Semiotics of Terminology:
A Semiotic Knowledge Profile

By their fruits ye shall know them
(Matt. 7:15-20)

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Abstract

It is not possible to organize knowledge using universalistic knowledge theories in accordance with any realistic theory and it is not possible to represent knowledge in a thesaurus structure simply because the thesaurus is too rigid to compensate for the conceivable bearings of a concept. Furthermore the author does not believe that knowledge is actually organized the same way that a thesaurus is structured. A thesaurus is a tool developed on the basis of nominalistic knowledge theories, whereas a Knowledge Profile is developed on the basis of a critical realism that respect the knowledge structure and tries to represent the knowledge structure in accordance with the existing knowledge structures. The focus of the article is to sharpen the definition of the semiotic knowledge organization method *SKO* by drawing a knowledge profile for SKO.

1   INTRODUCTION

One of the essential aspects of conducting science is to clarify terminology, to put names to ideas, and to convince fellow researchers to adopt those terms and taxonomies. It is a great achievement for a researcher, to develop concepts that make a difference even long after their death. For an extended application of one's terminology, the new concept or concepts containing new knowledge have to be inventive, innovative and very precise in their definitions. However, to gain acknowledgement, the concept has to be tested and used among peers. If it fails to ensure its legitimacy, i.e., if it does not make a positive difference, it will wither away and die. However, if it actually makes a difference and is

convincing in terms of definition, the concept will over time become a generally accepted concept. Knowledge is per excellence general and it has to be tested in a science community or within a knowledge domain. A concept that has been accepted is formed and moulded through the use and experience of the actors within a knowledge domain and indeed knowledge can be identified within a knowledge domain. A knowledge domain is a set of conditions that puts interpretive constraints upon its concepts, which means that concepts can only be understood correctly in relation to the knowledge domain from which they originate. Therefore, the place where we identify the knowledge *structure* of a given knowledge domain is in the *terminology* of the knowledge domain.

The meaning of a given concept equals the conceivable consequences of the concept; this is one of the main points in C. S. Peirce's doctrine of Pragmaticism. The consequences of a concept are materialized in the related terms of a concept. If we are able to identify all the related terms of a given concept, ideally speaking, we will have total knowledge of the concept. This could be an enormous undertaking since it is impossible in the real world to gain total knowledge of a concept due to the future consequences of the concept. However, the task is made considerably easier since the meaning of a concept is relative to the knowledge domain from which it originates. However, this does not mean that the meaning of a concept is fixed. On the contrary, as Peirce puts it:

> By his system of nomenclature, Sir William Hamilton has conferred an immense boon not alone on his own school but on all English philosophers who believe in anchoring words to fixed meanings. I deeply regret that I am not one of these. That is the best way to be stationary, no doubt. But, nevertheless, I believe in mooring our words by certain applications and letting them change their meaning as our conceptions of the things to which we have applied them progresses. Charles Peirce, Writings 1, p. 58 (1861)

Since Peirce's pragmaticism is my frame of reference, I often find myself in discussions with colleagues, who have completely different opinions concerning terminology. Just the other day, I had a discussion with a colleague concerning the matter of how to make our ideas clearer or simply if it is possible to sharpen terminology within the humanities. It quickly became clear that my colleague, who primarily studies hermeneutics did not at all like my pragmaticistic way of treating terms. In fact, he argued that I conducted a kind of conceptual hygiene by reducing the meaning of the concepts to a minimum, not allowing the meaning of a given concept to bloom and flourish. At first, I did not at all care for this accusation; it sounded to me like some kind of conceptual fascism. However, when I came to think further on it, it did not sound that bad after all. In my opinion, to conduct science in a scientifically correct manner, it is necessary to develop a

stringent terminology and to sharpen the meaning of concepts in order to avoid misunder-standings, to enhance communication and to become more scientifically grounded. Essentially, this means that a concept cannot have too many connotations. It must be precise in terms of meaning. As mentioned, this viewpoint is grounded in Peircean pragmaticism, which he defines in the following quotations: "*Pragmaticism consists in holding that the purport of any concept is its conceived bearing upon our conduct.*" (CP 5.442) And further: "*... pragmatism does not undertake to say in what the meanings of all signs consist, but merely to lay down a method of determining the meanings of intellectual concepts, that is, of those upon which reasonings may turn*" (CP 5.8) Furthermore, in a letter to Signor Calderone, Peirce writes: "*Now pragmaticism is simply the doctrine that the inductive method is the only essential to the ascertainment of the intellectual purport of any symbol*" (CP 8.209)

Therefore, according to Peirce the aim of developing terminology is to determine the meaning of intellectual concepts i.e., a Language of Special Purpose (LSP) and the way to do it is to investigate the conceived bearings of the concept at hand. By bearing, I understand 'consequences as interpretations'. Tested consequences are general relations, hence the general relations of a concept are related terms and only general relations can be related terms. Since an interpretation can express personal whims and preferences, it must be tested in the knowledge domain from which it stems. A test is simply whether or not the term finds footing and is applied according to the methods to obtain knowledge in the knowledge domain. If it succeeds, the knowledge it contains is generalized and has been found useful. If it does not find footing, it may wither away.

The aim of this article is to show how we may sharpen scientific terminology based on the pragmatic semiotics of Peirce and how to conduct conceptual "hygiene" upon concepts to erase meaningless connotations. I am using the epistemological development of the concept *semiotics of terminology* (SOT) as an example of how a Knowledge Profile can assist in developing concepts. A knowledge profile can be thought of as an epistemological fingerprint. No knowledge domains share the same knowledge profile. To fulfil this aim, I will discuss aspects of the SKO method (Semiotic Knowledge Organization) as is developed in Thellefsen 2002. The SKO method is used for identification of the fundamental sign (Thellefsen 2002) in a given knowledge domain. However, SKO can also be used to sharpen the terminology of a given knowledge domain, and, in fact, it can be used to provide a terminological overview of our project, allowing us to analyze our project in terms of terminology and help us be stringent in the use of terms. This article

will discuss the latter aspect alongside the development of a knowledge profile for semiotics of terminology.

2 SKO AS A METHOD TO IDENTIFY A KNOWLEDGE PROFILE

The SKO method offers a method to identify the knowledge profile of a knowledge domain. It is important to point out that every well-structured knowledge domain has a unique organization of its knowledge, which is its knowledge profile. Based on research conducted within Occupational Therapy (Thellefsen 2002), it seems to be a fact that the knowledge profile of a knowledge domain has its centre in a so-called fundamental sign (Thellefsen 2002), which is the sign that holds the vastest knowledge potential in the knowledge domain. The fundamental sign is a certain meaningful sign that compresses a lot of information and communicates this information relative to the knowledge level of the interpreter. This communication effect is called the significance-effect of the sign (Thellefsen 2002; Thellefsen, Brier, Thellefsen 2003). The fundamental sign is the concept that is in the centre of the knowledge domain and it functions as a conceptual knowledge organizer; it is the central idea that holds the self-identity of the knowledge domain. The fundamental sign exists in the knowledge domain in a multi-dimensional sign web where all related terms are to be understood as consequences of the fundamental sign. However, not all consequences are related terms. To become a related term, the terms must be tested through use by and experience of the actors in the knowledge domain. This means that it is the intellectual effort of the actors in the knowledge domain, which essentially shapes and forms the related terms to match the knowledge need in the knowledge domain. Consequently, the Knowledge Profile of a knowledge domain is unique to the knowledge domain in question. This is a radical step away from the knowledge organization theories that treat knowledge in a universal, positivistic, non-realistic, and static way[34] known primarily from Information Retrieval (IR) research. However, the conceivable consequences of the fundamental sign ensure the dynamic development of knowledge in a knowledge domain. Additionally, since we are dealing with symbols, which could be scientific nomenclatures or classification schemes that offer stable knowledge structures, the dynamics are much easier to handle than in categorization of

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[34] It is not possible to organize knowledge using universalistic knowledge theories in accordance with any realistic theory and it is not possible to represent knowledge in a thesaurus structure simply because the thesaurus is too rigid to compensate for the conceivable bearings of a concept. The author does not believe that knowledge is organized the way a thesaurus is structured. The thesaurus is a tool developed on the basis of nominalistic knowledge theories whereas the Knowledge Profile is developed on the basis of a critical realism that respect the knowledge structure and tries to represent the knowledge structure in accordance with the existing knowledge structures.

everyday language. Therefore, the concept of the knowledge profile has to be understood in relation to LSP and the development of terminology.

Furthermore, SKO offers a general understanding of concepts. Based on pragmatic semiotics, SKO views concepts from a pragmaticistic angle, which involves a realistic, fallibilistic, hyperbolic philosophical, etc. angle. Without going into detail, this results in the following characterization of concepts:

- A concept is a symbol constrained by the knowledge domain from which it stems when interpreted. It is stable but contains an element of spontaneity, which secures its ability to evolve.
- A concept is part of a certain terminology, which reflects the knowledge structure of a certain knowledge domain.
- The concept contains an intrinsic idea, which makes the concept unique; this intrinsic idea refers to Peirce's basic category of Firstness. However, the qualities of the concept are still relative to the purpose(s) of the knowledge domain.
- The meaning of a concept expresses purposefulness; that is to say that the concept is a result of final causation. The meanings of concepts are shaped through interpretations.
- Concepts are real in the Peircean realistic view. "*Though largely of a conventional nature, language is a mode of conduct, and as such, produces conceivable consequences and is normatively bounded. In its abilities to body forth new possibilities for conduct, to determine and be determined by further experience, and to communicate valid generals bearing conceivable consequences, language is real*" (Halton 1992) The fundamental sign is real.
- The meaning of a concept is manifested in its relations.
- The meaning of a concept resides in its possible imaginable consequences. Relations are fixed consequences that have been tested and found applicable for description of the knowledge in the knowledge domain.
- The knowledge contained in a concept is provisional because new consequences can alter the existing meaning of a concept. Hence knowledge is fallibilistic.

The third way of using SKO is for sharpening of the terminology of a knowledge domain. Moreover, it can be used methodically to sharpen individual research projects and students' projects through making a terminological map describing the epistemological approach to a given problem. How do you sharpen the terminology of a new concept?

3   IDENTIFYING THE KNOWLEDGE PROFILE OF *SOT*

In the following, I will seek to identify the concept of SOT, primarily by discussing the consequences of defining the concept within the pragmatic semiotics of Peirce. The example is by no means exhaustive. The purpose is to show how to create a knowledge profile and how a stringent use of terminology can describe a new research field as well as

how to maintain the concept definition in accordance with the ideas upon which it builds. If an idea builds upon pragmatic semiotics, one cannot ignore the scientific consequences of e.g., realism, fallibilism, idealism, etc. There has to be a thorough discussion when using the concept of, for example, the semiotic web and then excluding the realistic angle or using the pragmaticistic doctrine of Peirce as a frame of reference and then excluding the fallibilistic or idealistic angle of knowledge. Without sufficient argumentation it is a display of terminologically unethical behaviour. Of course, it is legitimate to use only parts of a scientific theory but there have to be good reasons for excluding vital parts of a theory. Figure 1 provides a knowledge profile of SOT
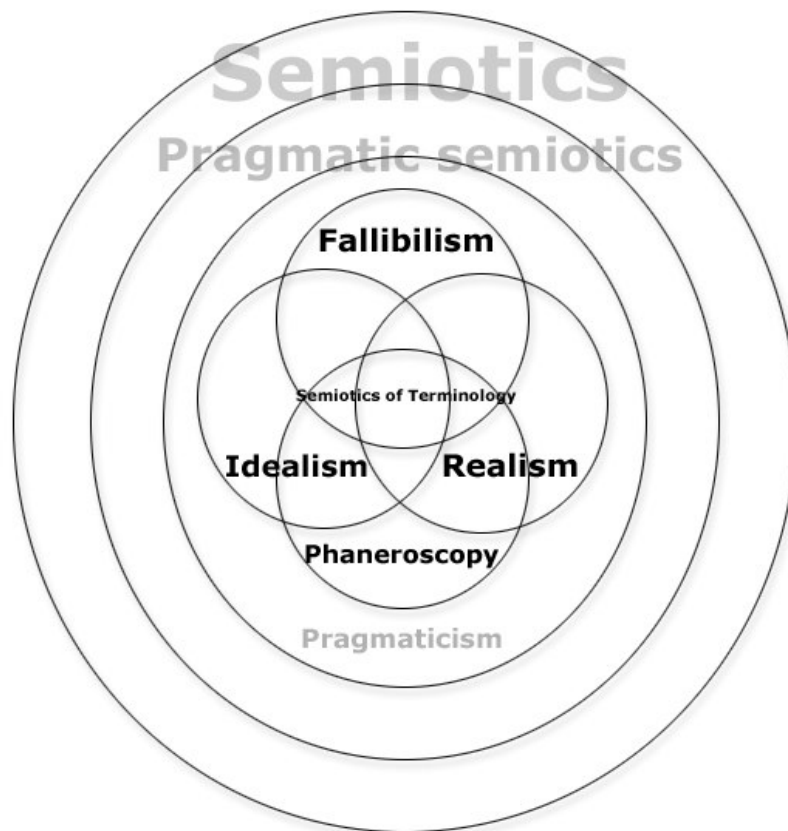
Figure 1: The figure is a knowledge profile of SOT. SOT is developed within the basic semiotics, which is a general theory of signs. However, in order to define SOT, we have to be more precise. The second circle is a theoretical precision; SOT has to be understood within the scope of pragmatic semiotics, ruling out the pragmatics of Dewey and James. However, SOT is developed in accordance with a special branch of Peirce's philosophy, namely the doctrine of pragmaticism. The doctrine of pragmaticism consists of several 'isms', more than the figure shows. However, I believe that the four most important elements in pragmaticism are represented by Fallibilism, Objective Idealism, Metaphysical Realism, and the Phaneroscopy.

In the following, I will define the concept of SOT by discussing four important terms (see figure 1) from the doctrine of pragmatism.

3.1   CONSEQUENCE NO. 1. FALLIBILISM AND SOT

Fallibilism means that knowledge is provisory. In other words, the conceivable consequences of a concept are capable of altering the present knowledge that we have of a concept. Peirce defines fallibilism in this way:

> For years [---] I used for myself to collect my ideas under the designation *fallibilism*; and indeed the first step toward *finding out* is to acknowledge you do not satisfactorily know already; so that no blight can so surely arrest all intellectual growth as the blight of cocksureness; and ninety-nine out of every hundred good heads are reduced to impotence by that malady — of whose inroads they are most strangely unaware! Indeed, out of a contrite fallibilism, combined with a high faith in the reality of knowledge, and an intense desire to find things out, all my philosophy has always seemed to me to grow…(CP 1.13-14)

Peirce continues defining fallibilism in the following quote:

> Thus, the universe is *not* a mere mechanical result of the operation of blind law. The most obvious of all its characters cannot be so explained. It is the multitudinous facts of all experience that show us this; but that which has opened our eyes to these facts is the principle of fallibilism. Those who fail to appreciate the importance of fallibilism reason: we see these laws of mechanics; we see how extremely closely they have been verified in some cases. We suppose that what we haven't examined is like what we have examined, and that these laws are absolute, and the whole universe is a boundless machine working by the blind laws of mechanics. This is a philosophy which leaves no room for a God! No, indeed! It leaves even human consciousness, which cannot well be denied to exist, as a perfectly idle and functionless *flâneur* in the world, with no possible influence upon anything — not even upon itself. Now will you tell me that this fallibilism amounts to nothing? (CP 1.162-163)

Bearing these quotations in mind, I define SOT as fallibilistic. Hence, I perceive the knowledge of concepts to be dynamic. However, since concepts are symbols, the dynamics have slowed down and will slow down even further when more consequences of the symbol are learned. Naturally, new consequences can create other consequences that may expand a new knowledge horizon but the basic nature of the symbol is to ensure an interpretative stability, meaning that a consequence which is able to alter the knowledge of a symbol has to have a severe impact upon the concept in question. When dealing with knowledge domains such an impact could be nothing less than a shift in paradigms and this seldom happens. The much less significant but more frequent impacts on a concept

stemming from consequences is that the knowledge of the consequences adds to the knowledge of the concept or removes already existing consequences. In this way, the knowledge content of the concept is the sum of consequences. However, this does not mean that the concept grows cumulatively. On the contrary, the consequences form and mould the meaning of the concept through the use and experience of the actors in the knowledge domain. This means that the concept matches the knowledge need within the knowledge domain. When the concept no longer matches this knowledge need, it alters by letting the consequences sharpen the concept definition. Peirce states that symbols grow through use and experience (CP 2.302), meaning that concepts will allways develop and be formed and moulded to match the knowledge need of the knowledge domain. However, as discussed in Thellefsen 2002, the development of symbols tend to slow down as the interpretive habits of a given knowledge domain constrain the meaning content in the symbols. Following the idea of the hyperbolic philosophy brought forth by Peirce "*Nature marches from premisses to conclusion; nature has ideal end different from its origin.*" (CP 6.582). This quote marks Peirce's understanding of a universal principle of movement, which, naturally, also applies to the development of symbols. Although fixed meanings are poison to the idea of pragmaticism, the development of symbols tends to slow down and become operative as stable knowledge structures. Of course there will always remain an element of iconistic spontaneity in the concept, which endangers the stability and ensures the development of the concept by adding more consequences. The latter part of this discussion introduces the realistic and teleological aspects of the concept.

3.2   CONSEQUENCES NO. 2 AND 3, METAPHYSICAL REALISM, OBJECTIVE IDEALISM AND SOT

By allowing the interpretations, which are the consequences of a concept to form the knowledge content of a concept, we have to accept that the development of a concept cannot be arbitrary; to the contrary, it is motivated. The motivation of a concept is its wish to match the knowledge need in the knowledge domain. The concept is motivated when we give the concept meaning through our use and experience with the concept. However, to understand how a concept can have a destination, we need to understand the objective idealistic element in Peirce's semiotics. This objective idealistic element, which is also an important part of Peirce's pragmaticism, is about truth. For Peirce, the truth of a concept is when all consequences of a concept are learned and we have moved a step toward the greater truth. Peirce writes: *"The opinion which is fated to be ultimately agreed to by all who investigate, is what we mean by the truth, and the object represented in this*

opinion is the real. That is the way I would explain reality" (CP 5.407). The objective idealistic assumption implants a determination in the concept – a striving towards truth based upon interpretive habits. This embeds realism in the concepts because when we accept that the goal of a concept lies outside the mind of the single individual then the concept and the goal of the concept, its final cause, exist outside the individual and rest within the concept. In the above quote, Halton explained how concepts can be realistic based on Peirces realism: "In its abilities to body forth new possibilities for conduct, to determine and be determined by further experience, and to communicate valid generals bearing conceivable consequences, language is real" (Halton 1992) Summing up, the meaning of a concept lies exclusively in its conceived consequences for human conduct. In other words, as we discover the consequences of a concept, our knowledge about the concept alters, however the meaning alters in order to reflect our knowledge need. Since our knowledge need also changes over time, the discovery of consequences is motivated and not arbitrary.

3.3   CONSEQUENCE NO. 4. PHANEROSCOPY AND SOT

Peirce's phaneroscopy of his basic categories consist of Firstness, Secondness and Thirdness. I will not go into detail with these categories. For a detailed discussion and analysis, I refer to Thellefsen 2002. However, in short, Firstness is defined as a potential of being; and, to Peirce, it is a primary ontological category denoting possibility, unqualified generality, and monadic reality. Firstness is monadic qualities/predicates, immediate sense qualities - simple and non-compound forms and feelings, potentiality of being. Secondness is defined as a dyadic relation between the sign and its object. The relation is dyadic, i.e., something 'else' exists as a binary entity to something 'first'. Peirce often uses the following example: to a force - a counter force exists, to will - corresponding unwillingness, etc. The relation between Firstness and Secondness is dyadic in the sense that the quality in itself does not constitute the fact but is tied to the fact. '…*it is with any law of nature. Were it but a mere idea unrealized -- and it is of the nature of an idea -- it would be a pure first. The cases to which it applies, are seconds*' (CP 3.342). Thirdness is defined as the category of generality, comprehensibility, rationality and regularity. The concept 'force of habit' is central to Peirce, as he suggests that natural laws are manifestations of habit-formation in nature. In semiotics, Thirdness is identical to the interpretant of the sign. For a sign to mean something there must be some kind of regularity behind. This regularity could be a social habit - a reaction to the sign - or the sign could designate some regularity in nature. The social habit forms the cultural evolution and the regularity in nature forms the biological evolution. Moreover, it is the social habit that is

important in the case of conceptual evolution in knowledge domains. In my opinion, a knowledge domain expresses a kind of cultural regularity, which places constraints upon the objects related to the knowledge domain, and therefore, specific knowledge exists and develops in knowledge domains. The knowledge domain expresses a kind of cultural evolution which is very dynamic but the dynamics are controlled by the basic thoughts in the knowledge domain i.e., the fundamental signs.

The most important issue concerning the development of concepts is the tendency of signs to create stable interpretative habits. The central issue is stated in the following quote, where Peirce writes:

> Three elements go to make up an idea. The first is its intrinsic quality as a feeling. The second is the energy with which it affects other ideas, an energy which is infinite in the here-and-nowness of immediate sensation, finite and relative in the recency of the past. The third element is the tendency of an idea to bring along other ideas with it (CP 1.135)

The quote contains the three basic elements of an idea. Regarding Peirce's phaneroscopy, Firstness is a potential of being – the quality in the idea as it occurs. Secondness is an actualization of Firstness' potential – its energy with which it can affect other ideas and Thirdness mediates between the potential of being and the actualization. Thirdness then creates generality and habit formation.

If we look at a generally accepted scientific concept and investigate its consequences, most of its consequences have been learned and indeed the consequences have become related terms and the related terms are in themselves symbols consisting of related terms. This means that the knowledge potential of the generally accepted concept is reduced and the speed of evolution has been slowed down. The more symbolic a concept gets through discovery of its consequences, the more embedded the interpretative habits become, and the harder it is to alter the meaning of the concept. Summing up, the concept symbolization process is a hardening of its meaning based on interpretative habit formation. When the idea has been fixated and is growing by attracting other ideas and indeed becomes a symbol, the knowledge potential is reduced as the habits strengthen. It becomes very hard to alter the meaning of such a symbol. Having dealt with the four important consequences of defining SOT within the doctrine of pragmaticism, let us sum up on the Knowledge profile of SOT.

4   THE KNOWLEDGE PROFILE OF SOT

The semiotics of terminology accepts:

- Knowledge to be provisory.
- That concepts have a determination – a final cause that has influence upon the meaning of the concepts.
- That the meaning of concepts is formed through the use and experience of actors in a knowledge domain to satisfy the knowledge need in the knowledge domain.
- That the meaning of concepts is based on interpretive habits.
- That concepts are real in the Peircean realistic view. Concepts can influence future conduct of actors in a knowledge domain; this makes the concepts as real as physical artefacts.
- That consequences of a given concept have to be tested before they become related terms to rule out personal whims and preferences.

Based on these accepted epistemological consequences SOT rejects:

> The classical thesaurus structure, as nominalistic; it is a structure that has been forced upon the field it tries to represent. It is not a structure that truly represents the knowledge structure in the knowledge domain. It is a structure that represents a way of thinking that ultimately is out of touch with reality. The classical thesaurus is based on universal knowledge theories since it is the same structure that is forced upon any field of interest. Research shows that knowledge structures differ significantly from knowledge domain to knowledge domain and that the focus of a knowledge domain lies within the fundamental sign of the knowledge domain. (Thellefsen 2002, Thellefsen & Thellefsen 2002)

Instead, SOT offers the Knowledge Profile, which is a structure that aims to match the knowledge of the knowledge domain by defining the epistemological basis of the knowledge domain – its so-called fundamental sign. The hypothesis is that it is the epistemological basis in a certain knowledge domain that determines the understanding of concepts and thus constrains the meaning of concepts to match the knowledge need of the actors in the knowledge domain. The following example shows how different use and experience with an artefact determines the understanding of the artefact and determines how differently that knowledge has to be profiled.

A music therapist and a violinist (a soloist) both use the violin as a tool. However, their different use and experience (which is determined by their goal) with the violin create different knowledge structures. The music therapists see the violin in a therapeutic perspective and the soloists view the violin as an instrument for reaching a certain artistic level in communicating pieces of art. As stated before, it is the use and experience that

determine the knowledge related in the artefact. The doctrine of pragmaticism regards concepts as real as artefacts because they have consequences on our conduct and because concepts also contain identifiable qualities. Thus, the use of concepts determines the meaning of the concepts.

Based on these assumptions and observations, the Knowledge profile is identifiable through the use and experience of the actors in a knowledge domain. Moreover, the knowledge structure is identifiable in this use and experience. The music therapists or the soloists do not care for a basic description of the violin as an instrument with four strings, which can be brought into action by using a bow, etc. This description is trivial. The music therapists are interested in the violin as an instrument in a therapeutic situation, and, it is in this situation, the knowledge of the violin is organized – hence it is the pragmatic view that enables the music therapists to construct the knowledge that is unique for their profession.

On this basis, let me sum up the Knowledge Profile of SOT:
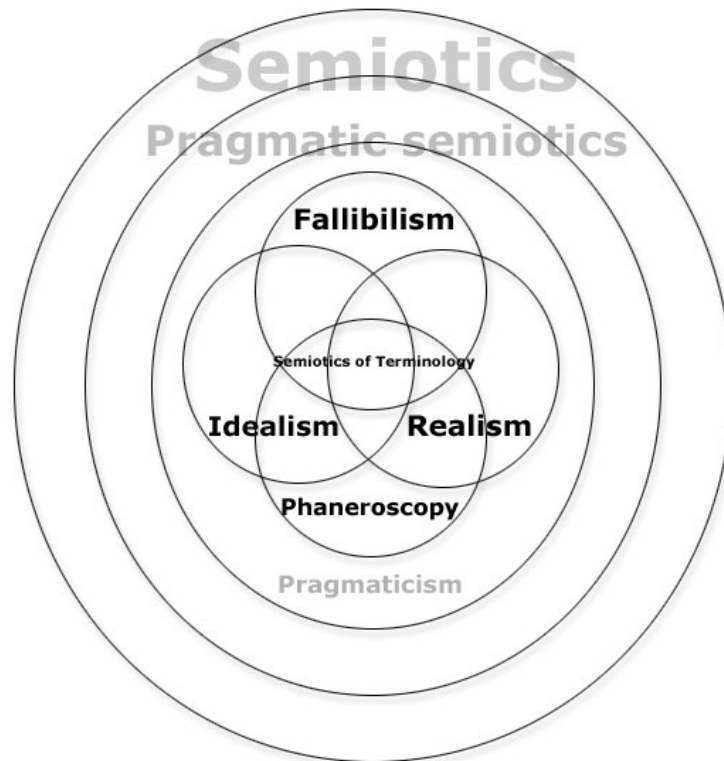
Figure 1: resumed

The knowledge profile of SOT is as follows: SOT is developed within semiotics. However, the concept is too general; it needs to be more precise. Semiotics is prefixed with pragmatic (pragmatic semiotics), ruling out the pragmatics of Dewey and James, leaving us with the pragmatic semiotics of Peirce. However, SOT is developed within the pragmaticistic doctrine of Peirce focusing upon the fallibilistic, idealistic, realistic and phaneroscopic aspects of knowledge, which have a many consequences on the conceptual understanding of knowledge as discussed above. By making a knowledge profile for a concept development or a theory development, it is possible to sharpen the concepts in a diagrammatic way without using the tree structure of a thesaurus. Although the conceptual definition of SOT can be translated into a concept structure, this structure merely suggests the precision of terminology as we try to capture the essence of SOT.

Semiotics
             Pragmatic semiotics
           Pragmaticism
                Fallibilism
                Objective Idealism
                        Phaneroscopy
                        Metaphysical Realism
                  SOT

This must not be understood as a hierarchical structure. However, as figure 1 shows, semiotics must be understood as the broadest concept. Pragmatic semiotics must be understood in relation to semiotics and is contained in semiotics. Pragmaticism is developed within the pragmatic semiotics and has to be understood as a part of pragmatic semiotics. However, the pragmaticist view implies a sharpening of the terminology since it is related to the pragmaticism of pragmatic semiotics we are dealing with. In the centre of pragmaticism is Fallibilism, Objective Idealism, Phaneroscopy and Metaphysical Realism, and these four very important concepts create the epistemological basis of SOT.

The Knowledge Profile is a breakthrough in terms of knowledge organization based upon pragmatic semiotics. It is able to handle the development of a single concept as we saw with SOT. It is capable of handling a research project where the Knowledge Profile can be used as a guiding tool to stay on the epistemological track and it can be used to identify the knowledge organization of bigger knowledge domains ranging from non-scientific to scientific knowledge domains.

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