

Wittgenstein and Indexing Theory

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Abstract

The paper considers indexing an activity which deals with linguistic entities. It rests on the assumption that a theory of indexing should be based on a philosophy of language, because indexing is concerned with the linguistic representation of meaning. The paper consists of four sections: It begins with some basic considerations on the nature of indexing and the requirements of a theory on this. It is followed by a short review of the use of Wittgenstein's philosophy in LIS-literature. Next is an analysis of Wittgenstein's work *Philosophical Investigations*. Finally, we deduce a theory of indexing from this philosophy. Considering an indexing theory a theory of meaning entails that, for the purpose of retrieval, indexing is a representation of meaning. Therefore an indexing theory is concerned with how words are used in the linguistic context. Furthermore, the indexing process is a communicative process containing an interpretative element. Through the philosophy of the later Wittgenstein, it is shown that language and meaning are publicly constituted entities. Since they form the basis of indexing, a theory hereof must take into account that no single actor can define the meaning of documents. Rather this is decided by the social, historical and linguistic context in which the document is produced, distributed, and exchanged. Indexing must clarify and reflect these contexts.

Introduction

The philosopher Ludwig Wittgenstein (1889-1951) has in his influential work *Philosophical Investigations* (1958) proposed a view on language and language use which we think can be related to a theory of indexing. When speaking of indexing and indexing theory within library and information science (LIS) not much attention has been or is paid to language and, in particular, philosophy of language. Language is not considered a problematic entity. Indexing, and in particular the actual document analysis, is very often in the LIS-literature described as something we "just" do (cf. Lancaster, 1998). Language is seen as something secondary in relation to indexing and indexing theory, despite the fact that indexing and indexing theory is the examination of linguistic expressions and contains, therefore, a significant linguistic dimension.

In the following we will examine this linguistic dimension and discuss indexing and indexing theory in the light of language and the philosophy of language. Concerning indexing theory, we intend to use the view of language of the later Wittgenstein as it is expressed in his *Philosophical Investigations* as our premises in order to deduce a theory of indexing.

We begin with some general considerations of indexing and indexing theory and the concepts of meaning and interpretation. This is followed by a short review of the use of Wittgenstein's philosophy of language in the LIS-literature. After this we will outline some relevant themes in *Philosophical Investigations* as we think they relate to this paper. Eventually, these themes will be related to indexing theory.

General considerations of indexing and indexing theory

Indexing is a process with the purpose of generating a representation of the subject(s) of a document. Indexing can be divided into two steps (cf. Lancaster, 1998; and figure 1): 1) an analysis of the subject(s) of the document; and 2) translating this/these subject(s) into the particular indexing language or IR-language. An indexing theory has to answer these questions: What is a subject? How is it uncovered? How is it represented as best as possible?

We will not discuss what a subject is. For a clarification of this concept, we will refer to Hjørland (1992; 1997).

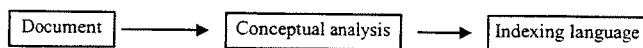


Figure 1: Simplified illustration of the two-step model; i.e. the indexing process

As pointed out by Blair (1990), indexing theory can be seen from the point of view of philosophy of language because philosophy of language is, among other things, concerned with words and concepts and their possible relation to reality. Indexing theory is also, or at least should be, concerned with words and concepts. However, this is for the purpose of representing a document or documents most appropriately to facilitate retrieval. Therefore, indexing theory contains a considerable pragmatic dimension. The representation of a document says something about both the actual document and the reality or social context it may represent or reflect. We believe therefore that indexing theory can be seen from a philosophy of language point of view and that is what we will demonstrate in the following.

The two-step model mentioned above is characterised by being based on a given document. But a given document cannot influence a theory of indexing.

According to our point of view, a theory of indexing is to be found outside the given document because a theory of indexing, among other things, is supposed to formulate some fundamental principles for this two-step model. The actual document is merely what indexing theory is used on. A theory of indexing therefore has to be found outside the document. That is why the document is not of primary importance. The two-step model is both an expression of the actual indexing process and subsequent indexing practice.

Furthermore, this two-step model is rather an introduction to indexing practice than it is an expression of indexing theory, even though Lancaster (1998) seems to consider it like indexing theory. But, *basically*, a theory of any kind is not a question of what can be realised in practice, but, rather, as Quinn (1994, pp. 146) states in relation to classification and indexing theory: "*Theory can increase understanding and guide practice*" (our italics).

Concerning indexing and the two-step model, Frohmann (1990, p. 82) has stated that

"Indexing is generally taken to consist of at least two distinct operations. The first involves either the implicit or explicit representation of a document by an indexing phrase. The second involves the translation of the terms of the indexing phrase into the lexicon of a controlled vocabulary, with due regard for the semantics and syntacs of the indexing language. Most research focuses on the second step, while the first continues to be lamented as an intellectual operation both fundamental to indexing yet so far resistant to analysis."

In the LIS-literature similar statements have been made by, for instance, Hutchins (1978), Langridge (1989) and Chu & O'Brien (1993). Despite the recognition of the importance of this first step, the development of an explicit theory of indexing within LIS is, in our point of view, still lacking. Research within LIS on classification and indexing has resulted in a lot of knowledge about the actual translation process, i.e. the second step in the model, construction of indexing languages, classification systems etc. But we believe that a theory to explain and create a better *understanding* of this two-step model do not exist within LIS. In the LIS-literature not much attention is paid to this lack of an indexing theory. As Quinn (1994, p. 141) states quiet rightly: "*The lack of an indexing theory to explain the indexing process is a major blind spot in classification.*". Regarding indexing, Frohmann (1990, p. 81) has also remarked that what is peculiar to LIS as a science, is to represent documents conceptually for the purpose of retrieval. It is, therefore, incomprehensible that LIS hasn't been able to formulate and explicate a theory of indexing. Consequently, we believe it is the first step in the two-step model which has to serve as the foundation for a theory of indexing and that is what we will concentrate on in the following.

When actually speaking of theories of indexing within LIS the fundamental problem is, paradoxically, that they are non-theory based. Theories of automatic indexing and classification should serve as a classic example of this. As far as we are concerned, no formulated principles of what it means to index and a thorough understanding of indexing is developed within LIS. In our opinion Wilson (1968) and Lancaster (1998, pp. 1-18) is the closest one can get of an LIS insight of an explicated theory of indexing.

By using the philosophy of language of the later Wittgenstein as it is expressed in his Philosophical Investigations, we believe we can provide a contribution to a theory of indexing.

Meaning and Interpretation

Føllesdal et al. (1992, p. 169) connect language with a communication process. This means that, when dealing with language and philosophy of language in relation to indexing theory, an indexing process can be seen as a communication process. Hence, a theory of indexing contains an essential aspect of the philosophy of language. This is also suggested by Blair (1990, p. 122):

“...The process of representing documents for retrieval is fundamentally a *linguistic process*....Thus any theory of indexing or document representation presupposes a theory of language and meaning.” (our italics)

Speaking of the relationship between language and communication, Føllesdal et al. (1992, p. 169) add that in the communication process language is necessary, because we cannot transfer information directly. When speaking of indexing, we don't transfer information directly either. Rather, information is transferred by the use of document representations. These document representations are constituted by language. Hence, communication of information happens through language. Føllesdal et al. (1992, p. 176) further states when speaking of meaning that the meaning of a linguistic expression is what it brings to express; that's what we know when we understand it and thereby meaning is the basis of all communication. This means, when speaking of viewing indexing as a form of communication, that a theory of indexing must be a theory of meaning. Since meaning is the basis of all communication, this means that communication without meaning is not possible, that is, the communicative act cannot take place. When the later Wittgenstein (1958, § 43) asserts that meaning is use it should be understood in the sense that meaning is something we create in order to gain understanding. In order to communicate at all human beings, conceived of as social actors, need to have a certain degree of understanding of the situation (the language game) within which something is being communicated. Therefore, in the language game we have *created* a meaning which

ensures this degree of understanding. That is why meaning is use. And that is why it is not important whether what is being said is true or false but, rather, whether it is understood or misunderstood. Thus, to say that meaning is use and meaning is the basis of communication does not reflect a contradiction.

Assuming that meaning is the basis of communication, the communication process is in this connection not identical to Shannon & Weaver's (1949) conception of the communication process (1). Shannon & Weaver are concerned with transmission of intended meaning. Intended meaning means that meaning is built into the transmitted message and, with that, given in advance. Fiske (1990, pp. 2-3) calls the approach of Shannon & Weaver for "the process school". This approach to the study of communication sees the communication process as consisting of an encoder who has an intention with the message being sent, a channel through which the message is being sent and decoder/receiver. The intention being a change of what the cognitive viewpoint within LIS would call the knowledge structure of the user, i.e. the receiver (cf. Ingwersen, 1992). The conception of the concept of meaning is very similar to the information concept of the cognitive viewpoint (Ingwersen, 1992, p. 33).

However, Fiske (1990, pp. 2-3) speaks of another approach to the study of communication, "the semiotic approach". "The semiotic approach" to communication studies views the communication process as being that of production and exchange of meaning. The study of communication in this approach is the study of texts and culture. That is, "the semiotic approach" focuses on how texts interact with people in order to produce meaning. Those involved in a communication process are all influencing each other and the meaning received is not necessarily the one intended. Rather, meaning is something which is being created and exchanged by those involved. This semiotic approach and its conception of meaning is very similar to the theory of meaning the later Wittgenstein developed in his *Philosophical Investigations*. Here, the meaning of a word is its use in language (Wittgenstein, 1958, § 43). This circumstance that the meaning of a word is its use in language is our premise when we in the following are going to talk about indexing theory; that is, how do we index documents when the meaning of words arise in use or, with the terminology of Wittgenstein, in the language game. Therefore, with this we claim *that in considering indexing theory a theory of meaning entails that, for the purpose of retrieval, indexing is a representation of meaning. Therefore, a theory of indexing is basically and necessarily a question of how words are used in the linguistic context (that is, the language games) they are a part of.* Consequently, a question of instrumentality or functionality. This is to say that language use plays a determining role and, when speaking of indexing theory, that meaning can not be presupposed but is determined in use. As Blair (1990, p. 145) points out with the words of Wittgenstein: "...we don't start from certain words, but from certain occasions or activities." On communication, and for the matter of this paper indexing theory, we can further state that it contains an interpretative aspect. Since language is a mean of communicating meaning, we need to interpret the meaningful expressions in order to act upon them; that is, to understand the meaning "lying behind" these meaningful

expressions. From this it follows that meaning and interpretation are central concepts in a communication process and, therefore, in an indexing process. Within LIS researchers have treated modern hermeneutics in various ways in relation to theoretical LIS problems. For instance, Benediktsson (1989) and Hoel (1992) both discuss the possibility of LIS taking its theoretical foundation in modern hermeneutics. Ingwersen (1992) points out the overlaps between the cognitive viewpoint and the hermeneutics of Heidegger and Gadamer. Ingwersen pays special interest to Gadamer's concepts of pre-understanding and horizons of understanding and the cognitive viewpoint's concepts of individual knowledge structures and world models (Ingwersen, 1992, p. 42); concepts which the cognitive viewpoint makes of use in IR interaction. Christensen (1994, p. 38), in her attempt to explore hermeneutic ideas and concepts and their possible relevance to LIS, ascertains with regard to indexing, but without speaking about indexing theory, that central concepts from hermeneutics such as understanding, interpretation, communication and language are of great significance for the subject analysis and indexing process and the representations as the result of this process.

Through his "Interpretive Viewpoint" Cornelius (1996a, pp. 11-22) uses modern hermeneutics in his theoretical considerations of the relationship between information and interpretation. Further, Cornelius (1996b) uses modern hermeneutics in an attempt to deliver a foundation for LIS theory and practice.

Hjørland (1997, p. 34), however, states that the relationship between hermeneutics and LIS has never been discussed in order to relate modern hermeneutic ideas (in particular, Hjørland mentions the ideas of Gadamer) to subject data, and thereby indexing.

As we intend to show later, there are certain similarities between the philosophy of the later Wittgenstein and parts of hermeneutics when speaking of indexing theory.

Wittgenstein and Library and Information Science

In general, few works in the literature of LIS are based on the philosophy of language. Neither do many have the later Wittgenstein's philosophy of language as basis when speaking of indexing theory. In the following we will give a brief review of those within LIS who have dealt with Wittgenstein in their works. This review is, of course, not at all exhaustive (2).

In addition to McLachlan (1981) and Nedobity (1989), Hjørland (1998) points out, nevertheless, that within LIS a growing interest (in the 1990's) of Wittgenstein can be traced. Examples are Blair (1990, 1992), Frohmann (1990), Warner (1990), Brier (1996a, 1996b), Karamüftüoglu (1996, 1997, 1998), Talja (1997), Tuominen (1997) and lately Hjørland (1998) and Mai (1998). Warner (1990) is the only one using the

early Wittgenstein, while Nedobity (1989) and Hjørland (1998) use both the early and later Wittgenstein. The others rest on the later Wittgenstein.

In order to discuss the classification theory put forward by Buchanan in his work "Theory of Library Classification" (1979), McLachlan (1981) makes use of the later Wittgenstein's philosophical considerations. According to McLachlan, Buchanan's view of classification is that it can be seen as a mental activity and McLachlan supports this view. With that, McLachlan dissociates himself from the ideas of the later Wittgenstein because the later Wittgenstein would claim that it is through the language game we have access to the concepts. In this connection McLachlan sticks to a theory of John Locke which McLachlan himself names "linguistic mentalism" (McLachlan, 1981, p. 191). According to McLachlan, Buchanan claims that members of a class must necessarily have something in common, but McLachlan thinks that Buchanan's assertion is untenable referring to the later Wittgenstein's theory of family resemblances (McLachlan, 1981, p. 195).

As mentioned before, Nedobity's (1989) point of departure is both the early and later Wittgenstein. Nedobity tries to evaluate the different methods used in investigating the meaning of a term. In doing this, the theories of meaning from Wittgenstein's youth work *Tractatus Logico-Philosophicus* and *Philosophical Investigations* are used together with Eugen Wüster's investigations of the relationship between concepts and their representation.

Warner (1990) uses only the early Wittgenstein. In order to theorise about the relationship between documents and computers, Warner uses the logical considerations and principles presented in *Tractatus Logico-Philosophicus*. The inner language of the computer is illustrated by these logical considerations and principles. But because Warner ascertains that the relationship between LIS and semiotics is yet undiscovered, Warner's primary errand is to amalgamate a fundamental principle for both documents and computers.

In his semiotic analysis of IR-systems and IR-interaction, Karamüftüoğlu (1996, 1997, 1998) makes use of the theory of language games developed by the later Wittgenstein. The theory of language games is used to explain that the significant distinction in IR-interaction is a distinction of two specific forms of language games: Language game "denotation" and language game "prescription" (Karamüftüoğlu, 1996, p. 85)

With an epistemological and methodological basis, Talja (1997) presents the "discourse analytic viewpoint", as developed by Michel Foucault, as an alternative to the cognitive viewpoint within LIS. Talja (1997, p. 70) uses the later Wittgenstein's private language argument to reject the cognitive viewpoint's conception of concepts and categories as being mental representations.

By the use of discourse analysis, Tuominen (1997) examines Carol C. Kuhlthau's book "Seeking Meaning: A Process Approach to Library and Information Services."

(1993). Touminen holds that Kuhlthau's book doesn't offer a critical reflection as to how researches within LIS actually are constructing users. With Kuhlthau's book as a reference, Touminen believes that within LIS there's a tendency towards constructing the librarian as a physician and the user as a patient. With regard to information needs, Touminen doesn't believe that they are an expression of something mental which is up to the librarian or information specialist to diagnose. Here, Touminen refers to the later Wittgenstein's private language argument and deduces that the user's information need always is a social construct rather than an individual construct (Touminen, 1997, p. 361).

Brier (1996a, 1996b) argues for a theoretical foundation for LIS based on the later Wittgenstein's theory of language games, the semiotics of Peirce and second order cybernetics. However, Brier's discussion of the later Wittgenstein is limited to a review of Blair's (1990) reading of the later Wittgenstein.

Mai (1998, p. 231) argues that LIS in general and the organisation of knowledge in particular, needs an epistemological foundation. Starting from the epistemological view the later Wittgenstein presents in his "On Certainty", Mai (1998, p. 240) points out that organisation and representation of knowledge takes place within a certain social practice, and that this practice is the crucial factor in the organisation and representation of knowledge.

Hjørland (1998) puts forward that IR-theories must relate to theories of meaning. Specifically, Hjørland discusses the consequences for the different subject access points in databases and for IR as a whole, if the theories of meaning presented in "Tractatus Logico-Philosophicus" and Philosophical Investigations, respectively, are the point of departure.

As shown in this brief review, the use of Wittgenstein within LIS with regard to indexing theory is minimal. Therefore, we believe that Blair (1990, 1992) and Frohmann (1990) are the only ones who specifically deal with Wittgenstein's philosophy of language in order to discuss and analyse problems in indexing theory. Blair (1990, pp. vii-viii), for instance, holds that

"The central task of Information Retrieval research is to understand how documents should be represented for effective retrieval. This is primarily a problem of language and meaning. Any theory of document representation, and, by consequence, any theory of Information Retrieval must be based on a clear theory of language and meaning."
(our italics)

So, Blair believes that indexing theory should take as its starting point the philosophy of language, that is the philosophy of language of Wittgenstein in particular, but also the philosophy of language of John L. Austin and John R. Searle.

Frohmann (1990) criticises what he calls for mentalism in IR. Frohmann thinks that much attention has been on discovering mental rules on how to deduce index terms. Arguing with the rule-following considerations put forward by Wittgenstein in *Philosophical Investigations*, Frohmann believes, regarding indexing theory, that we ought to go from “rule discovery” to “rule construction”.

In the following, we consider our paper to be a continuation of Blair’s and Frohmann’s very important contributions to our understanding of indexing theory within LIS.

Conception of language in *Philosophical Investigations*

We will now take a closer look on the conception of language in Wittgenstein’s *Philosophical Investigations*. We have chosen what we consider as four relevant and central themes in *Philosophical Investigations*: Language games, family resemblances, rule-following and the private language argument.

In Wittgenstein’s youth work, *Tractatus Logico-Philosophicus* (1961), it was the *sentence* which was the fundamental meaning bearing and mediating entity. In *Philosophical Investigations* it is the language game. In *Philosophical Investigations* a varied conception of language is established. Language is seen as something constituted by the presence of language games. The question of what is being said, is not whether it is true or false but, rather, if it is understood or misunderstood.

Language games

We consider the concept of language games the central point of *Philosophical Investigations*. Hence, it also serves as a main concept for the three other themes.

Wittgenstein opens up *Philosophical Investigations* by citing a conception of language presented by St. Augustine. St. Augustine has learned language by observing how adults speak. With this St. Augustine has learned to understand which objects the various words designate (Wittgenstein, 1958, § 1). According to Wittgenstein, St. Augustine hereby believes that he has learned language; i.e. when you’ve learned what all words in language designates, then you’ve learned language. Wittgenstein believes this conception of language presents a particular picture of what he calls the essence of human language:

“It is this: the individual words in language name objects -sentences are combinations of such names.- In this picture of language we find the roots of the following idea: Every word has a meaning. This meaning is correlated with the word. It is the object for which the word stands.”

(Wittgenstein, 1958, § 1)

Wittgenstein now introduces the concept of language games. According to Wittgenstein, the way we learn language does *not* consist in a game of inventing names (which is, however, also a kind of language game, although primitive); that is, the view that we take an object and point at it in order to learn somebody the name of that object; in other words to use ostensive definitions. To this Wittgenstein will reply that we have learned nothing about the object because we do not know what it is we are pointing at. The form of the object? Its color? And what is color? What does pointing mean? etc. However, Wittgenstein will not exclude ostensive definitions as a means of learning language, but points out that it implies some knowledge of language and the language game it is involved in. If one merely can say the name of the object, one cannot claim to have learned the language game because one have not learned to *use* the word, and with that, according to the later Wittgenstein, what it means. Hereby, Wittgenstein contests the theory of naming he put forward in *Tractatus Logico-Philosophicus*. Here words are the names of objects and the name of the object is its meaning. That is, a conception of language as something which is constituted of names, and something for which conditions of truth can be put forward. For example “Here is a house and it is green” unlike “Ouch!”. According to the later Wittgenstein, a meaningful sentence is not necessarily a picture of state of affairs. Wittgenstein defines the concept of language games like this:

“Here the term ‘language game’ is meant to bring into prominence the fact that the speaking of language is part of an activity, or of a form of life”

(Wittgenstein, 1958, § 23)

To speak a language is in itself a social action, a collective undertaking, an activity, etc., and the individual is nothing but a language user. This means that by having a language, you have the other and vice versa. Language is basically a social phenomenon. Every linguistic activity is connected to the usage of rules. Being a part of a language game, it is expected that these rules are followed. In this sense rules are an expression of how words are *used* in the particular language game because:

“For a large class of cases-though not for all-in which we employ the word “meaning” it can be defined thus: the meaning of a word is its use in language.”

(Wittgenstein, 1958, § 43)

The meaning of words, then, is not what they designate but what they can be used for. With that Wittgenstein has proposed a new theory of meaning: Meaning is something human beings create as social actors within the framework of a particular language game in order to communicate. This is the opposite of considering meaning as something which is given a priori. This is not to say that language is a totally subjective entity but, rather, that language has an intersubjective character:

“”So you are saying that human agreement decides what is true and false?”-It is what human beings **say** that is true and false; and they agree in the **language** they use. That is not agreement in opinions but in form of life.”

(Wittgenstein, 1958, § 241)

With that, language, language games and forms of life are inseparable sizes. Rules in one particular language game are not necessarily rules in other language games because of the diversity of language games. This implies that the usage of words is equally diverse. Wittgenstein compares the diverse applications of a word with the tools in a toolbox:

“Think of the tools in a tool-box: there is a hammer, pliers, a saw, a screw-driver, a rule, a glue-pot, glue, nails and screws.-The functions of words are as diverse as the functions of these objects.”

(Wittgenstein, 1958, § 11)

The individual language games are almost incommensurable (Wittgenstein, 1958, § 65) and, therefore, the legitimacy, validity or truth of language has to be found in its functionality or appropriateness. Truth is an essential part of a language game because criteria of truth consist in and arise from language use. In order to function it is necessary with a minimum level of consensus within the particular language game concerning the usage of words or simply to speak a language. Further, it implies that a language game has no limits but limits are drawn with regard to a purpose (Wittgenstein, 1958, § 69). The act of a language game is not a goal in itself. The language game is some sort of an empirical study of language use; i.e. the language game serves as a mean to describe and explain the possible meaning of the words in the actual language game:

“Our clear and simple language-games are not preparatory studies for a future regularization of language-as it were first approximations, ignoring friction and air-resistance. The language-games are rather set up as objects of comparisons which are meant

to show light on the facts of our language by way not only of similarities, but also of dissimilarities.”

(Wittgenstein, 1958, § 130)

Compared to the above mentioned statement concerning the language game as a mean to describe and explain the possible meaning of the words in the actual language game, it follows that when the language games change, then the words change and thereby the meaning of words. It is not, then, the words who change the language games. This is a prerequisite for the understanding of the nature and instrumentality of the individual language games. This entails that access to the meaning of words happens through the language game because the individual is nothing but a language user.

Family Resemblances

In *Tractatus Logico-Philosophicus* Wittgenstein defined language as being a picture of the world (i.e. the picture theory of meaning). In *Philosophical Investigations* language is a name of the class of indefinite language games. The amount of language games is indefinite because new language games can arise and the boundary of what can be considered as a language game is difficult to draw. Due to the diversity of the language games, no absolute recipe exist as to how language is defined. Language has no determining property and the class of language games does not form a community (Wittgenstein, 1958, § 65-66). Language is made up by various language games which both look similar and differ from each other. A word is not an absolute entity which means that it does not have one particular usage and thereby one particular meaning. Words do not refer to one general meaning which refers to reality. The consequence of this is that a given word does not in itself have one clear unambiguous meaning. This means that we are not able to deliver an adequate account of the characteristics something ought to have in order to come under that particular word. As an explanation of this, Wittgenstein speaks of family resemblances (Wittgenstein, 1958, § 67). With the concept of family resemblances, Wittgenstein points out that just because language is an expression of the class of indefinite language games one cannot assume that the language games express something “common”, because what should it be like? Wittgenstein illustrates this with the example “games”, and asks what is the common denominator for games like cardplaying, ball game or a board game etc. Wittgenstein argues against the position that just because these games fall into the category “games” does not mean that they necessarily have something in common. By investigating these games Wittgenstein thinks that one will find that nothing common exists for these different games, but rather resemblances and the like: “To repeat: don’t think, but look!” (Wittgenstein, 1958, § 66).

When the class of language games do not have a common denominator but is constituted of family resemblances this also implies that one cannot state complete and unambiguous rules as to the correct application of a given word. Nevertheless, we

are able to intersubjectively use the word properly because it is the particular language games which state the usage and thereby meaning. To use a word as name then, is just one out of many possible applications (Wittgenstein, 1958, § 27). With that Wittgenstein settles with the conception in *Tractatus Logico-Philosophicus* that words are only meaningful if and only if they are names.

Rule Following

With the introduction of the concepts of language games and family resemblances Wittgenstein has argued for two conceptions of language. First of all, the conception that the meaning of words in a lot of cases is not what it designates but arises in use. Second, words do not have one clear meaning. We are not able to give clear and thorough guidelines as to the correct application of a word. A word can be used in many diverse contexts. In relation to this Wittgenstein points out that there is a strong relationship between, respectively, to understand and to use a word *and* to understand and to follow a rule. Wittgenstein points this out because “The application is still a criterion of understanding.” (Wittgenstein, 1958, § 146). This is because understanding will lead to the correct application. The concept of “application” is what connects understanding and rule following because we *apply* a word and *apply* a rule, and both with regard to action. The application of, respectively, a word and a rule happens thus with regard to a purpose. Hence the connection between understanding and application of a word on the one side and understanding and rule following on the other.

According to Wittgenstein to follow a rule is a social practice; in other words to follow a rule cannot be something private or individual because

“To obey a rule, to make a report, to give an order, to play a game of chess, are customs (uses, institutions).”
(Wittgenstein, 1958, § 199)

and further

“And hence also ‘obeying a rule’ is a practice. And to think one is obeying a rule is not to obey a rule. Hence it is not possible to obey a rule ‘privately’: otherwise thinking one was obeying a rule would be the same as obeying it.”
(Wittgenstein, 1958, § 202)

To follow a rule is determined by the fact that there is a world, a practice, and it is not an inner intention which determines the world. To follow a rule and to understand a word is not a mental condition because formulating a rule does not in itself explain how the rule is supposed to be followed. Likewise a formulation of a word does not explain how it is supposed to be applied and understood because

“...what confuses us is the uniform appearance of words when we hear them spoken or meet them in script and print. For their application is not presented to us so clearly.”
(Wittgenstein, 1958, § 11)

and because

“A main source of our failure to understand is that we do not command a clear view of the use of words.”
(Wittgenstein, 1958, § 122)

Since following a rule and applying a word is not identical to some other mental state, there must be some appearance of some, if not objective, then intersubjective criteria as to when a person has understood a word. These intersubjective criteria have to be found in the language game and is defined by the practice of the particular language game. This means, for instance, that every time we point at a house and say “car!” it is not a meaningless statement. It just means that in that particular language game we agree upon when we point at a house we say “car”. Besides exemplifying the intersubjectivity, this example also shows that the meaning of the statement “car” is its use in language.

Since there is a connection between understanding and applying a word and to understand and follow a rule, it follows that the understanding of a word likewise must be something defined by the social practice, and thereby not something mental. If the understanding of a word is something mental we run into problems as how to determine if a given word is understood correctly. In what should these criteria consist in and what mental state should be identified with the understanding? Wittgenstein’s answer to this is that the single language user cannot determine if s/he uses a word correctly:

“For even supposing I had found something that happened in all those cases of understanding, -why should it be the understanding? And how can the process of understanding have been hidden, when I said “Now I understand” because I understood?! And if I say it is hidden- then how do I know what I have to look for? I am in a muddle.”
(Wittgenstein, 1958, § 153)

Private Language Argument

Wittgenstein’s distinction between the inner/private and outer/public is further emphasised in his private language argument. Since the understanding of an expression and rule following is not an expression of something private or mental, Wittgenstein does not think that a private language can be maintained (Wittgenstein, 1958, § 243 & § 269). A private language is a language in which the mediation of

private experiences happens and a language in which no one else than the individual can understand and speak:

“The individual words of this language are to refer to what can only be known to the person speaking; to his immediate private sensations. So another person cannot understand the language.”
(Wittgenstein, 1958, § 243)

Wittgenstein’s denial of the conception of a private language is supposed to be seen in continuation of his conception of language as a fundamental social phenomenon. Language is not learned through pure subjective experiences.

If so a conception of a private language should be maintained, Wittgenstein shows that this will lead to absurdities. If one speaks of a private linguistic practice, that is, a practice where only the individual can express himself, then it does not make sense to talk about the word “correct”, or for that matter “incorrect”. This appears by the application of a given word. Here, the individual cannot give a understandable intersubjective definition because the individual is speaking a private language. Furthermore, the individual is not able to state public criteria as to the correct application of a word. In what should these public criteria consist in when it is a private linguistic practice that is being maintained? What is supposed to be consulted in the private language in order to reach a decision as to the correct application? The individual language user *cannot* determine if s/he is using the word correctly. This implies that persons each having a private language cannot communicate with each other. Unless, communication between minds was possible. This is in itself an absurdity when speaking of intersubjective linguistic communication.

With the rejection of the possibility of an private language, Wittgenstein at the same time rejects solipsism. Solipsism assumes that knowledge of reality must take its point of departure in subjective experiences. What can be known with certainty is what the subject can acknowledge immediately through its private senses. The subject, then, has direct and unmediated access to the phenomena.

Philosophical Investigations and indexing theory

In the following we will outline the principles of an indexing theory based on Philosophical Investigations. We will proceed in the same manner by taking each of the philosophy’s four themes in turn, and consider their consequences for indexing.

Language games and indexing theory

Assuming that any given document is a part of a linguistic practice, a language game, then the document in and by itself cannot be the basis of indexing, let alone a theory thereof. Rather indexing must be based on the context and the language game it is a

part of. Indexing is thus not merely a matter of summarising the document's content conceptually, i.e. producing a document surrogate (cf. Hutchins, 1978). This forms only a part of the document representation. If the representation is to be meaningful it must also reflect the language game that the document is a part of. A document is produced by people partaking in a certain language game which it reflects, but can also be considered a single statement in a slow game consisting of documents. Knowing the document is not in itself sufficient to understand its meaning. We also have to know the language, which implies knowing how to use it. *The document representation must conceptually reflect the language game.* The subject analysis of the specific document must result in indexing terms which reflects its linguistic context. The scope of indexing theory must be broadened to include a dimension concerned with the sociology of language and knowledge, in order to explain the linguistic and epistemological functions of a document in the particular language game. The information given through these considerations are vital for the proper indexing, and subsequent retrieval, of any document. Concerning knowledge in the language game, Blair (1990, p. 148) states with the words of Wittgenstein: "...the knowledge of language games is a 'knowing how' rather than a 'knowing that'". It is in the light of this, that the sociolinguistic dimension must contribute to the language game of the document. An analysis of the language game is necessary to clarify its conceptual structure, thereby establishing the correct use of the words within it. In other words it will reflect the rules of the particular parent game of the document, at the time of analysis. By meaning of the words is clear when their proper use is established. The analysis of the language game is based on a empirical study of the language use. The conceptual analysis of a document cannot be carried out properly unless the indexer has a good understanding of the language game. The meaning and purpose of a document is not a property inherent to it. Rather its linguistic and conceptual meaning is determined by external factors, within the framework of the language game. If we are to carry out an analysis of a given document, we need to understand it in its context. Indexers are in other words in the business of sense-making. Føllesdal et al. (1992, p. 85) points out that the prerequisite of a theory meaning is a definition of what constitutes meaning and how it is transferred through the use of signs. An indexing theory based on the notion of language games, cannot consider a document's content as an objective linguistic entity. A document does not define itself.

This notion is also maintained by the philosophical hermeneutics of Hans-Georg Gadamer, who states that there can be no complete and final interpretation of a text (Lübcke, 1996, p. 175). According to this philosophy, it is meaningless to talk of the text as an entity with an independent meaning. A text should not be seen as more than an object of interpretation, and the sum of these make up its meaning(s). There might, at a given time, be one correct interpretation, but every new generation must relate to the text from its particular points of view. Consequently, a document can not have a universally recognised, finite subject matter, such as the "forms of knowledge" advocated by Langridge (1989, p. 69).

As Føllesdal et al. (1992, p. 92-93) notes, a text signifies what the established use of words and concepts allow. This will change over time. A subject analysis of a document is meaningless without due regard for the language game from which it originates.

Family resemblances and indexing theory

With the concept of family resemblances, Wittgenstein established that language has no defining properties. Rather it consists of a number of intertwined language games, which may share some characteristics. Words cannot be defined unambiguously since their use may, and will, differ with the game. The possible uses to which a word can be put at a given time depends on the language games, and so the range of its meanings depends on the differences among the games. The meaning of the word can thus not be given a priori, but, since meaning is use, rather a *posteriori*.

The consequence for an indexing theory is, that we cannot have a preconceived notion of the use and meaning of words and concepts. An indexing theory cannot consider these independently of their use. As Wittgenstein points out (1958, § 66) we have to go out and look. Regarding subject descriptions Blair (1990, p. 157) writes:

"They cannot be defined either by reference to expected behaviours, or even to act in certain way... *They are, in short, simply words which are used in a particular way in certain kinds of situations.*"
(our italics).

This by no means excludes that we may delimitate or more explicitly formulate the use of a word in a particular context. We believe that this is exactly the purpose of indexing theory regarding family resemblance. We have to clarify the relationships between the various language games and the words and concepts we want to understand, in order to realise the potential uses to which the latter can be put

Rule following and indexing theory

With his concept of rule following, Wittgenstein stresses the close relationship between understanding and using a word and the ability to follow a rule. They are connected by virtue of being social phenomena rather than mental properties. Expressions may be used and rules may be used, but neither are self explanatory in the sense that the proper use is self evident. The correct use of both are defined by and takes place in a social practice. Within any one social practice, consisting of the life forms and their language game, there is agreement concerning the use. If the concept of rule following is applied to indexing theory, it is immediately apparent that *indexing is a social practice, constituted by rules for the assignment of indexing terms*. An indexing theory must attempt to create the foundation that will allow the coherent and explicit explanation of the social practice of term assignment which, with the words of Frohmann (1990, p. 97), "...depends, therefore, upon a preliminary understanding of the social practices constituting text retrieval in the actual, historically real social world." In other words, an explication of the rules of indexing.

This is necessary because a theory is meaningless if it cannot be stated clearly or communicated. This is where the connection between understanding and the following of a rule is of importance, since, as Wittgenstein writes:

“Is what we call “obeying a rule” something that it would be possible for only one man to do, and to do only once in his life-This is of course a note on the grammar of the expression “to obey a rule”. It is not possible that there should have been only one occasion on which someone obeyed a rule. It is not possible that there should have been only one occasion on which a report was made, an order given or understood; and so on...To understand a sentence means to understand a language. To understand a language means to be master of a technique.”
(Wittgenstein, 1958, § 199)

If we are unable to state the indexing theory explicitly, we cannot justify the rules that govern the assigning of indexing terms. If we cannot explicate these rules, they are not rules at all; how can we communicate these rules so that others may understand and use them, if we are unable to state them? If we are unable to put the rules into words, we cannot claim to have understood them, and following rules which we haven't comprehended won't do.

Considering the pragmatic dimension of indexing, a theory must also include an awareness of which social practices, i.e. language games, the document might have potential to be of use to. The indexing rules which have to be created within LIS should, with Wittgenstein's principle of rule following in mind, be firmly based on an indexing theory. Ideally, this theory should be the result of the general knowledge and insight of LIS. Consequently, LIS must acquire a thorough knowledge of language games: An understanding of why and how the need for knowledge and information arise within the particular language game, in its social, cultural and historical context. This knowledge is necessary because we index documents so that they may, at a later date, satisfy such information needs. But the information need cannot be understood unless the language game and its socio-cultural context is taken into consideration because they are the prerequisite for sense-making. A statement is meaningless unless viewed against its lingual and social backdrop. Consequently, the understanding of these contexts is vital to a theory of indexing, since it is basically a theory of meaning.

Private language and indexing theory

First of all, with the private language argument theories of automatic indexing must logically be rejected. These kind of indexing theories are considering the actual document, and *not* the social context which constitutes the document, as point of departure. In other words, in theories of automatic indexing meaning is assumed to be inherent in the individual document. But when speaking of private language in

relation to indexing theory it is *not* a question of how an individual (e.g. author/document, indexer or user) uses a word or concept, but how that word or concept is used in the particular language game.

The consequence of the discussion above is that no individual, regardless of whether it is the author/document, the indexer or the user, can be the sole cognitive authority on matters of indexing or its theory. The cognitive authority is the yardstick against which the meaning of words and concept is measured. If an individual was the cognitive authority in matters indexing theoretical and linguistic, the result would be a private language. But, according to the later Wittgenstein, a private language is impossible because it cannot tell us anything about the proper use of a word. Since the use of a word is determined through social interaction, no one person can define it arbitrarily. Subsequently, an indexing theory cannot be based on the interpretation of the individual. Indexing and indexing theory is often based on the idea of an individual cognitive authority, very often the author. An example of this is Lancaster (1998, p.22) who states that: "It is the ideas dealt with by the author, rather than the words used, that must be indexed.". Thereby it is implied, that indexing should reflect the author's intent. However, writing a document is a social act (cf. Bazerman, 1988, p. 10), it is a statement made through a particular medium, and so the ideas dealt with by the author is not for the author to decide. Since private language is an impossibility, the cognitive authority of the indexing theory must be the language game. Because we consider a theory of indexing a theory of language use, which is a public phenomenon, it cannot rest on a mentalistic/psychological foundation. It is exactly the public use of language that constitutes the language games, in which the meaning of the words blossom and makes itself accessible. If we accept that the language game is the cognitive authority of the indexing theory, the question arise: Whose language game? The author/documents? The users? The indexer's? We shall answer through exclusion. The indexer should be an intermediary, whose job it is to help the document and the user meet. The language game of the indexer is irrelevant to this function. The language games of the users are too heterogeneous and dynamic to be a feasible foundation for indexing. So, the last man standing is the author. *It is the parent language game of the author and the document which is the cognitive authority*, under the assumption that they originate from the same game. We rest this on two points.

First, we assume that the primary objective of any information system is to proactively mediate documents, i.e. the language game of the author/document. This is done, in part, through the indexing. Making the information system proactive is not the same as giving the users what they want, indeed we consider the two mutually exclusive. Accommodating the users may compromise the system by simply confirming their particular, subjective notions. Thereby the information system would in effect be trying to cater to the private languages of the users. Furthermore, there is no need to mediate what the users already know. The role of the information system must therefore be to promote the documents by reflecting their language games. We interpret this to be in line with Mai (1998, p. 240) when he points out that the

organisation and representation of knowledge takes place within a certain social practice, and that this practice is the crucial factor in the organisation and representation of knowledge. While the language game of the author/document is irrelevant to the actual use to which the document is put, it is of major importance in indexing theory. The social practice concerned with the representation of the said document cannot take into account the uses to which the document might be put, i.e. the language games it might be used in. In an indexing theory we need to understand the language game of a given document in order to predict its potential uses. For example different theoretical viewpoints present in a document may themselves serve as potentialities which can be of use in other social contexts; i.e. other language games. However, we need to understand what has fostered these theoretical viewpoints in order to predict the potential uses of a document. This is an understanding of the social contexts in which these theoretical viewpoints are born. To try to predict the potential uses of a certain document, i.e. to give rise to applications in other social contexts, is also to say something about the social context which fostered the document in question. Because we cannot predict some usage of a document out of the blue, there must be a ground which give rise to the potential uses and that is the social context of the document to be indexed. We believe that the particular language game of a given document is an expression of what constitutes the document; that is, an expression of the conditions under which meaning is produced, distributed and exchanged and this is exactly what makes indexing theory a theory of meaning. We can illustrate this with an elaboration of figure 1:

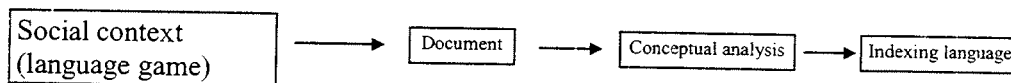


Figure 2: Elaborated indexing model and process

With this elaboration we try to underscore the importance of the language game of the document in an indexing process. Thus, we have developed a new step one, i.e. the step from the social context to the document which means that what was step one before is now step two and so on. In step two an interpretation takes place and in step three a translation. However, we got to understand the new step one in order to carry out step two and three. The indexing language will, naturally, reflect the social context which *it* serves and it is therefore through the particular indexing language the potential applications of the document will be expressed.

Secondly, the words and concepts, and thereby their meanings, that is used by the author/documents, are conceived in the language game that they participate in. Therefore these games are the focus of the indexing theory. Understanding the language games is a prerequisite for the prediction of its informative potentials. Hartnack (1986) points out that philosophical problems, according to Philosophical Investigations, often are due to mismatching of language games, and that it is the task of

philosophy to clarify which concepts belongs to what game, and how they should be used. We believe that the object of an indexing theory is similar: It must facilitate the clarification of how the concepts and words of the documents are used by assigning them to the proper language games. The document is an image, a frozen reflection, of a dynamic language game at a particular point in time. The indexing will reflect this. This focus on the language game of the document doesn't conflict with the pursuit of helping users. If the users cannot understand the indexing terms assigned to the document and its language game, they probably won't be able to use the document itself. The indexing we advocate will therefore aid users in finding the proper documents. Furthermore we believe that user guidance should be relegated to the supporting parts of the information system. It should not be a part of the indexing. Due to the intertextuality of documents, the language games of the author/documents must be considered more stable units than, for instance, the multitude of language games among the users. This stability is also brought about by the fact that a language game, in which all statements are made through documents, is a quite slow-paced one. The rules and meanings simply cannot change as fast as in a conversation.

The focus on language games should not lead anyone to believe that we attribute no meaning to the document itself. This meaning lies in the fact that it is possible to make sense of the content of the document. It is this content that should be nuanced by representing the documents language game in the document representation. However, the meaning of a document in a theory of indexing, lies with the notion that the latter is a theory of meaning. Thus it must express knowledge of the conditions under which meaning is produced, distributed and exchanged. Since meaning must travel through a medium, this is also a theory of documents.

That the language game of the author/document is the cognitive authority doesn't mean that one should proceed in the manner of classical hermeneutics, represented by for instance Schleiermacher. The basic assumption of classical hermeneutics was, simply put, that sense should be made of a work by charting both the inner and outer life of the author, as well as his/her intention with the document. This is also referred to as the empathic theory (Pahuus, 1995, p. 112-113). Thereby classical hermeneutics committed what modern hermeneutics and literary critics term the intentional fallacy which is the inability to distinguish between an author's intentions and motives for making the text (what Lancaster denote "the ideas dealt with"), and the meaning of it. When we consider the parent language game of the document as the cognitive authority, we are in fact focusing on the intertextuality of the documents. By intertextuality we are referring to the intersubjective, textual context which the document is a part of, i.e. the language game. Thereby we also argue, in line with and as a consequence of the private language argument, against mentalistic approaches to indexing theory because, as Frohmann (1990) has pointed out, mentalism conceals intertextuality. So we return to the relationship between language game and indexing theory. The subject analysis of the document is not concerned with its inherent properties, although the text composition may be of importance to the indexing theory.

However, the purpose of this paragraph has been to stress that a theory of indexing is a theory of meaning. Meaning is the prerequisite of communication, and the process of indexing is a communicative process. Furthermore, communication is a public enterprise. Since meaning is use, we believe that a theory of indexing is a theory of the social communication of meaning. Subsequently, the idea of private language is meaningless in connection with such a theory.

Conclusion

We assume that an indexing theory is a theory of meaning. An indexing theory based on Philosophical Investigations *shifts the theoretical focus from the document, to what constitutes the document: The language game*. This doesn't mean that the document is meaningless in an indexing theory. A document can be made sense of, it can contribute to the creation and exchange of meaning which is the potential applications of a document. By conceptually representing the documents language game in the indexing, we are able to nuance this sense-making. The point of the document in an indexing theory is, that the theory must express the conditions under which meaning, and thereby documents, is produced, distributed and exchanged. Therefore the document is not the primary concern of the theory, but rather what it is applied to. Using the concepts of language games and private language, exception is taken to mentalistic notions of language. Indexing theories that focus on the individual are considered meaningless because language is a social phenomenon. The individual user is of no importance to a theory in the sense that the perceptions of the individual cannot and should not be incorporated. To do so would violate the private language argument. Nor can the theory be based on the language games of groups of users. These games are too heterogeneous and dynamic to be useful.

An indexing theory based on Philosophical Investigations must divide the universe of knowledge into a number of relatively stable language games, which must be indexed separately. This is where the language philosophical aspect of the indexing theory is situated.

Notes

1. Here quoted from Fiske (1990)
2. Ultimo August 1999, Wittgenstein was cited 77 times in the subject category of "information science & library science" in the Social SciSearch citation database at DIALOG

References

- Bazerman, C. (1988). *Shaping written knowledge. The genre and activity of the experimental article in science*. Madison, Wisconsin: The University of Wisconsin Press.
- Benediktsson, D. (1989). Hermeneutics: Dimensions towards LIS thinking. *Library and Information Science Research* 11, 201-234
- Blair, D. C. (1990). *Language and representation in information retrieval*. Amsterdam: Elsevier.
- Blair, D. C. (1992). Information retrieval and the philosophy of language. *The Computer Journal*, 35(3), 200-207
- Brier, S. (1996a). "Cybersemiotics: A new paradigm in analyzing the Problems of knowledge organization and document retrieval in information science." In: Peter Ingwersen og Niels Ole Pors (Ed.): *Proceedings CoLIS 2: Second international conference on conceptions of library and information science: Integration in perspective*. pp. 23-44. Copenhagen: Royal School of Librarianship.
- Brier, S. (1996b). Cybersemiotics: A new interdisciplinary development applied to the problems of knowledge organization and document retrieval in information science. *Journal of Documentation*, 52(3), 296-344
- Buchanan, B. (1979). *Theory of library classification*. London: Clive Bingley. (Outlines of modern librarianship)
- Christensen, M. L. (1994). Hermeneutik - fortolkning og forståelse. (Hermeneutics - interpretation and understanding) *Biblioteksarbejde*, 15(41), 25-40
- Chu, C. M. & O'Brien, A. (1993). Subject analysis: the first critical stages in indexing. *Journal of Information Science*. 19, 439-454
- Cornelius, I. (1996a). Information and interpretation. In: Peter Ingwersen og Niels Ole Pors (Ed.): *Proceedings CoLIS 2: Second international conference on conceptions of library and information science: Integration in perspective*. pp. 11-21. Copenhagen: Royal School of Librarianship.
- Cornelius, I. (1996b). *Meaning and method in information studies*. Norwood: Ablex Publishing Corporation, Norwood, New Jersey.
- Fiske, J. (1990). *Introduction to communication studies*. 2. nd. Ed. London: Routledge.
- Frohmann, B. (1990). Rules of indexing: A critique of mentalism in information retrieval theory. *Journal of Documentation*, 46(2), 81-101
- Føllesdal, D; Walløe, L. & Elster, J. (1992). *Politikens introduktion til moderne filosofi og videnskabsteori*. (Introduction to modern philosophy and theory of science) København: Politikens Forlag.
- Hartnack, J. (1986). *Wittgenstein and modern philosophy*. Translation of: Wittgenstein og den moderne filosofi. Translated by Maurice Cranston. Notre Dame, Ind. : University of Notre Dame Press, xiii,
- Hjørland, B. (1992). The concept of 'subject' in information science. *Journal of Documentation*. 48(2), 172-200.

- Hjørland, B. (1997). *Subject representation and information seeking. An activity-theoretical approach to information science*. Westport, Connecticut: Greenwood Press.
- Hjørland, B. (1998). Information retrieval, text composition and semantics. *Knowledge Organization*, 25, No. 1/2, 16-31
- Hoel, I. (1992). Information science and hermeneutics: Should information science be interpreted as a historical and humanistic science? In: Pertti Vakkari & Blaise Cronin (Ed.): *Conceptions of library and information science. Proceedings of the first CoLIS Conference*, Tampere, August 1991. London: Taylor Graham. pp. 1-11.
- Hutchins, J. W. (1978): The concept of "aboutness" in subject indexing. *Aslib Proceedings*, 30, 172-181
- Ingwersen, P. (1992). *Information retrieval interaction*. London: Taylor Graham.
- Karamüftüoğlu, M. (1996). Semiotics of documentary information retrieval systems. In: Peter Ingwersen og Niels Ole Pors (Ed.): *Proceedings CoLIS 2: Second international conference on conceptions of library and information science: Integration in perspective*. Copenhagen: Royal School of Librarianship. pp. 85-97.
- Karamüftüoğlu, M. (1997). Designing language games in OKAPI. *Journal of Documentation*, 53(1), 69-73
- Karamüftüoğlu, M. (1998). Collaborative Information Retrieval: Toward a Social Informatics View of IR Interaction. *Journal of the American Society of Information Science*, 49 (12), 1070-1080
- Kuhlthau, C. C. (1993). *Seeking meaning: A process approach to library and information services*. Norwood, NJ: Ablex Publishing Corporation.
- Lancaster, F. W. (1998). *Indexing and abstracting in theory and practice*. London: The Library Association.
- Langridge, D. W. (1989): *Subject analysis: Principles and procedures*. London: Bowker-Saur.
- Lübcke, P. (1996). Gadamer: Sandhed og metode. (Gadamer: Truth and method) In: Lübcke, Poul (Ed.) (1996): *Vor tids filosofi: Engagement og forståelse (Philosophy of our time: Commitment and understanding)*. 6. oplag. København: Politikens Forlag. 432 s. pp. 163-177
- Mai, J-E. (1998): Organization of knowledge: An interpretive approach. In: *Information Science at the Dawn of the Next Millennium*, Edited by Elaine G. Toms, D. Grant Campbell and Judy Dunn, 231-42. Proceedings of the 26th Annual Conference of the Canadian Association for Information Science. Toronto: Canadian Association for Information Science.
- McLachlan, H. V. (1981): Buchanan, Locke and Wittgenstein on classification. *Journal of Information Science*, 3, 191-195.
- Nedobity, W. (1989). Concepts versus meaning as reflected by the works of E. Wüster and L. Wittgenstein. *International Classification*, 16(1). 24-26
- Pahuus, M. (1995) Hermeneutik. (Hermeneutics) In: *Humanistisk Videnskabsteori (Humanistic theory of science)*. Ed. Finn Collin og Simo Køppe. Danmarks Radio Forlaget. pp. 109-139

- Quinn, B. (1994). Recent theoretical approaches in classification and indexing. *Knowledge Organization*, 21(3), 140-147
- Shannon, C. & Weaver, W. (1949). *The mathematical theory of communication*. Illinois: University of Illinois Press.
- Talja, S. (1997). Constituting "Information" and "User" as Research objects: A theory of knowledge formations as an alternative to the information man-theory. In: Pertti Vakkari, Reijo Savolainen & Brenda Dervin (red.): *Information seeking in context. Proceedings of an international conference on research in information needs, seeking and use in different contexts*, 14-16 august, Tampere, Finland. London: Taylor Graham. 467 s. pp. 67-80
- Tuominen, K. (1997): User-centered discourse: An analysis of the subject positions of the user and the librarian. *Library Quarterly*, 67(4), 350-371
- Warner, J. (1990): Semiotics, information science, documents and computers. *Journal of Documentation*, 46(1), 16-32
- Wilson, P. (1968): *Two kinds of power. An essay on bibliographic control*. Berkeley: University of California Press.
- Wittgenstein, L. (1958). *Philosophical investigations*. New York: Macmillan Publishing. Originally published in 1953.
- Wittgenstein, L. (1961). *Tractatus Logico-Philosophicus*. Routledge. Translated by D. F. Pears & B. F. McGuinness. Originally published in 1922.
- Wittgenstein, L. (1969). *On Certainty*. New York: Harper and Row

