

Article

Theory of Knowledge Based on the Idea of the Discursive Space

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Abstract: This paper discusses the theory of knowledge based on the idea of dynamical space. The goal of this effort is to comprehend the knowledge that remains beyond the human domain, e.g., of the artificial cognitive systems. This theory occurs in two versions, weak and strong. The weak version is limited to knowledge in which retention and articulation are performed through the discourse. The strong version is general and is not limited in any way. In the weak version, knowledge is represented by the trajectories of discourses in time, in a dynamical space called the discursive space, which has an arbitrary number of dimensions. Given space is used to represent a given part of knowledge. A manifold is introduced to represent knowledge with a wider scope (all knowledge). The strong version is an extrapolation of the weak version to cover all forms of knowledge, not necessarily human or manifesting in language. The use of dynamical space construction allows one to formalize knowledge as such. Such an effort requires us to initially consider knowledge as mainly a social and linguistic phenomenon, which also could be presented as a result of the evolution of the understanding of knowledge that took place in the 20th century.

Keywords: knowledge; epistemology; dynamical space; discourse; discursive theory



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1. Introduction

This part is very important because it introduces a series of assumptions that allow one to carry out further reasoning. These assumptions have a diverse nature, which results from extensive reflection, taking into account many different approaches to the phenomenon that is the subject of analysis, i.e., knowledge. This phenomenon is also the subject of a large body of literature, of which only a part will be mentioned here. The intention of the text is not to present the most extensive possible research context of knowledge but to select elements that can be gathered into a coherent whole, leading to the conclusions presented in the Introduction and enabling the construction of a theory of discursive space.

The two most important assumptions on which this analysis is based are the social nature of knowledge and language as the form of its articulation. Both of these properties transfer the problem of knowledge beyond the epistemological approach, i.e., purely philosophical, but, in the author's opinion, they do not break away from these foundations, and even remain strictly grounded in them.

Knowledge is a phenomenon that has been theorized since the earliest times and in the context of various cultures. Although the name of the approach that encompasses this theorizing—epistemology—appeared only in the 18th century, in principle, this approach concerns man as the center of the issue. Chisholm, in 1966, defined it as follows: “Theory of knowledge, when considered as a part of philosophy, is the concern with such questions as ‘What can I know? How can I distinguish those things I am justified in believing from those things I am not justified in believing? And how can I decide whether I am more justified in believing one thing than in believing another?’ These questions are properly called Socratic since they are questions about ourselves” [1] (p. 1). These questions, whose aim is “to correct and improve our own epistemic situation” (*ibidem*), should be treated as the assumptions of a metaphysical (philosophical) approach. They form a closed horizon for reflection, which Chisholm emphasizes in the third edition of his book. He notes there

that fields such as information theory, artificial intelligence, and cognitive science also enter the area of knowledge theory, but, as “branches of empirical science”, they do not belong to the area of philosophy.

Woleński’s approach can be considered a breakthrough in the understanding of epistemology in the context of Chisholm. Woleński’s approach is clearly pragmatic and is visible in his version of the questions posed by epistemology, which are as follows: “What is knowledge?; Is knowledge based on senses or reason? Is certainty attainable? What is truth? Are there ultimate limits of knowledge?” [2] (p. 4). At the same time, he completely resigns from the construction of man as the main (and exclusive) subject in the context of which the phenomenon of knowledge can be considered. This shift in emphasis, which is treated here as the implementation of the modern evolution of the approach to knowledge, is also the source of the approach presented here. The article justifies the thesis that the pragmatic approach to knowledge has dominated the reflection devoted to it, although, of course, the number of proposals and disputes regarding the answers to the questions posed is very large, and they form a separate subject of investigation, remaining beyond the scope of this paper, e.g., refs. [3–9].

The concept of pragmatism, applied here to knowledge, refers to the tradition of the philosophical current associated with this notion, as a certain epistemic activity, which, as broadly understood by the term itself, is always strongly related to the empirical reality. On this topic, James Dewey wrote the following: “In order to be able to attribute a meaning to concepts, one must be able to apply them to the existence. Now it is by means of action is made possible” [10] or Peirce, who wrote that “the rational purport of a word or other expression, lies exclusively in its conceivable bearing upon the conduct of life” [11]. The most important semantic context of this concept is its utility in relation to the practical approach. In the case of knowledge, this shift in the way it is perceived is visible as a historical and social process. During this process, knowledge emancipates itself, abandoning the character of a certain human capacity, and gaining the position of an independent phenomenon that is interpreted in various ways.

The classical approach to putting a human being at the center of consideration [9] (p. 3) comes from the idea given by Plato in his dialogue *Theaetetus*. This idea laid the foundation for understanding knowledge for the next nearly 2500 years, and it is still the source of the organization of the reflection. It has the form of a short definition (with a slight modification of the original sentence), *Dóksa alethés metá lógu*. The English translation by Waterfield is “true belief accompanied by a rational account” [12] (p. 115), usually shortened to the *justified true belief* [7] (p. 771). This is a combination of three key elements, belief, truth, and justification (the so-called *tripartite*), which “is a central philosophical claim [of knowledge] of the Western tradition since Plato” [13] (p. 43). The importance of the last element is emphasized by Davidson [14].

The condition of truth plays a special role in the presented definition of knowledge. Hestir has performed a careful study of how Plato uses this concept [15]. Plato is traditionally considered, along with Aristotle, to be the inventor of the correspondence theory of truth. Hestir describes and justifies, in his book, the metaphysical foundations of meaning and truth, noting at the outset a certain property of Plato’s approach to truth, which he calls “dual conception”. He reports it as follows: “So, on the one hand, Plato seems to think that truth simply *is* being—that is, truth has an ontological dimension. But by predicating truth of those statements, thoughts, and judgments that correctly assert or deny something about the world, he also seems to think that truth is a property of those privileged statements, thoughts, and judgments that get things about the world” [15] (p. 5). The above-mentioned observation of Hestir, which has a preliminary character here, is the subject of further careful analysis in the book, which remains beyond the scope of our interest. However, it provides a justification that also allows language to be introduced as the universal basis for the existence and analysis of truth and, subsequently, the existence and analysis of knowledge. Such an approach has far-reaching consequences—for example, that language

enables the transfer (and extension) of the plane of analysis to the level of a broader social analysis and also leads to the reconstruction of the idea of truth.

The hidden source of such an approach, however, is also hidden in the already mentioned connection of knowledge with the subject. This assumption also results from the use of the notion of *dóksa* (δόξα). Preus translates it directly as opinion or expectation [16], which is in line with common practice, e.g., Waterfield translates it as “belief”, Reimer as “Vorstellung” [17], Brisson as “l’opinion” [18]. It is a commonly accepted understanding of this concept, referring to a human being as the disposer of this type of knowledge, e.g., Audi [3], which also appeared in Chisholm’s approach. However, in Plato, one can already find a clear and deep conviction that it is impossible to separate man from his social environment. This conviction also appears anecdotally in the context of the definition of knowledge by *Theaetetus*. He claimed to have heard this definition from someone whom he could no longer remember, and, moreover, he forgot about this definition. With this parable, Plato reminds us of the context in which opinions spread and die. This context is the other person. This kind of approach opens up a direct social approach that would be a contemporary development of Plato’s suggestions and would consist of shifting the recognition of knowledge as a result of a subjective (individual) disposition towards a social (collective) disposition, which includes it in a completely different set of circumstances.

One of the consequences of the social approach is the introduction of a historical perspective, and thus the possibility of analyzing the phenomenon of knowledge as a certain, time-varying interpretation. Therefore, it is possible to indicate certain events that turn out to be important from the point of view of this interpretation while significantly reconstructing its elements, i.e., the assumptions on which the original definition of Plato is based. This reconstruction concerns two conditions, i.e., the condition of the truthfulness of knowledge and the direct connection of knowledge with a human being. The following events of this type can be pointed out:

1. The most important event is a change in the attitude towards creating models of the world, i.e., representing the world with the help of constructions considered to be correct. At the end of the nineteenth century, the Hilbert and Peano axiomatic systems appeared. These are free-form constructions, the correctness of which is based solely on internal consistency. Compliance with experience is not only unnecessary, but principally discarded at the stage of theory development. The principle of correspondence, one of the fundamental and most widely used ideas of truth, ceases to apply, e.g., refs. [19–22]. According to the idea adopted here, the aforementioned process occurred as fundamental changes in mathematics and physics in the nineteenth century, e.g., [23,24] (1906/1907), and it further developed as some fundamental means of treating knowledge “as a generalized capacity to act and as a model for reality” [25] (p. 22) and a separate issue [25–28]. The pragmatic approach takes on a special character within the philosophy of science, where it appears as a discussion on the justification of scientific judgments. Although the philosophy of science is as old as philosophy itself, e.g., [29,30], in the twentieth century, it became the “distinct yet central part of philosophy” [31] (p. xxi), formulating fundamental questions about the justification of scientific reasoning, e.g., ref. [32]. It led later to the “historical turn” in the understanding of science as a product of current historical and social circumstances in the ideas of the aforementioned Kuhn, Lakatos, and Feyerabend [33] (p. 21).
2. Popper draws consequences from these experiences, formulating a weak, negative version of the correctness of knowledge based on the idea of falsification as the only reasonable certainty available to science. Such a consideration of all existing, unfalsified, and binding theories *de facto* in a situation of uncertainty can be understood as a withdrawal from the pursuit of achieving truth by them [34].
3. The third event is based on the so-called Gettier problem, which shows an error in Plato’s definition of knowledge [35]. For a broad discussion of Plato’s views on knowledge, one can refer to Cornfold [36]. The problem is also discussed, among

others, by Sober, Pritchard, Russell, Moser, Shope, and Borges et al. [9,23,37–40]. This error, which Gettier justifies with two examples, proves that Plato (through the mouth of *Theaetetus*) defines knowledge incorrectly. In particular, he presents two situations in which the fulfillment of the condition of having a justified and true belief does not mean having knowledge. This is an important case as it introduces distrust into the so-far transparent area, which is the meeting of man and his epistemic structures with the world. Gettier shows that it is not an easy meeting, as Russell summarizes in the following statement: “Every case of knowledge is a case of true belief, but not vice versa” [23]. Russell seems to prejudge knowledge to be necessarily true. The problem, however, is that *dóksa* (belief, opinion, expectation) turns out to be an immanent component of knowledge available to the human. This kind of conviction crept into science in the twentieth century, leading to point 4.

4. In the twentieth century, many ideas emerged, the common feature of which was the link between knowledge and the social context. Adolf and Stehr associate their sources with researchers such as Max Weber, Max Scheler, Karol Marks, Karl Mannheim, Georg Simmel, and Emil Durkheim [25], whose insights were complemented and continued by researchers such as Steve Woolgar, Bruno Latour [41], Karin Knorr-Cetina [42], or David Bloor, one of the creators of the so-called strong programme in the field of the sociology of scientific knowledge [43]. These ideas also include the so-called social constructivism in various forms, e.g., Peter Berger and Thomas Luckman [44], Michel Foucault [45,46], and Jean-François Lyotard [47]. A more strictly epistemological approach is represented by, e.g., Thomas Kuhn [48], Paul Feyerabend [49], and Imre Lakatos [50]. One should also mention the precursor of many of the aforementioned reflections, Ludwik Fleck [51]. The aforementioned reflections are based on the variously interpreted assumption that knowledge is deeply determined by the social context, which excludes its objectivity, mandatory character, etc. In this situation, its unequivocally true character is also undermined.
5. The pragmatic approach also appears as an articulation of the role of social conditions, determining both knowledge and the procedures for its acquisition, scientific or otherwise. Such a social context becomes not only important but even decisive, as indicated above. The pragmatic approach to knowledge materializes through the following three main articulations: first, as a political or/and economical project, the foundation of economics, the society organization base, etc. [52–55]; second, as a subject of management where knowledge can be treated as an organizational asset [56,57], and, third, where knowledge is understood as the utilitarian goal of the practical activity of an individual [58]. This approach made it possible to formulate great political projects in the second half of the twentieth century, and it also became the basis for reforming entirely practical management strategies [59].
6. One of the most important variants of the pragmatic concern of knowledge developed in the field of technology. Knowledge is treated as a separate asset that appears in such contexts as the Internet (World Wide Web) or artificial intelligence. Both provide either more abstract and theoretical approaches [28,60–62] or are strictly related to practical solutions, e.g., [63,64]. The latter approach has a long history in the development of knowledge representation, e.g., [65–68], described widely, e.g., [69,70]. The latest development of knowledge representation in digital technology, namely artificial intelligence, is based on a nonsymbolic, distributed manner [70]. The different possibilities of knowledge understanding in the context of artificial intelligence come with the idea of the holder of knowledge, which is an artificial cognitive system. Such a situation causes a complete transformation of the means of understanding the phenomenon of knowledge concerning Plato’s definition, including its necessary truthfulness (*alethés*). This problem is taken up, e.g., by Burgin, who proposes an introduction of the concept of the artificial observer, who is the only reference for knowledge [28]. The Internet (World Wide Web), as a source of knowledge, could be considered a prototype for the other massive data sources, currently recognized as a

new and very promising knowledge repository accessible through several techniques known as mining, including data mining or, in particular, text mining [71–73].

The very generally presented events of the evolution of knowledge understanding lead to the observation that the classical definition of knowledge is fundamentally insufficient due to the following two important shifts: first, the dismantling of the state of certainty as to the ability to maintain the relationship of truth between knowledge and the world (the correspondence idea), and, second, the removal of man as a necessary instance in the description of the existence of knowledge. This process is supported by the reification of knowledge as a utilitarian good, possessing certain value and possible to evaluate or apply in context. On the other hand, the same process leads to the autonomization of knowledge, which becomes perceived as a separate and independent entity.

According to the mentioned shifts, the theory described here is based on two observations that lead to a further hypothesis. First, knowledge is treated as a separate and autonomous entity, and, second, it does not need not only the human presence as a necessary condition to understand it, but also that of any of its other disposers (knowers).

The text refers to the theory of knowledge in two versions, weak and strong. The first is a specific case of general knowledge theory. Its specificity refers to the propositional character of the knowledge it concerns. It also has an initial nature in the sense that it was chronologically the first means of theorizing knowledge undertaken by the author. It also seems a good simplification through which to understand the general model. This article is also a summary of previous attempts at this theorizing, e.g., [74,75].

The paper consists of three main parts, supplemented by methodological notes and conclusions. The first part, the Introduction, presents the premises thanks to which knowledge can be considered a linguistic and social phenomenon; therefore, it can be subject to historical changes and has a pragmatic character. The premises for these features can already be found in the definition of Plato, which builds a certain relationship between a purely epistemological, speculative, and pragmatic social approach. However, the aforementioned changes introduce two significant corrections to this definition, i.e., they remove the requirement of truthfulness in the correspondence sense and deprive the human being of the exclusive possession of knowledge. These two adjustments make it possible to construct the discursive space as an area of knowledge retention. This construction is discussed in Section 2. The third section describes the elements that build this structure—in particular, the phenomenon of discourse and the idea of space and its extrapolation, i.e., manifold. This description is supplemented by a description of the ontological assumptions allowing for the generalization of this theory.

2. Theory of Discursive Space

The starting point of the theory presented here, and also the place that implements the so-called weak version, is the language procedures that appear in the discourse. These procedures ultimately come down to the text as the basic knowledge environment. The text and any other kind of utterance remain in subtle and deeply analyzed relations of a classical character (e.g., de Saussure, Austin). For this analysis, the text as a material and permanent form is taken into consideration. The participation in the processes of gathering and articulating knowledge is fundamental, e.g., [76–79]. This is significantly affected by the development of methodologically disciplined scientific knowledge, as well as the development of digital means of communication (ICT). In particular, the Internet (the World Wide Web) can be considered a massive collection of texts that can be used to create language models, which is implemented in NLP technologies, for example [80–82].

The cognitive construction that allows one to theorize the language environment as a domain of knowledge is a discourse that realizes the process of the retention/articulation of knowledge. This process exceeds the strict level of language understood as a communication medium. According to the idea presented by Michel Foucault in different places, e.g., [45,46], and concretized in a lecture in 1970 [83], discourse is an entity that goes beyond language. It achieves its sovereign living dimension with a strictly semantic character.

The literature on discourse as a representation of knowledge is extensive and, in principle, develops the idea of Foucault, e.g., [84–87]. For a detailed discussion of the discourse phenomenon, one can refer to the Discussion.

This state of discourse allows us to regard it as an autonomous entity that allows the use of abstract analytical constructions. This step is also supported by the introduction of the ontological interpretation based on the idea of Armstrong/Wittgenstein. The details are described in the Discussion section.

Proposition 1. *To describe and analyze discourse(s) in the theory of knowledge presented here, the construction of a dynamical space from the area of physics is introduced [88,89]. This space is based on an unlimited set of many dimensions in which discourse (discourses) moves. These dimensions are qualitative and are the result of the substantive (qualitative, semantic) analysis of a given discourse related to the subject, which is examined in terms of the knowledge about it. The space constructed in this way is called a discursive space. As a rule, many discourses may appear in a discursive space as a means of retaining/articulating knowledge on a given topic. For discursive knowledge, the category of truth is irrelevant. Each phenomenon may have many, also contradictory, opinions and analyses. In an example of the analysis of discursive knowledge, the subject of study was the Internet (World Wide Web), which was presented as the state of 19 variables of various types observed over time [74,90]. This process has been visualized as a plot in the parallel coordinate system [91]. The subject of similar research can be any phenomenon that is the subject of observation and knowledge, e.g., digital transformation [92].*

Definition 1. *The definition of discursive space is as follows: discursive space is an n -dimensional dynamical space in which discourses, which are autonomous instances of knowledge, run in time trajectories describing the real state of knowledge in the subject that they concern.*

The further development of the theory presented here is based on the refinement and substantiation of the concept of discourse, given by Foucault, by defining the relationships that connect discourse with the world. These relationships demand an ontological interpretation of this world. In this way, on one hand, the basis for describing how discourses exist is built, and, on the other, a means of generalizing the existence of knowledge that goes beyond the language domain is introduced.

Proposition 2. *Firstly, the relationship of supervenience is introduced as a relationship connecting discourses and the world, and, secondly, the network of facts (affairs) is adopted as the mode of existence of this world. Armstrong describes the relationship of supervenience [93]. It is based on circular mutual dependence realized by bottom-up and top-down causation. Armstrong builds it based on the ontological interpretation, which is the basis of the second part of this proposition. The idea for this interpretation comes from Wittgenstein [94], who, in this context, referred to Russell's concept [95] (1911), although it can be assumed that it was rather the result of their cooperation [96]. It introduces elementary, atomic parts of the world, the so-called particulars, whose relationships and properties shape the world, observed in the form of states of affairs (facts). The ontological interpretation type presented was adopted for two main reasons. Firstly, it is maximally simple, which means that it requires a small number of assumptions introducing potential problems later in the analysis, and, secondly, it is based on the idea of a network of relations.*

The assumptions adopted in Proposition 2 have the following three key effects: first, for obvious reasons, the states of the world are temporary. The time variable has been extensively described by Armstrong and has a fundamental impact on the theory of knowledge presented here, e.g., [93] (p. 5). Discourses, as the articulation/retention of knowledge change over time, just as beliefs on a given topic change over time. Probably the most emphatic and fruitful interpretation of the temporality of knowledge in a particularly sensitive area, which is science, was presented by T. Kuhn [48]. Therefore, it should be assumed that the relationship of supervenience develops over time, which seems natural in the context of knowledge.

Second, discourse (discourses), thanks to the relationship of supervenience, inherits the uncontroversial property of the world, which is its complexity. The assumption of the existence of a network of relations between particulars in the concept of the world as facts (states of affairs) supports and justifies this property. The introduction of the idea of complexity opens up a broad research perspective and, in particular, justifies the use of a dynamical space model. Thirdly, and crucial for expanding the theory of knowledge based on discourse (discourses), the idea of the world of facts (states of affairs) is holistic, i.e., it covers all phenomena, including the phenomena of discourse and knowledge themselves.

To embrace such a whole, a construction of manifold is introduced, which, locally, for a selected discourse at a given time point, concretizes to a single discursive space by analogy to the formal definition of the manifold. This type of understanding of manifold was taken directly from Bernhard Riemann [97] (1854), whose idea is described by Jost in the following manner: “Riemann distinguishes between the qualitative manifold structure and the quantitative measurement structure, that is, between the topological and the metric structure of space [. . .]. The manifold structure refers only to the neighborhood structure and to the relative positions, i.e., to the qualitative aspects. [. . .] For his concept of a manifold, Riemann assumes that space can be locally described by coordinates, i.e., that it can be locally related to a (Cartesian) number space.” [97] (p. 44).

In our case, the specific set of dimensions that is characteristic of the particular discursive space is analogous to the Cartesian space and forms the local space devoted to the particular knowledge realized by the particular discourse or discourses.

Definition 2. *The definition of knowledge in the version limited to the discourse (weak) is as follows: knowledge is a set of discourses contained in an n -dimensional manifold that can be interpreted locally as a discursive space.*

The strong version of the theory of knowledge based on the idea of discursive space consists of further extrapolation based on the assumptions presented in Proposition 2. Both man and discourse belong to the world of relations and properties of particulars described by Armstrong. The world of facts (states of affairs) is holistic, so there is no reason to treat man or discourse as entities in any way distinguished from others. This means that one must allow for the relationship of supervenience in other situations that are analogous to the existence of discourse.

This reasoning gives the basis for the existence of forms of knowledge analogous to discourse, but not limited to language or any other kind of materialization. It allows us to replace the entity, which is a discourse that implements the process of the retention/articulation of knowledge through language, with a more general entity that can cover all other realizations of knowledge based on other systems of the meaning transfer. This reasoning is empirically confirmed. Such implementations are noticed in various places around the world, e.g., in biological processes that can be interpreted as computational processes, e.g., [98], and, above all, in the area of digital technology, e.g., in the field of artificial cognitive systems [28,99] or massive computational data, e.g., [100]. In all these examples, one can observe non-human and non-language knowledge.

Proposition 3. *To generalize the concept of discourse to all situations in which knowledge may appear, the concept of the gnoseme is introduced (gnoseme coming from Greek gnosis, which means knowledge). Gnosemes are complex structures of knowledge that cover parts of their entirety. The volume of such a part, e.g., the amount of content measured indirectly, e.g., by the length of the text, the DNA sequence, the amount of energy contained in the bonds connecting the atoms of the chemical molecule, the number of bits, etc., is not strictly defined uniformly and results directly from the semantical context. The basic feature of a gnoseme is its delimitation character. The subject of this delimitation varies depending on the means of knowledge articulation.*

The properties of the gnoseme can also potentially be deduced from the properties of the discourse, which Michel Foucault gave in a specific way, i.e., defining the principles

of the examination of discourse. Discourse is a special case of gnoseme. The emerging question about the dimension of the gnoseme opens up a separate problem. Due to the introduced generalization, the discursive space can be considered a special case of the knowledge space.

Definition 3. *The generalized (strong) version of the knowledge space definition is as follows: the knowledge space is an n -dimensional dynamic space in which gnosemes, which are autonomous instances of knowledge, run the trajectories in time describing the real state of knowledge in the form they concern.*

The general ontological interpretation already introduced allows the construction of a universal, generalized concept of knowledge as a universal system covering all processes in which knowledge appears, regardless of its physical implementation. In this concept, knowledge is a very large (practically infinite) set of states of gnosemes whose trajectories run in a manifold and concretize in local knowledge spaces. Gnosemes are structures of knowledge that remain in a supervenience relationship with areas of the world that are relevant for the knowledge contained in these gnosemes. At the same time, they remain separate parts of the same world and, in this sense, belong to it analogically to discourses. A scheme of this kind of dependence and its broader, but initial, description can be found in [75].

Definition 4. *A generalized (strong) definition of knowledge is as follows: knowledge is a set of states of gnosemes in an n -dimensional manifold that can be interpreted locally as a knowledge space.*

For the presented theory, information plays a secondary role. It is a theoretical construction that, at the speculative level, connects each space of knowledge with a part of the world to which this space refers as to knowledge about it. In this sense, information is a kind of interface (gateway) that enables, identifies, and fortifies contact between these areas.

At the empirical level, gnosemes enter into a relationship of supervenience with the world of facts (states of affairs). Information at this level is generated as a result of the process of supervenience, which is dynamic, i.e., it changes over time. From this point of view, information is a kind of relationship that, each time, has a specific character depending on the circumstances and current state. Such a circumstance may include language as the basis for articulating knowledge through discourse. In this case, the information has a linguistic character (e.g., textual).

Information as a relation is observed in time as a translation (shift), and thus as a kind of replacement of one by the other through the supervenience relation, i.e., several facts (state of affairs), by the gnosemes. The concretization process that runs by gradually revealing differences (in the supervenience relation) and immediately replacing them (by gnosemes) fulfills the characteristics of the following known definition of information provided by Bateson: “any difference which makes a difference in some later event” [101]. Because gnosemes do not have an established form of materialization, i.e., they allow any kind of process of realizing supervenience, this is also the only condition of the articulation/retention of knowledge, which makes knowledge a universal process.

The last remark concerns the relativistic nature of knowledge. A discursive space does not exist “objectively”; it is not an ideal entity in the Platonic sense. The discourses themselves are used to construct the discursive space, which in turn is used to describe them, e.g., [74]. There is a subtle process of mutual formation; on the one hand, discourses are shaped by the discursive space, and on the other, the discursive space is shaped by its discourses. These dynamics, although based on a different interpretation of discourse, are well illustrated in the literature devoted to discourse [84,86,102,103]. It is also the fundamental assumption of Foucault’s idea regarding the power (e.g., political) kept by discourse [83]. Knowledge, which is the subject of articulation/retention in the discourse, is therefore relativistic in the sense that it depends on the frame of reference chosen for its analysis, i.e., the discursive space. This frame of reference, in turn, is created from the

observed state of discourses, which can be studied empirically by analyzing language occurrences (the text). Relativistic generalization for any kind of knowledge, not just discursive, seems possible by analogy but requires a separate study.

3. Discussion of the Theory

This part contains descriptions of the most important structures used in the theory of knowledge to create a model of knowledge in a weak and strong version, including discourse, dynamical space, and manifold. Next, we will describe the ontological interpretation applied here, which is the basis for the use of these structures. Finally, the places of reasoning that need further development will be recalled. These are primarily the following: the issue of the construction of the dimensions of the knowledge space, the issue of the dimension in the knowledge space (its metrics), as well as the generalization of the relativistic nature of the theory.

There are two main concepts of discourse, which are as follows: the first, older, is based on the concept of the universe of discourse and is intentionally quantitative; the second one, contemporary, of a qualitative nature, defines discourse as a social and cultural phenomenon. The first is based on the concept proposed by de Morgan and developed and described by Boole [104]. Boole defines it as follows: “The office of any name or descriptive term employed under the limitations supposed is not to raise in the mind the conception of all the beings or objects to which that name or description is applicable, but only of those which exist within the supposed universe of discourse” [104] (p. 42).

The Cambridge Dictionary of Philosophy gives the following definition: “universe of discourse, the usually limited class of individuals under discussion, whose existence is presupposed by the discussants, and which in some sense constitutes the ultimate subject matter of the discussion. Once the universe of discourse has been established, expressions such as ‘every object’ and ‘some object’ refer respectively to every object or some object in the universe of discourse” [105] (p. 941). The universe of discourse is a structure introduced by Boole to reconcile formal logic and natural language. Therefore, this construction is invented to fulfill the role of one of the foundations of formal reasoning with a mathematical character.

The computational discourse idea, which aims to create automatic discourse analysis models, can be considered a contemporary continuation of Boole’s idea of seeking to formalize discourse. These models are based on the search for relationships between text segments, which, moreover, turn out to be very complex [106]. One of the first discourse parsing systems was the Transformations and Discourse Analysis Project (TDAP), implemented between 1958 and 1959 by Zelig Harris [107] (p. 10), who created the concept of “discourse analysis”, introduced in 1952. Jurafsky and Martin write that “much of the fundamental work in computational approaches to discourse was performed in the late 70’s” [107] (p. 732). Computational discourse analysis is a variant of natural language analysis (NLP), which, however, is based on a simplified interpretation of discourse. Jurafsky and Martin define it only as “collocated, structured, coherent groups of sentences” [107] (p. 693).

Boole did not doubt that the discourse that he was trying to formalize had social roots. The starting point for Zelig Harris’ reasoning was also similar, which was as follows: “the examination of language beyond the level of the sentence and the relationship between linguistic and non-linguistic behavior” [108] (p. 2). Paltridge and Fairclough then emphasized the dual nature of research approaches with respect to discourse and stated the following: “I see discourse analysis as ‘oscillating’ between a focus on specific texts and a focus on what I call the ‘order of discourse’, the relatively durable social structuring of language which is itself one element of the relatively durable structuring and networking of social practices” [103] (p. 3). In this case, the social context is understood as the implementation of social constructivism [87,108,109] and transfers the main burden of reflection to the field of knowledge, e.g., [59,84–87,102].

Foucault remains the main source of inspiration in this area [87,103] (pp. 2, 13). He describes the discourse rigorously, although it is a qualitative description. In its finished form, it was presented in a lecture at the Sorbonne in 1970 [83]. This description forms the basis of the knowledge theory described here. Foucault characterizes discourse indirectly, but by formulating the following four principles of its analysis: reversal, discontinuity, specificity, and exteriority. The first considers classical philosophical issues, such as the author, the discipline, and the will to truth as “the negative action of a cutting-up and a rarefaction of discourse” [110] (p. 67), which is the claim for the general change in approach. The second, discontinuity, describes discourse as “discontinuous practices, which cross each other” (*ibidem*). The third rule underlines the pragmatic and teleological character of discourse that establishes its means of existence, which make it “a violence which we do to things” (*ibidem*). The fourth rule, exteriority, reminds us that the method is peculiar and elusive and “go towards its external conditions of possibility” (*ibidem*). These rules direct one to consider discourse as a complex phenomenon and then lead to a formal model, such as dynamical space [74,75].

Space, as a geometrical (quantitative) structure, is an entity that also appears in the area of qualitative research. At least two examples of this use can be cited, including an idea of the conceptual spaces by Gärdenfors [111–113] and an idea of complexity as a suitable tool for social analysis [114]. The first formalizes knowledge as cognitive states (“mental representations”), which can be represented as geometric forms in space with appropriately defined dimensions [113] (p. 8). The second allows the world to be presented as constructed narratives that have the shape of trends. These trends can then be mapped as a complex system of trajectories [114] (p. 154). Both concepts try to combine a qualitative and quantitative approach, which, in practice, boils down to the problem of space dimensions, but none of them refer directly to the construction of dynamical space, which is the basis of the theory of knowledge presented in this paper.

The concept of a dynamical system has its strict physical interpretation proposed by Poincaré, who combined a qualitative and quantitative approach with a geometric concept [115] (p. xviii). This interpretation was developed in the classical work of Birkhoff, who is considered the creator of this concept [116] (1927). The idea of dynamical space has a separate history [88] but is directly related to the concept of dynamic systems. Nolte describes it as a unifying concept in the following manner: “by taking a geometric view of physics, concentrating on the time evolution of physical systems as trajectories through abstract spaces, these topics share a common and simple mathematical language with which any student can gain a unified physical intuition” [89] (p. v). Due to its universality, dynamic space can have many variants, including configuration space, state space, phase space, and spacetime [89]. The idea of dynamical space seems to be an appropriate tool for describing the trajectories of discourses and gnosemes in multidimensional spaces. There is also a good means to visualize this space based on a parallel coordinate system [91].

The author has attempted to apply the theoretical assumptions regarding space to the concept/phenomenon of the Internet [74]. It was based on a synthetic diagram of the development of the Internet, created and published by the author, presenting an analysis of this phenomenon. It consisted of three fundamental issues, technological, economic, and social, together with humanistic. This analysis revealed some regularities and identified some major discursive trends, which were defined by the following design: “Internet as ...”. These trends were as follows: Internet as an ethical space, Internet as a being, Internet as a market, Internet as a new social form, Internet as an economic space, Internet as a community, Internet as a social network and other types of networks, Internet as technology, Internet as an area of automated services, Internet as a field of definition of the subject, or human, Internet as a threat, Internet as a future and Internet as art. Such a set allows the creation of arbitrarily chosen terms that serve as discursive dimensions, which are as follows: political hierarchy—individual vs. state; state hierarchy—peace vs. military; political attitude I—pro-state vs. anti-state; political attitude II—anarchism vs. opportunism; political attitude III—egalitarianism vs. stratification; economy—affirmation

vs. criticism; accessibility—freemium vs. pricing; network as a political project—freedom vs. slavery; human situation—individual vs. community; technology as a dominant—cause vs. effect; network as a model—selfless knowledge vs. practical tool; the future—optimistic promise vs. danger; social attitude—opportunism vs. rebellion; development—novelty vs. continuation; attitude—usability vs. moral obligation; status—openness vs. closeness; law—regulation vs. deregulation. Next, the parallel coordinate system was created on the basis of assumed dimensions. The exact values of the various states of the system of the Internet were estimated based on an analysis of the literature on the subject. These values were assigned to the chosen historical states of the Internet following the dimensions adopted. In this way, the dynamic system that was the Internet was described by the appropriate states of phase space.

The extension of the idea of space is the construction of a manifold, which was presented in 1854 by Bernhard Riemann [97]. As Torette emphasizes, Riemann “must clarify the general concept of which space is just a particular instance” [117] (p. 83) and introduce a “broader genus” for considerations about space, especially in the context of the appearance of the so-called non-Euclidean geometry in the first half of the nineteenth century. Torretti emphasizes that Riemann did not understand manifold as formally as modern topology. Husserl also understood it in a more general way, which is as follows: “a manifold is the ontological form of the (highly complex) state of affairs represented by a given theory (which is a set of propositions, or their conjunction, a complex proposition)” [118] (p. 110). Lee gives the following descriptive definition of the formalized version of the manifold in his book: “The underlying idea is that manifolds are like curves and surfaces, except, perhaps, that they might be of higher dimension. Every manifold comes with a specific non-negative integer called its dimension, which is, roughly speaking, the number of independent numbers (or “parameters”) needed to specify a point.” [119] (p. 1). Other formal definitions have been provided, e.g., Kirby and Siebenmann or Tu [120,121] (p. 7, 48).

This theory uses a structure such as discourse in the weak version and gnoseme in the strong version. They are represented by their trajectories in dynamical space. To cover more complex areas of knowledge retention and articulation, this space must be generalized to the level of the manifold. This complex model is based on an ontological concept that allows one to define the morphology of the world and the type of relationship that connects discourse/gnoseme with the world and is a de facto direct relation describing the emergence of knowledge. This relationship is supervenience, which is defined as follows: “We shall say that entity Q supervenes upon entity P if and only if it is impossible that P should exist and Q not exist, where P is possible” [93] (p. 11). The only condition for the existence of supervenience is existential, which means that knowledge based on this relationship can be present everywhere and its ontological basis does not matter, which fundamentally changes the idea of knowledge compared to the Platonic definition, giving it a pragmatic and general character. The relationship of supervenience does not prejudge, in particular, its dynamics, direction, quality, etc., which support the property of universality of the presented theory of knowledge. The relationship of supervenience is time-dependent, i.e., it develops over time.

To maintain the universality of the presented description of knowledge, the following ontological interpretation was adopted, based on the idea of the world of facts (state of affairs): “The general structure of states of affairs will be argued to be this. A state of affairs exists if and only if a particular (at a later point to be dubbed a thin particular) has a property or, instead, a relation holds between two or more particulars. Each state of affairs, and each constituent of each state of affairs, meaning by their constituents the particulars, properties, relations, and, in the case of higher-order states of affairs, lower-order states of affairs, is a contingent existent. The properties and the relations are universals, not particulars. The relations are all external relations.” [93] (p. 1).

This idea was taken from Wittgenstein [94], who, however, was probably inspired by the concept of Russell, his teacher and mentor. Russell is the author of a very interesting and relevant concept of “individuals” or “simples”. He writes, “I believe there are simple

beings in the universe, and that these beings have relations in virtue of which complex beings are composed.” [95] (p. 94). Russell’s concept has evolved into an increasingly advanced form [96], leading to the following key conclusion about knowledge: “We could distinguish in the world a stuff (to use William James’s word) and a structure. The stuff would consist of all the simples denoted by names, while the structure would depend on relations and qualities for which our minimum vocabulary would have words. This conception can be applied without assuming that there is anything absolutely simple.” [23] (p. 276).

The idea of “relations and qualities” adopted by Armstrong is the attitude of the presence of knowledge in the world according to the theory presented here. This idea has a holistic character, i.e., it is extremely general; it is also systemic, and, in particular, it does not distinguish any quality features. Based on relationships, it can also be the basis for using the idea of complexity, which is described in more detail in [75].

The following issues require further development in the presented theory: the issue of the construction of the dimensions of the knowledge space, the issue of the dimension in the knowledge space (its metrics), as well as the generalization of the relativistic nature of the theory. The first issue has already arisen [74]; it also has its precedents in the discussed concepts of Gärdenfors and Byrne and Callaghan. In this context, attention should be paid to the extremely promising opportunity of creating arbitrary semantic dimensions using the latest NLP technologies, e.g., [80–82,122]. Other issues need to be elaborated on.

4. Methodological Considerations

The theory of knowledge described here is primarily speculative but also refers to experimental arguments. This theory also uses well-described constructions based on mathematics and physics, such as dynamical space and manifold. Because of the latter two circumstances, the existence of a formalized version of this theory is highly probable and even necessary, although it is not undertaken in this text, which plays the role of a descriptive introduction to such formalization. The reasoning methodology used in speculation is based on deductive logic.

It is worth recalling here the very well-developed approach to knowledge description and analysis, which is epistemic logic [123–125], whose modern conception was introduced by Hintikka [126] and which has also been expanded into the idea of dynamical epistemic logic [127]. Epistemic logic offers a fully formalized approach, which is also useful in computer science. According to the description by Rescher, it also provides fully understandable pragmatism and expediency. On the other hand, the following passage perfectly presents the absolute difference in approach compared to the one presented here. Rescher starts with the following reflection devoted to knowledge understanding: “we are dealing with the resources of intelligent beings (not necessarily members of *Homo sapiens*) operating substantially within the limits imposed by the realities of this world of ours. Accordingly, the ‘facts of life’ that reflect the cognitive situation of such beings and the conditions that define their situation in this world represent the ultimately factual (rather than purely theoretical) circumstances that a logic of knowledge as such will have to reflect. In particular, knowers have to be construed as finite beings with finite capacities, even though reality, nature, has an effectively infinite cognitive depth in point of detail, in that no matter how elaborate our characterizations of the real, there is always more to be said” [123] (p. 5).

As one can observe, the reasoning presented here is based on the opposite assumptions, which are as follows: the knower is presumed unnecessary and it is possible to overcome the limitation of the finitude condition, i.e., not to limit “facts of life” as subjects of knowledge. The second assumption results from the first, but also needs an appropriate model of reasoning, which is delivered by the special ontological interpretation and the idea of complexity.

A specific premise for formalization is also the fact that the presented theory is reversible, i.e., it is knowledge about knowledge. From this point of view, it is the reasoning

achieved from within the described system. In this sense, this theory implements the basic requirement of internal coherence, which refers to the well-established axiomatic approach of building formal systems proposed by Hilbert and Peano [21,128–130].

5. Conclusions

In the theory of knowledge presented here, we managed to present two versions of knowledge, weak and strong. The first has a narrower and particular character and can be treated as an initial idea. It is based on the analysis of discourse as a means of the articulation and retention of knowledge. This means of understanding discourse is common and has been theoretically described by Michel Foucault, whose concept is the basis of the presented theory. Discourse is a phenomenon with a specific ontological status and can be treated as a physical phenomenon that has its trajectory in dynamical space, i.e., the discursive space. Because discourse is also the articulation and retention of knowledge, these trajectories present changes in the state of knowledge in given dimensions, which are qualitative and are the result of the analysis of discourses in reality. Because discourse, on the one hand, is determined by these dimensions and, on the other, is also their source, it depends on the reference system (frame of reference), which is a set of adopted dimensions. In this sense, the knowledge represented by discourse is relativistic. To describe the wider scope of knowledge (all knowledge), very many discursive spaces are needed to create a higher-order structure (the discursive manifold).

The weak version of knowledge limited to discourse can be generalized to the level of any knowledge manifestation, regardless of how it is articulated/retained. In this version of the theory of knowledge, which is called strong, the role of discourses is played by structures called gnosemes, which are the articulation/retention of knowledge of any nature. Accordingly, they move in particular spaces of knowledge that make up the general manifold. Thanks to this generalization, it is possible to describe knowledge not necessarily associated with a specific disposer (e.g., a human) and not necessarily having a specific form or subject. This feature opens up the possibility of describing the knowledge that appears in biological, chemical, IT, etc., fundamentally non-human forms. One can also imagine knowledge as an extremely complex system that can be locally reduced to a known concretization, e.g., of the semantical type located in texts.

The described theory of discursive space is an initial proposition that opens three main paths for further research work. First, it would be extremely necessary to formalize it and express it in a formal language, consistent with the adopted interpretation provided by the chosen approach. The approaches that deserve attention are set theory and probability modeling. Second, the concept of discourse needs to be developed and implemented, which will enable the practical application of the theory based on experimental data. Discourse has an extensive literature and research tradition that should be evaluated in terms of the expectations connected with the theory. The third path concerns the development of the research material beyond the area of discourse and finding other articulations of knowledge, as well as searching for appropriate research tools for them, i.e., analogous to discourse.

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