus is blocking the entrance. Scrooge and Donald

give up their hunt for gold, but Huey, Dewey, and Louie instead consult the *Guidebook* in which it says that if you get into a battle with an octopus, you need a powerful source of light in order to scare it away. Therefore, the ducks take out their camera and use the flash to scare away the octopus, which makes it possible for them to collect the coins from the shipwreck.

There are many more stories containing operative situations in the Donald Duck series: The ducks come across a large bull and do not know how to get out of the situation, but the *Guidebook* tells them what to do: They should run for their lives. A similar simple solution is suggested by the *Guidebook* when the three nephews want to fish for their dinner: It is best to fish where the water is not too deep. And the *Guidebook* provides another simple solution when the ducks are stuck in the desert without water; while Donald tries (unsuccessfully) to use a willow twig, the *Guidebook* tells the three nephews to look for water in the container used for washing the windows of the car in which they are travelling. However, in one of the stories, the *Junior Woodchucks' Guidebook* cannot help Huey, Dewey, and Louie solve their problem in the given situation: The nephews have been teasing their Uncle Donald to a point where he has had enough and starts chasing them with a stick. They start running and simultaneously consult the *Guidebook*, but it turns out that the *Guidebook* does not contain data about what to do when running away from a furious uncle.

2. INFORMATION NEEDS IN INFORMATION SCIENCE

In information science, the analysis of information needs involves a strong focus on information behavior, whereas in lexicography, the focus is on the single user and her/his concrete need(s) in specific situations (see Section 3 for an elaboration on this point). Furthermore, information science is generally not very interested in transferring the analysis of information needs to the development of new information tools, contrary to the purpose of lexicographical analyses, which aim at producing helpful tools for people experiencing the investigated information needs. Some of the main problems in the treatment of information needs in information science were formulated more than 30 years ago in the famous and still relevant paper by Wilson (1981). One of the criticisms he provides is that in information science, no clear distinction is made between "data," "information," and "knowledge" (1981, p. 1). The problem arising from this is that it is not made clear that users make interpretations of *data*, and that these interpretations constitute the *information* that the users get, i.e. all users will not necessarily get the same information out of the same data; this may be because the data is formulated in a way that makes different interpretations possible, or it could be because a user makes a wrong interpretation, e.g. because the user misunderstood a part of the data. Thus, a person can have information needs, but not data needs. The information extracted from the data can be stored for a long or a short time as *knowledge* in the user's brain. However, despite Wilson having emphasized this terminological problem decades ago, we see that "data" and "information" are still used as synonyms in information science. Wilson also criticizes information science for having more focus on "information seeking behavior" and not on the more important "user need for information" (Wilson, 1981, p. 7), which – as mentioned above – is still a valid criticism. Wilson's most important point in his article is his skepticism towards the inclusion of human needs – the latter being inspired by Maslow's classification (Maslow, 1954) – which are often used as the starting point for discussions on information needs in information science. Maslow (1954) works with five levels of needs:[1]

- biological and physiological needs
- safety needs
- love and belonging needs
- esteem needs
- self-actualization needs

[1] Wilson only operates with three types of needs: physiological, affective, and cognitive, but these are clearly inspired by Maslow's classification.

Dorner et al. (2015, pp. 12-13) give an overview of different scholars' classifications of needs, which are based on Maslow's concept of human needs, e.g. the one suggested by Nicholas and Hermann (2009):

- coping information to resolve basic physiological needs
- helping information to resolve higher-level needs such as those related to personal relationship development
- comparative information for resolving needs related to personal esteem
- edifying information for resolving needs related to self-fulfillment and realizing one's potential

This and the other classifications mentioned by Dorner et al. (2015) are or could be relevant for some studies, but we do not find them relevant for a classification of information needs. Whether someone experiences a need for human contact or the need for consuming food is not relevant in relation to *information* needs. Instead, when classifying information needs, the point of departure should be the situation in which a person gets an information need. The concept of situation is to some extent discussed in contributions made within information science, and in these contributions, a distinction is made between single situations and a long chain of situations belonging to the same scenario.[2] The example in Section 1 with the ducks searching for the philosopher's stone shows that a scenario can have many situations. To find the philosopher's stone is the end goal for the ducks, but on their way to solve this problem, they find themselves in different situations where they experience different needs, some of these being information needs, and apply different sources (tools) to solve the specific information need in each of these specific situations. Thus, a scenario is a complex situation that can be divided into single situations; some of these single situations can lead to a certain information need, but certainly not all situations will do so. If we are not dealing with an information need, it is instead a general social or individual need, but these are neither relevant for lexicography nor information science. Case (2002, pp. 22-34) presents different scenarios such as "buying products," "healing a patient," or "betting at race horses" in which the person seeking information is motivated either by an assignment given to the person by someone else or by the person himself or herself out of self-interest, and he also provides specific examples of such scenarios. However, he does not distinguish between type of scenario and (actual) scenario: Buying a product could be seen as a type of scenario whereas the specific example he provides of an information seeker shopping for a new car is an (actual) scenario.

If someone plans to make a journey, s/he will experience certain information needs while planning it, but will most likely run into different information needs during the journey which he was not aware of before he went away:

> …information needs appeared to decrease after purchasing the travel, but to increase again when novel or unexpected situations (e.g., to make international calls, to find a place for taking a rest, or to be lost at a certain sightseeing place at the travel destination) were encountered, or at the time decisions had to be made during trips (Choi, Morrison, & Jang, 2012, p. 33).

Each of those single situations described here in relation to travelling is a different situation with a different kind of information need, but they are all related to the same scenario. The person could run into different kinds of cognitive need, like: How is the weather there in this part of the year and must I fear different kinds of tropical disease? Or s/he could experience operative needs, like: What can I do to prevent getting sick from malaria? Or it could be a communicative need such as when the person wants to find the railway station but does not know the word for "railway station" in the language spoken in the country s/he is visiting.

[2] Contributions in information science talk about "seeking scenarios," e.g. Case (2002, p. 20ff), but it would be more precise to talk about a "scenario" without "seeking" because a scenario can, but does not have to, lead to a seeking process, i.e. either to the use of one or more information tools or to asking another person for his or her help.

We have talked about information needs in this and the previous section, but what is an information need, really? The general answer is always something like this: There is an information need if someone or a group of people does not know something and wants to get this knowledge (e.g. Nicholas, 2000, pp. 19-35). Like Bergenholtz and Bothma (2013, p. 22), we distinguish between *situation, user, information need, information tool*, and *interpretation of data*. Our starting point and the only relevant point is the user who finds himself/herself in a certain situation with a certain information need. Therefore, it is not relevant to talk about unrecognized needs (Nicholas, 2000, p. 21); if a person has an information need, but is not aware of it, he has no need to find the piece of information that can help him solve the problem. And neither is it relevant to talk about ill-defined needs (Ingwersen & Järvelin, 2005, p. 298) as a user will not be aware if his need might be ill-defined. Of course, if a need is indeed ill-defined, it may result in a longer search process, it may be difficult to seek help from other people, and so on, but the user still has an information problem; whether it is ill-defined or not might be relevant for a librarian, but it is irrelevant for the user.

A clear understanding of types of information needs makes it easier to find relevant data to satisfy these needs. The discussion about the difference between information needs, information wants, information desires, and information demands (see e.g. Belkin & Croft 1992, p. 31; Nicholas, 2000, p. 19; Dorner et al., 2015, pp. 7-9) is not important. Of course, we could make differentiations of this kind, but for the person with an information need, the main problem is still simply to get a piece of information to solve this need. Thus, there are much more important distinctions to make, especially between different kinds of information need. We have already used one type of classification in the stories about the ducks presented in the first section: communicative, cognitive, and operative needs. This classification will be elaborated on in the next section.

3. INFORMATION NEEDS IN LEXICOGRAPHY

3.1. What are Lexicographical Information Needs?

The focus on information needs (also called user needs) in lexicography is still relatively new. Not until a classic conference on lexicography held in the United States in the 1960s did lexicographers start talking about users and their needs instead of focusing on dictionary content isolated from the intended users, cf. Householder (1967, p. 279), who in his summary report wrote that "[d]ictionaries should be designed with a special set of users in mind and for their specific needs." However, even though lexicographers started focusing on what they considered information needs or user needs, many actually focused on data needs (i.e. what types of data do people look for in dictionaries). This can clearly be seen in the many user studies carried out within lexicography in the last few decades in which users – typically in questionnaires and interviews – are asked about their need for data types, not about the needs for information that have led them to consult dictionaries. Thus, even though these studies are meant to study users' information needs, they instead focus on data and only identify what users are familiar with from existing dictionaries.

User needs never occur in isolation, but are connected to two other components: (1) the dictionary user in whose mind the need occurred and (2) the pre-lexicographical situation in which the need occurred. Together, these three components – user need, user, and user situation – determine the function of a dictionary according to the lexicographical function theory (see e.g. Bergenholtz & Tarp, 2003, p. 176; 2005, p. 12). When we look at user needs from this perspective, another problem occurs with the many user studies being carried out in lexicography as almost none of these focus on the social situation in which a need occurs – the needs are analyzed in isolation.

Tarp (2009a, p. 279) argues that lexicographical needs make up a subset of human needs in general, and furthermore provides characteristics of a lexicographical information need (2009a, pp. 279-283), which have been summarized in the following list:

1. It is objective (not subjective)
2. It is historical-cultural (not natural)
3. It is genuine (not artificial/constructed)
4. It is recognized by the dictionary user; an information need may not always be recognized, in which case he will not use an information tool and then it will not be a lexicographically relevant information need

5. It is concrete (not abstract), i.e. it is related to a specific user in a specific user situation
6. It can be met by consulting a lexicographical tool
7. It is a need for information
8. It is either a (primary) function-related need or a (secondary) need related to the use of an information tool

The sixth point is problematic as it results in a tautology: A lexicographical need is met by consulting a lexicographical tool, and a lexicographical tool is designed to accommodate lexicographical needs. Therefore, this one should be excluded from the list. The one that is of particular interest in this article is the second point: that lexicographical needs are historical-cultural. In the preceding section it was explained that many typologies of information needs in information science are connected to all human needs, but here it is made explicit that the only types of needs that are of interest are the ones connected to a human being's social life, not his natural state, cf. the second point. A human being's need for food, air, water, etc. (i.e. biological and physiological needs) are not information needs related to a person's historical and cultural life. The eighth point is very important to emphasize as there is an important difference between function-related and usage-related needs not realized by many lexicographers: The function-related needs occur in the pre-lexicographical situation and are the ones that (potentially) lead to a lookup situation; usage-needs occur in the lexicographical situation, i.e. when users are actually using a dictionary and need to find certain data in this specific dictionary. To the seven points (having excluded the sixth one above), we can add the following two points:

- It can be either simple or complex (cf. Bergenholtz & Tarp, 2003, p. 177; Dorner et al., 2015, p. 32)
- It is punctual (not global) (cf. Tarp, 2009b, p. 264)

According to Dorner et al. (2015, p. 32), it is possible to construct a simple spectrum of needs, ranging from simple to complex, e.g. from finding out when the next train to a specific city leaves to finding out how to change the manner in which elections are held. However, Dorner et al. make it sound as if the simple needs are related to the individual, whereas more complex needs are related to a wider context, but this is not necessarily the case, at least not from a lexicographical perspective. Here, a simple need could for example be the need to understand the meaning of a certain word, whereas a complex need could be to find out how to build a cupboard. There is clearly a difference in the complexity of these two needs, and they are both individual needs. According to Bergenholtz and Tarp (2003, p. 177), simple needs are solved with one or a few lexicographic data items, whereas complex needs are met by a combination of different sorts of lexicographic data.

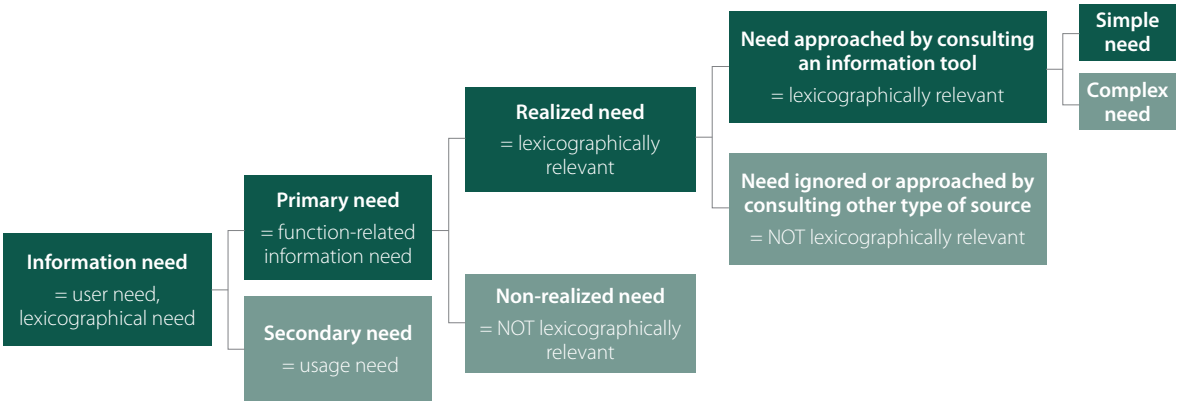

Fig. 1 Lexicographical information needs

If we zoom in on the types of needs a dictionary user may experience, we can look at them from a rather general perspective or a more specific perspective:

General level – information about
- The native language
- A foreign language
- A special subject field
- Culture and the world in general
- The native LSP
- Etc.

(Bergenholtz & Tarp, 2003, p. 175)

Specific level – information about
- Meaning of lemma
- Meaning of idioms
- Meaning of proverbs
- Pragmatic and cultural restrictions
- Orthography
- Variants of collocations
- Etc.

(Tarp, 2008a, p. 75)

The needs mentioned here and in all meta-lexicographical contributions are linked to communicative and cognitive situations, but as will be shown in the next section, many more diverse user needs could and should also be accommodated in lexicographical information tools (e.g. needs related to acting in a certain situation). When we look at needs at the specific level, it is again important to keep in mind that user needs should not be mistaken for data type needs, cf. the typical focus of lexicographical user studies mentioned above. The data incorporated into a specific lexicographical tool is selected according to the function of the dictionary, i.e. among other things the needs of the user. A few user studies have tried to focus on these needs, cf. e.g. Müller-Spitzer (2014), but the problem with this study is that it relies on the user's memory and, most likely, it will not result in the production of innovative information tools as the informants' responses are based on what they are familiar with, i.e. the needs they know that traditional tools are applied to solve, and therefore they may not comment on needs that traditionally have not interested lexicographers. So far, function theorists have suggested using a deductive approach to the identification of user needs (see e.g. Tarp, 2009a, p. 293; Fuertes-Olivera & Tarp, 2014, p. 53), but methods for collection of empirical data are still lacking in this area because it is not possible to know beforehand when a specific need will occur in a certain situation and therefore it is difficult to observe.

As mentioned above, a dictionary need is connected to a given user type and a given user situation, and these components make up what the function theory calls a dictionary function. Thus, when we need to determine the different needs that a user can have in a lexicographical context, we first need to look at both the different user types and user situations. The needs mentioned above should not be seen in isolation, but should be related to a specific type of user in a specific situation. In this article, we will elaborate on situations since, as argued by Bergenholtz and Tarp (2003, p. 176), the determining element in a dictionary function is the situation because there is greater difference between dictionaries conceived for different situations than for different user types; this is also why functions are frequently named after the corresponding type of user situation.

The lexicographical work process
1. Identify user situation and user type
2. Identify user need based on user situation and user type
3. Identify and select the relevant data based on the user situation, user type, and user need, i.e. the intended dictionary function

3.2. Dictionary Functions, User Situations, and User Needs

The cornerstone in the lexicographical function theory (for more details on this theory, see e.g. Bergenholtz & Tarp, 2002; 2003; 2005) is the dictionary function. Of course, this theory is not the first to apply the word *function* in lexicographical literature, but it is the first one to clearly define the term and connect it to the three specific components of user, user situation, and user need. The German meta-lexicographer F. J. Hausmann was the first meta-lexicographer to talk about dictionary functions in connection to types of user situations. In his famous *Einführung in die Benutzung der neufranzösischen Wörterbücher* from 1977, Hausmann makes a typology of *Wörterbuchfunktionen* in which he distinguishes between *learning* and *consultation*; in

the latter case, he also distinguishes between *reading* and *writing*. However, Hausmann is not the first lexicographer to talk about functions (or purposes) – this can also be seen in e.g. Jacob and Wilhelm Grimm's *Deutsches Wörterbuch* (1854) and Ladislav Zgusta's *Manual of Lexicography* (1971). In Grimm's dictionary, the lexicographers write the following in their foreword:

> Was ist eines Wörterbuchs Zweck? nach seiner umfassenden Allgemeinheit kann ihm nur ein großes, weites Ziel gesteckt sein. Es soll ein Heiligtum der Sprache gründen, ihren ganzen Schatz bewahren, allen zu ihm den Eingang offen halten (XII).
>
> [What is the purpose of a dictionary? According to its comprehensive universality, it can only be a great, broad purpose. It is to establish a sanctuary of language, to preserve all its treasure, to keep the entrance open to him.]

This is a very general statement, but the authors indirectly do speak with a functional understanding of the dictionary purpose when they later say that a person can use a dictionary if s/he cannot remember a word s/he wants to use, and when a father and his son want to improve their vocabulary; i.e. they mention different specific situations, but they do not establish a typology of situations.

In his *Manual*, Zgusta says that "the purpose for which a dictionary is intended is a powerful determining factor" (1971, p. 214) and "[t]he decision concerning the purpose or the combination of purposes of a planned dictionary is one of the most important ones" (1971, p. 216). He then argues that a dictionary should be planned to serve e.g. one's scholarly colleagues, students, or the man in the street – i.e. the user – and furthermore mentions that the purpose depends on whether the dictionary is descriptive or prescriptive. In terms of the first part, we see some similarities to the current understanding of dictionary function; however, interestingly, nowhere else in his book does he focus on the dictionary user – he mainly focuses on the incorporation of data without relating it to the user. As for the second part, Zgusta clearly has a different understanding of the word purpose since function theorists would say that the approach, i.e. whether a dictionary should be descriptive or prescriptive (or proscriptive, cf. Bergenholtz, 2003; Bergenholtz & Gouws, 2010), will depend on the *purpose* of the dictionary.

The German meta-lexicographer H. E. Wiegand is famous for having put the user into focus – cf. his statement about "der bekannte Unbekannte" ["the known unknown"] (1977, p. 62) – and in his many contributions, Wiegand also talks about user situations; see e.g. Wiegand (1977; 1998). However, he does not discuss these situations from a theoretical perspective, but simply takes them as a point of departure for other theoretical discussions without contemplating their importance. Consequently, in his work, he ends up focusing on usage situations instead of user situations, i.e. on the situations in which users use actual dictionaries instead of the situations in which the information needs occur (Bergenholtz & Tarp, 2004). These examples show that *users, functions/purposes,* and *situations* are mentioned either directly or indirectly in earlier lexicographical literature, but these concepts were not connected and incorporated systematically into a lexicographical framework before the lexicographical function theory was conceived in the 1990s.

With Hausmann's distinction between *learning (reception* and *production*) and *consultation*, the foundation was made for a distinction between communicative and cognitive functions, which were initially argued to be the two main functions in the lexicographical function theory. However, only the communicative function – which is the one that lexicography traditionally has dealt with – has been investigated in depth and a number of sub-situations have been identified (reception, production, and translation), but cognition remains somewhat unexplored. Tarp (2008a, p. 45) writes that a cognitive situation is when you need knowledge about a certain topic, but in his book and in most of the subsequent literature on the function theory, he and other functional lexicographers leave out *learning* from the characterization of this function. Tarp (2008a, p. 46) does divide cognition into two main types: sporadic and systematic, but apart from this not much else is known about this function.

In his later work, Tarp introduces a new function called the operative function (2007) and another function called the interpretive function (2008b). Tools with an operative function are designed to satisfy needs for instructions or advice in relation to acting, and tools with an interpretive function are designed to satisfy needs for understanding non-linguistic signs.

Interestingly, following these two articles, no one has actually researched these functions, but simply accepted the fact that they are useful lexicographical categories in the functional framework (a number of meta-lexicographical contributions mention these functions, but do not elaborate on them, and only a few try to incorporate them into their dictionary concepts). Ten years later, Agerbo (2017b) investigates the interpretive function and argues that it is not an actual function because it is not based on a certain need occurring in a certain situation in a certain user, but only on a distinction between linguistic and non-linguistic signs. Agerbo therefore rejects this function and argues that the function theory contains not four, but three main functions: communicative, cognitive, and operative. Suggestions for other functions have been made – see e.g. Simonsen (2012) and Gallardo (2013) – and Simonsen even argues that the function theory takes a much too narrow view on functions; that there are many more situations in which information is needed. However, the situations suggested by Simonsen (2012, p. 566), e.g. information related to entertainment and when forming new social relations, cannot be related to the types of needs described earlier in this section – these are not actual information needs (what needs for information would occur in these examples, and is it possible to talk about an entertainment situation in the same way as we talk about operation and cognition?) and therefore not lexicographically relevant needs.

As mentioned in the earlier section, the lexicographically relevant needs commented on in the meta-lexicographical literature and the ones incorporated into existing dictionaries have been the ones occurring in communicative situations and in a few cases cognitive situations. But with the incorporation of the operative function into the function theory, needs occurring in operative situations must also be considered. Agerbo (2017a) analyses twelve existing dictionaries ranging from the 18th century to the 21st century with the aim of showing that these dictionaries actually have an operative function. Some of the user needs that can be extracted from these tools are for example the need to: carry out a physical exercise, cook a meal, plant a flower, do some calculations, and buy a house in a foreign country. For some readers, these needs may appear strange in a lexicographical setting, but this is only because lexicography over the years has been pushed onto a narrower linguistic pathway. As the analysis of these investigated dictionaries shows, for many years, lexicographers have dealt with other needs than only communicative needs.

Specific needs are typically not connected to main situations (communication, cognition, and operation), but rather sub-situations. For example, a native speaker may experience a need for understanding the meaning of a word in a text in a reception situation, not a communicative situation; and a native speaker may need to understand how to inflect a word in a production situation, not a communicative situation. However, for cognition and operation, no sub-situations have yet been described and therefore it is difficult to make a description of the needs related to these functions (cf. Tarp, 2008a, who only comments on communicative needs in detail, not cognitive needs). The following section therefore suggests some newly identified sub-situations related to these functions.

4. TYPES OF INFORMATION NEEDS IN TYPES OF SITUATIONS

In this section, we will present the different types of situations identified in lexicography in which information needs can occur. As mentioned in Section 3, the lexicographical function theory operates with three main situations: communication, cognition, and operation. Of these, only communication has been investigated in detail, which is why for this situation, three different sub-situations have already been identified. Unfortunately, this pre-lexicographical situation has overshadowed all other pre-lexicographical situations for many years, and therefore, in the case of the two other situations, no research has yet resulted in (conclusive) divisions into sub-situations. This section will try to cover this gap by suggesting sub-situations for all three main situations.

4.1. Communicative Situations

As mentioned, communicative situations have been well researched – especially because these are the ones that traditionally have been focused on in lexicography – but up until 2017, the needs connected to these situations have only been related to linguistic signs. According to Agerbo (2017b), communicative situations

should also be connected to needs where a person has trouble regarding non-linguistic signs. The following are examples of needs related to the three sub-situations of communication.

Reception

- **Sub-situation 1**: James, who is a native speaker of English, is reading an English newspaper article and comes across the word *post-factual*. He has never heard or read this word before and therefore does not know what it means. In this case, he wants to know what it means so he can understand the text he is reading; he therefore has a reception need.
- **Sub-situation 2**: Tina, who is a native speaker of English, is visiting a public swimming pool. Standing next to the medium-sized pool, she sees a sign on which is portrayed a person jumping from the edge into the pool and it also has a red diagonal line crossed over the image. Tina is not quite sure what it means: Could it be that she is not allowed to swim in the pool? Is she not allowed to jump into the water? Or is she not allowed to jump with her head first into the water? In this situation, she experiences a reception need.

Production

- **Sub-situation 1**: Linda, who is a non-native speaker of English, wants to write a text in English about global warming for school. She is not quite sure if *greenhouse effect* can be written in the plural or only in the singular, i.e. she is unsure about inflection; she therefore has a text production need.
- **Sub-situation 2**: Sam, who is a native speaker of English, wants to write a text message, but he is not quite sure how to express with an emoji that he finds something hilarious; he therefore has a text production need (he needs to find out which emoji to use in a specific sentence).

Translation

- **Sub-situation 1**: Tim, who speaks Danish as his mother tongue and speaks English as his second language, is writing an article for an English music magazine. He is not sure what the translation of the Danish word *ørehænger* is and needs to find its equivalent; he therefore has a translation problem.
- **Sub-situation 2**: Anne, who was born and raised in Denmark, is on holiday in Egypt. She is having a conversation in English with a local woman, who at some point in the conversation makes a certain gesture with her hand where she presses all fingers together and holds them upwards (swaia), which Anne does not understand; she therefore has a translation problem (both if this were to be translated into a Danish linguistic sign or a similar gesture used by Danes, this would be a translation problem).

Tarp (2008a, pp. 75-77) has already discussed a large number of different information needs that a person may come across in these sub-situations, and therefore we will not go into further detail with these. However, Tarp only recognizes linguistic needs and does not comment on needs related to non-linguistic signs. As shown in the three sub-situations that constitute the communicative situation, all of these could involve needs related to either linguistic (sub-situations 1) or non-linguistic signs (sub-situations 2). Thus, the table of needs provided in Tarp (2008a) clearly needs to be expanded.

4.2. Cognitive Situations

Bergenholtz (1997, pp. 20-21) writes about the cognitive situation that "the most important point is that the data in the dictionary is not applied to help understand or translate a text, but that it is the data itself that is the goal of the lookup" (our translation). Tarp (2008a, p. 45) furthermore writes that a cognitive information tool seeks to accommodate needs to gain new knowledge in a great number of pre-lexicographical situations. However, he does not go into much detail with these situations compared to his descriptions of communicative situations, nor does he provide as detailed a typology of sub-situations as he does for communication. He unsystematically mentions some social situations in which a person experiences cognitive needs (2008a, p. 45) – e.g. when you suddenly wish to know more about a certain question while you are reading a text, or through processes in your sub-consciousness where you suddenly get inspiration to investigate something – and he furthermore argues that there are two sub-situations into which the cognitive situation can be divided:

- **Systematic** cognitive situation
- **Sporadic** cognitive situation

In both of these situations, a person wants to gain knowledge. However, what is actually meant in terms of "systematic" and "sporadic" is not completely clear and no other meta-lexicographical contribution has expanded on this division. We instead suggest that the cognitive situation should be divided into the following two sub-situations:

- **Knowledge expansion**
- **Learning**

In the first type of sub-situation, a person may be interested in finding out when Napoleon was born (a punctual problem); in the second type of sub-situation, a person may want to learn as much as is relevant for writing a school paper about the Napoleonic Wars (an information problem to be solved systematically). Other potential needs related to knowledge expansion could be:

Knowledge expansion

- I have cancer and therefore I want to know more about it, e.g. how many people die of cancer?
- Who is the current president of the United States?
- What is the etymology of the word *apple*?

In some situations of knowledge expansion, the need may be rather punctual, cf. the president example mentioned above, or it can be a more comprehensive one, cf. the cancer example mentioned above. We often find that a need such as wanting to know the etymology of a word is supported by data in traditional communicative dictionaries. However, this need has nothing to do with communication, but is rather an example of a cognitive need. Thus, the inclusion of etymological data in communicative tools seems misplaced and is not useful for people who look in a communicative tool to solve a communicative need.

Learning (see e.g. Hausmann, 1984), on the other hand, is always a systematic acquisition of knowledge or skills with a specific purpose in mind. Some potential needs related to learning could be:

Learning

- I want to learn how to play cricket
- I want to learn all irregular verbs in German
- I want to learn how to breed minks
- I need more knowledge (i.e. learn) about traffic rules in preparation to get a driving license

Learning may take place in the form of classroom learning, often a controlled learning situation, but may also take place as learning on one's own – it could also involve a mix of both situations. The purpose is to gain desired knowledge or skills, e.g. in order to pass a test as in the examples with the traffic rules above: When you want to get a driving license, you need to attend classes as well as learn from a textbook and from a list of traffic terms.

4.3. Operative Situations

Agerbo (2017a) analyses twelve dictionaries, which she argues could all be considered operative tools. Some of the information needs identified in these tools are listed in Table 1.

Based on these findings, it is possible to extract two basic types of operative sub-situations:

- **Advice**: *What* should I do in this situation? → if you experience x, do y
- **Instructions**: *How* should I carry out this act in this situation? → to do x, do x_1, x_2, and x_3

It is important to notice the distinction between *what* and *how*: In the former case, a person needs to find out in what way s/he should act or react in a specific situation, and in the latter case, a person needs to know how to carry out this act. For example, if a person wants advice on what to do in a certain situation, e.g. what to bring when going whale fishing or what to do if you get bitten by a snake, he is not interested in being told *how* to do it; but in the case of performing a physical exercise, a person wants instructions on how to actually do the exercise step by step. In some situations, a person may both want to know *what* to do and *how* to do it.

Some of the information needs mentioned in the table may be argued to occur in cognitive instead of operative situations, e.g. attacking the enemy and playing a sport. Though these two needs are connected to acting, the end goal is clearly a result of learning (and practice), i.e. they are not needs that can be solved via dictionary consultations. If we compare the two needs related to playing a sport versus playing a game such as rock-paper-scissors, we find that the former requires learning, whereas the latter is solvable with a look-up in an information tool. Thus, the former is a cognitive need, and the latter is an operative need.

Table 1. Examples of Operative Information Needs.

Dictionary	**Information need** – information on
Military dictionary	· cooking a dish · attacking the enemy
Universal Dictionary of Trade and Commerce	· making calculations · exchanging money · going whale fishing
The Sportsman's Dictionary	· curing diseases · using specific equipment · working with/taming an animal · fishing, hunting etc.
A dictionary of photography	· working with chemical processes
Dictionary of agriculture for the practical farmer	· curing diseases · applying methods in farming · growing crops
The Illustrated Dictionary of Gardening	· cultivating flowers and trees · getting rid of insects
A Dictionary of Etiquette	· behaving appropriately in different social situations
The Phoenix Dictionary of Games	· playing a sport · playing a game
Food and Fitness	· performing a physical exercise
International Dictionary of Food and Cooking	· making food and drinks
Pschyrembel Wörterbuch Pflege	· nursing/helping sick/disabled people
Real estate dictionary	· buying real estate abroad

4.4. An Overview

Below is an overview of the three main situations and eight sub-situations described in this article. It is important to note that the word *text* should be understood very broadly. It is not necessarily a piece of written *text*, but could also be for example a traffic sign or a natural sign.

Communicative situations: the need to get information which in a specific situation is necessary in order to accomplish successful communication

- situation in which a person needs help to understand parts of a text
- situation in which a person needs help to formulate parts of a text
- situation in which a person needs help to translate parts of a text

Operative situations: the need to know in a specific situation how to carry out a certain act or which act to carry out

- situation in which a person needs advice on **what** s/he should do
- situation in which a person needs to know **how** s/he should solve a problem, i.e. the person needs instructions

Cognitive situations: the need in a specific situation to acquire knowledge which you do not already have

- situation in which a person needs to acquire knowledge about a specific (singular) phenomenon or about a more complex theme
- situation in which a person has a goal-oriented need to learn something, either on his/her own or by being taught by someone

As these boxes show, the point of departure for the analysis of information needs is the situation in which this need (experienced by a person with a certain user profile) occurs. The function of an information tool is to satisfy these specific type(s) of need that a specific type of user experiences in a specific type of situation. Some tools may have more than one function, i.e. they are polyfunctional, and some tools may try to accommodate more than one type of need. It is not until such points have been settled that it is possible to discuss what kinds of data are useful for satisfying the users' need for information.

Even though lexicographers for many years have focused too much on the communicative situation, lexicography has theoretically been better at working with information needs than information science has, since a much more useful classification of situations has been produced. We believe that the typology of situations applied in lexicography – especially in its expanded version that includes communication, cognition, and operation – can also be applied in information science and beyond, i.e. that it can be used in many different fields in order to understand the information needs that people in today's information society may experience.

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