Reception of externalized knowledge

A constructivistic model based on *Popper's* Three Worlds and *Searle's* Collective Intentionality

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Summary

We provide a model for the reception of knowledge from externalized information sources. The model is based on a cognitive understanding of information processing and draws up ideas of an exchange of information in communication processes. *Karl Popper's* three-world theory with its orientation on falsifiable scientific knowledge is extended by *John Searle's* concept of collective intentionality. This allows a consistent description of externalization and reception of knowledge including scientific knowledge as well as everyday knowledge.

1 Introduction

It is generally assumed that knowledge is in people's minds and that this knowledge can be communicated to other people as well as taken over by other people. There is also a general consensus that, in addition to direct communication, this can also be achieved by conveying knowledge through various forms of media presentation, e.g. books, and their reception. The prerequisite for this mediation is the externalization of knowledge by the knowledgeable person, e.g. by writing a book.[1]

For the consideration of such externalization and reception processes it seems reasonable to make the following distinction between types of knowledge:

- Knowledge in one's own head for various purposes, such as problem solving or acting.
- Knowledge in other people's minds.
- Knowledge in externalized form, e.g. in books.

In addition, knowledge can also be characterized by its relationship to various forms of reality. For this purpose, it is useful to distinguish between true or objective reality and constructed or actual reality (cf. Figure 1).

True reality is objective and transphenomenal, i.e. it exists independently of man and his perception. This reality is withdrawn from perception and can only be postulated ontologically - as just done. Examples are all natural phenomena that existed before human existence and will continue to exist in the future. *Actual reality* is the phenomenal world that affects the subject's experience and in which the subject can act - actual reality is the perceived true reality. Actual reality is not direct-

[1] With this depiction we draw on earlier work, cf.: Winfried Gödert: Information as a cognitive construction: a communication-theoretic model and consequences for information systems, in: Knowledge Organization 23.4 (1996), pp. 206–212.

ly given, but is the result of a cognitive construction based on sensory impressions. Knowledge about true reality is only knowledge about an actual reality generated by a process of the individual. Knowledge is the result of a construction of actual reality.

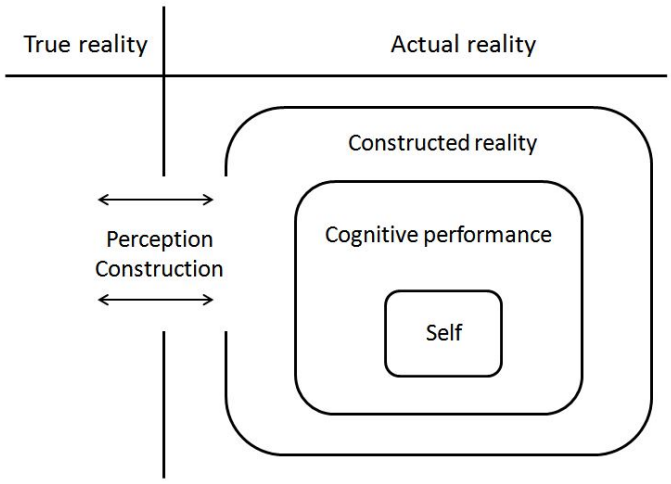

Figure 1: Self - True reality - Actual reality

Individual knowledge can be acquired - in analogy to the three different types of knowledge - in the following way:

- by one's own cognitive confrontation with true reality and its objects;
- by communicative exchange with other people;
- by the reception of knowledge sources that make externalized knowledge available.

As conclusive as a distinction between the types of knowledge and the forms of knowledge acquisition may be, the character of the process that makes objective reality a cognitive reality must remain unclear in this model. It will be necessary to learn more about the characteristics of true reality and actual reality. A possible starting point is the three-world theory of *Karl Popper*.

2 The Three-Worlds Theory by *Karl Popper*

Popper describes the complexity of true reality through the assumption of three worlds, which he, in short, characterizes as follows:[2]

World 1 The "physical world - the universe of physical objects".

World 2 The "world of mental states, including states of consciousness, mental dispositions and unconscious states".

World 3 The world of "the contents of thought and the products of the human mind".

For the consideration of the topics externalization of knowledge and reception of knowledge, the *world 3* deserves special attention.

> "By world 3 I mean the world of products of the human mind, such as narratives, explanatory myths, tools, scientific theories (true and false), scientific problems, social institutions and works of art. The objects of World 3 are created by ourselves, although they are not always the result of the planned work of individuals.

[2] Karl R. Popper/John C. Eccles: Das Ich und sein Gehirn, 3. Aufl., München Zürich 1984, p. 63. (Translation by authors).

> Many objects of world 3 exist in the form of material bodies and in some ways belong to both world 1 and world 3. Examples are sculptures, paintings and books of a scientific or literary nature. A book is a physical thing and therefore belongs to World 1; but what makes it a significant product of human thought is its content: what remains unchanged in the various editions and editions. This content belongs to world 3".[3]

Popper's three-world model requires connections or interactions between the worlds, which can generally be thought of as cognitive interactions, without the nature of these interactions having been treated particularly intensively by *Popper*.

> "Almost all of our conscious subjective knowledge (world 2 knowledge) depends on world 3."[4]

This includes the assumption of an inter-subjective objectivity that allows people other than the author to take up and develop their ideas. *Popper* introduces two thought experiments:

> "Experiment 1: All our machines and tools are destroyed, as is all our subjective knowledge including our subjective familiarity with the machines and tools and their use. But the libraries survive and our ability to learn from them. It is clear that our world can get going again after many adversities.
>
> Experiment 2: As before, machines and tools are destroyed as well as our subjective knowledge including our subjective familiarity with the machines and tools and their use. But this time all libraries are also destroyed, so our ability to learn from books becomes useless.
>
> If you think about these two experiments, then the reality, meaning and degree of independence of World 3 (as well as its effects on World 2 and 1) may become a little clearer to you. For in the second case, our civilization will not resurrect for thousands of years."[5]

The three-world model assigns knowledge to true reality. *Popper's* central theme, the explanation of the gain in knowledge in the natural sciences, makes the central importance of scientific theories in his *world 3* understandable. However, it is questionable whether the idea is suitable to serve as a model for all human dimensions of life, recognition and knowledge.[6] Reception processes for the acquisition of general knowledge cannot be subjected to the same truth claims and falsification principles as are possible for scientific facts and theories.

Presumably, only a small part of the externalized knowledge of the *world 3* is available as scientific theory, at the same time the nature of its writing is not necessarily of a formal nature. Texts are unstructured data whose understanding is strongly dependent on the context and the time of their creation. Our "ability to learn from books" may already have suffered so much at a given point in time that the mere retrieval of the data is not sufficient to initiate the process of understanding. Who dares today to use a technical description from the encyclopedia by *Diderot* and *d'Alembert* to reconstruct a mechanical device? It will not be because of the dimensions given there, but rather because there is frequently no idea of the purpose and function. And how long has it been since these texts were written?

Popper argues that the knowledge stored in *world 3* is available to humans for re-acquisition, but makes no statements about the nature of this re-acquisition, about the reception of knowledge. What exactly does *Popper* mean when he assumes that "our ability to learn from the knowledge stored in *world 3* will survive"?

Popper at best gives weak clues, but recognizes the difficulty of an explanation when he says:

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[3] Ibid, p.64

[4] Karl R. Popper: Objektive Erkenntnis : ein evolutionärer Entwurf, unter Mitarb. v. Ingeborg Fleischmann (Campe-Paperback), Hamburg 1993, p. 75. (Translation by authors).

[5] Popper: Objektive Erkenntnis (as ref. 4), p. 111. (Translation by authors).

[6] Cf. also: Lars Albinus: Can science cope with more than one world? : a cross-reading of Habermas, Popper, and Searle, in: Journal for General Philosophy of Science 44.1 (2013), pp. 3-20.

> "[...] that it is easier to understand how we make world 3 objects than how we grasp, comprehend or 'look' at them."[7]

His model for understanding *world 3* objects is problem-centered. It follows the change of trial and error or hypothesis formation and error elimination, which is based on the falsification principle, and thus focuses on the searching and researching activity in the cognitive process. In his well-known uncomplicated language *Popper* calls his model the "spotlight theory" of insight gain and compares it with the "bucket theory".[8]

He adopts the active and evolutionary schema of trial and error for cognitive processes, e.g. learning, perception and action:

> "On the counterpart (meant is the 'bucket theory', author's note) I establish the theory that nothing is 'given' to us: that already our sense organs are active adaptations, the result of mutations, thus of precursors of hypotheses; and that all hypotheses are active adaptation attempts. We are active, creative, inventive, even if our inventions are controlled by natural selection. So the stimulus-response scheme is replaced by a mutation (=new action)-selection scheme.[9]

In the sense of this point of view, learning from *world-3*-objects becomes a creative process:

> "In my opinion, we should understand the grasping or understanding of an object of World 3 as an active process. We must explain it as a doing, as a recreation of this object."[10]

Popper leaves the way or method of this "doing" or "re-creating" open, but it must be in our actual focus if we are interested in the possibilities of externalizing and receiving knowledge. There is a lack of a description of the interaction between *world 2* and *world 3*, of a model for the acquisition or exchange of knowledge elements.

We will present an information externalization and reception model based on communication processes with the possibility of feedback and verification. This model describes how cognitive processes can access objects of an outside world and construct actual reality for them. Their results can then be interpreted as knowledge. The acquisition of knowledge is a process connected with an individual cognitive achievement. In short, knowledge is created through a cognitive process that is based on a consciously experienced processing of information.

3 A Constructivistic Model of Externalization and Reception of Information

The relationship between information and knowledge is interpreted differently in the various professional contexts. Sometimes information is a prerequisite for the generation of knowledge, sometimes it is the result of its application. Sometimes knowledge presupposes information, sometimes information presupposes knowledge.

We regard information as a generic term for a basic entity of cognitive processes. This entity is processed into knowledge within the framework of constructions of cognitive reality. The communicative exchange of information, its medial fixation and reception as well as the storage and retrieval of information require actors. We describe the processing steps involved as cognitive processes.

Cognitive information processing serves in an elementary sense the purpose of life sustainment and the various requirements of an active life shaping. The acquired knowledge is initiated by inner

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[7] Popper/Eccles: Das Ich und sein Gehirn (as ref. 2), p. 70. (Translation by authors).
[8] Cf. Karl R. Popper: Kübelmodell und Scheinwerfermodell : zwei Theorien der Erkenntnis, in: Objektive Erkenntnis : ein evolutionärer Entwurf, Hamburg 1984, pp. 354-375. (Translation by authors).
[9] Karl R. Popper: Die beiden Grundprobleme der Erkenntnistheorie : aufgrund von Manuskripten aus den Jahren 1930 - 1933 (Die Einheit der Gesellschaftswissenschaften Bd. 18), Tübingen 1979, p. XXXII. (Translation by authors).
[10] Popper/Eccles: Das Ich und sein Gehirn (as ref. 2), p. 70. (Translation by authors).

stimulation or sensory perception coming from outside. Knowledge enables us to cope with a wide variety of tasks. The entirety of a person's knowledge is their world knowledge or actual reality knowledge.[11]

A more accurate characterization of knowledge can be stimulated by asking typical questions: Is knowledge only present if one has explained and presented something understood? Is it necessary to be able to do this again and again? Is this knowledge lost when one cannot do it anymore, but remembers that one could do it before? Is it sufficient for the existence of knowledge to have known something once and to know the consequences without, however, still being able to give the reasons? As a example for this case one can think of mathematical statements or physical laws, whose statements one knows, but whose proofs or derivations one can no longer give. Is the knowledge of a matter lost if or because one is no longer able to explain it? Does it make a difference whether it is scientific knowledge or everyday knowledge?

Knowledge is not static, but a dynamic state. It can be extended, corrected or discarded by new construction processes. Without further stimulation, forgetting can also occur. Whether knowledge is 'true' or 'false' cannot be deduced from the properties of the model, i.e. objectivity or truth are not inherent properties of knowledge.

Individual cognitive information processing always takes place within a framework; it is structurally determined.[12] Depending on the subject context, these structural determinations are referred to as context, paradigm, reference domains, background[13] or, more recently, framing. Figure 2 shows these framework constraints as reference domains using a simple example.

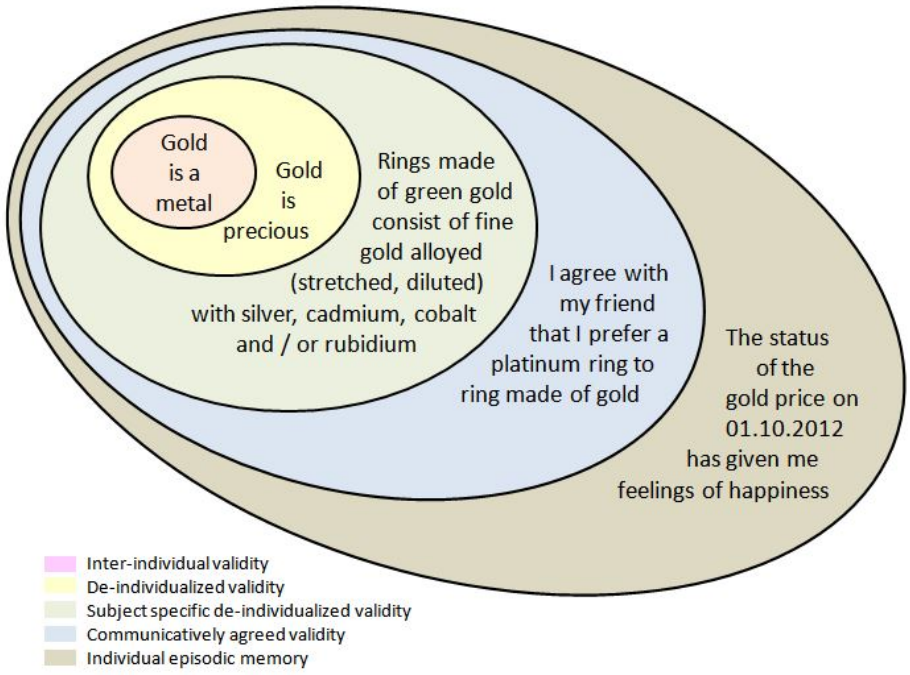

Figure 2: Reference domains of knowledge

[11] The model will be sketched here only briefly. A detailed description can be found in: Winfried Gödert/Klaus Lepsky: Informationelle Kompetenz : ein humanistischer Entwurf, Berlin 2019, especially chapter 2 and 3.
[12] Cf. Humberto R. Maturana/Francisco J. Varela: Der Baum der Erkenntnis : die biologischen Wurzeln menschlichen Erkennens (Fischer 17855), Frankfurt, M 2009, p. 105ff.
[13] The term ‚background' is used here in the sense developed by John Searle. Cf. John R. Searle: Die Konstruktion der gesellschaftlichen Wirklichkeit : zur Ontologie sozialer Tatsachen, 3rd ed., Berlin 2011, p. 135ff.

The first reference domain is the *Inter-individual validity*, often called objective. Statements within this reference range claim validity over and beyond the individual; examples are statements about objects in true reality and their properties, e.g. 'gold is a metal'.

The second reference domain, the *De-individualized validity*, is defined for each of us by the socialization of many years in school and instruction environments. The resulting structures are often regarded as so authoritative that their de-individualized character is superimposed by an impression of the inter-individual. The statement 'gold is valuable' depends on the value of gold in a society. This value is not an unchangeable characteristic of gold but a feature assigned by conventions within society that can change.

The reference area of *Subject-specific de-individualized validity* refers to a professional or subject-specific specialization in contrast to general socialization. The statement "rings made of green gold consist of fine gold alloyed (stretched, diluted) with silver, cadmium, cobalt and / or rubidium" claims validity within the professional reference domain of the goldsmith's craft.

The fourth reference domain, the *Communicatively agreed validity*, emerges from the diverse social structures of living together in societies. The agreement on validity includes a restriction of validity to communication participants, e.g. family, association, working world. The statement: I agree with my friend that I prefer a platinum ring to a gold ring' claims validity for only two individuals.

The fifth reference domain, *Individual episodic memory*, addresses knowledge that is not shared or cannot be shared by others. A statement like 'The state of the gold price on 01.10.2012 has given me feelings of happiness' seems to completely elude any codification and thus any possibility of a medial fixation. One might also think of diary entries that are based on experiences in which one was not involved directly. Further examples are perceptions of values which are not made explicit and which one does not share oneself. However, it is clear that every communication process is strongly influenced by this domain of reference. As long as no one lives completely isolated, but in constant interaction with others, this domain of reference cannot play a dominant role. Rather, there is a constant connection to the reference domain of the communicatively agreed validity.

The examples may give the impression that reference domains could be imagined as containers full of isolated entities. Of course, this is not the case, because each individual statement and the concepts it contains are embedded in a structure of interrelationships that result from abstraction, individualization, and association.

Each reference domain always implies the preceding ones, from the last to the first. In the given example, the feelings of happiness about the gold price in the last reference domain are directly related to the attribute "valuable" in the second.

The reference domains as examples of context, paradigm or background make it clear that structural determination within its boundaries creates familiarity. This familiarity makes it possible to classify and assign the particular, but also to derive the abstract on the basis of individual cases. At the same time, however, structural determination also represents a limitation, because it defines the limits of individual possibilities of insight.

The limitations of cognitive possibilities due to structural determinacy are countered by the so-called *plasticity* of the brain, which enables changes in the physiological organization of the brain. On the one hand, this allows (partial) compensation for impairments caused by illness or injury. On the other hand, such a reorganization allows the transition to the new or unknown without having to abandon orientation through structural determinacy. *Maturana* calls this property *structural drifting*.[14]

[14] Cf. Humberto R. Maturana: Kognition, in: Der Diskurs des radikalen Konstruktivismus (Suhrkamp Taschenbuch Wissenschaft 636), Frankfurt am Main 1990, pp. 89–118.

An important differentiation introduced by the discussion of the reference domains is the difference between data or factual knowledge and structural knowledge. Many ideas of learning processes - from the *Nuremberg funnel* via *Popper's bucket theory* to the *Conduit metaphor* shaped by information technology - draw a very simple picture of the transfer of knowledge from externalized information sources (cf. Figure 3).

These simple models of knowledge acquisition assume that non-existent knowledge can be identified and that it can be found in externalized form to integrate it into a cognitive structure. In extreme cases, it is assumed that this process can take place without any prior modification of the cognitive structure itself. This idea is often based on looking up unknown data such as years, the current temperature, the length of a river or the amount of a country's gross national product. Thereby it is often overlooked that data can only be understood with reference to a theoretical framework.

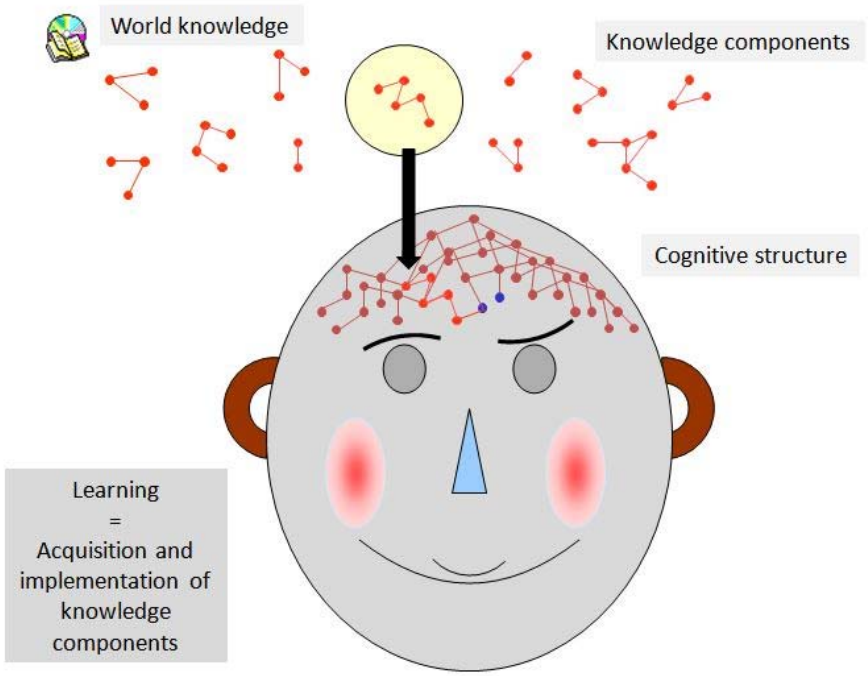

Figure 3: Integration of knowledge elements into a cognitive structure

The two statements 'Today is Friday, 22nd December 2018' or 'Today is the last full moon of 2018' can serve as an example. The day to which both statements refer can be assumed as an objective reality. Both given statements can only be produced and understood with reference to a calendar system. Its existence and description requires different structural elements for the understanding of a general calendar system, which cannot be enumerated here. Temperature degrees or longitudes can only be interpreted by specifying a reference system (degrees Celsius, degrees Fahrenheit; meters, miles). The everyday familiarity with a system alone does not create unambiguousness.

Acquiring knowledge or exchanging it communicatively does not mean simply inserting a new building block into a gap. Rather, further connections to already existing elements are established or cancelled, i.e. there is also a modification of the existing knowledge structure. Structural knowledge and reference domains are indispensable elements for describing a process that can be regarded as knowledge transfer. Such a transfer can take place either through direct communicative interaction or through reception from an externalized information system (a *world 3*).

For direct communicative interaction between two cognitive structures, knowledge transfer can be described as a process involving speech acts and activities. Figure 4 shows this process in simplified form.

A direct act of communication consists of the exchange of signals (sounds, speech, gestures) between two cognitive structures. These signals become sensory impressions. Within the cognitive structures, individual information processing compares them with existing knowledge structures, adapts them or develops them into new knowledge structures. A successful act of communication requires a *structural coupling* of both partners. It must be ensured that not only a statement has been sent and received, but that common knowledge structures exist.[15]

It is helpful for the process if each partner assumes the opposite role in both sending and receiving statements and thus takes on a reciprocal observer role. By doing so it can be tested and ensured that the act of communication is supported by a common consensus for success. This *consensual parallelization* allows both partners to access a common reference domain. This increases the chance of a structural coupling for the communication act.

The better the overlap between the reference domains and the structural knowledge already acquired, the more successful the communication will be. Repetitions of speech acts and activity-supported interactions make it possible to extend success to situations that both partners have not yet experienced together. Direct communication offers an opportunity to monitor success by asking for an action via speech acts ("Please give me the salt shaker") that can be directly checked.

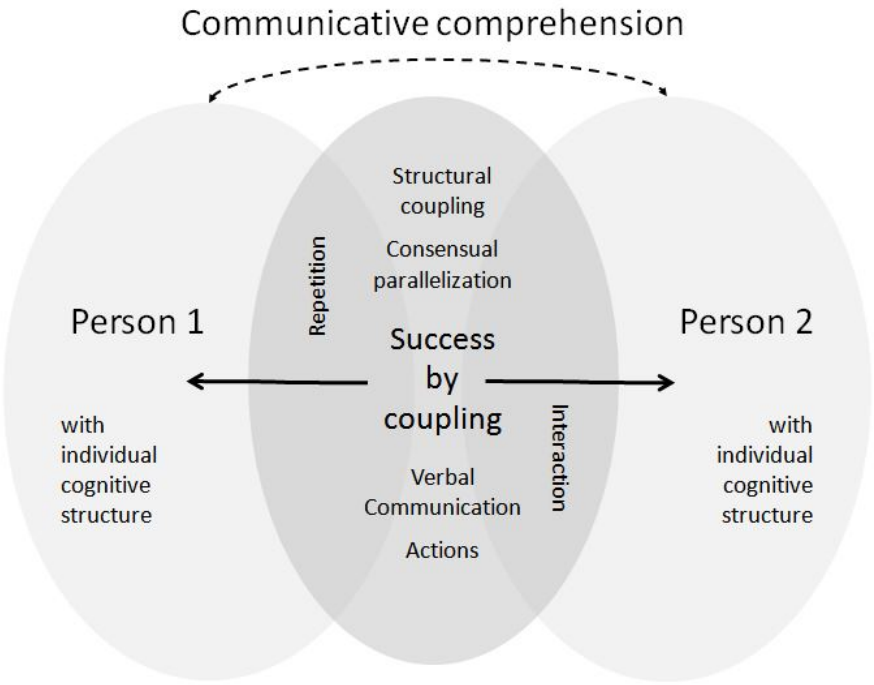

Figure 4: A constructivistic model of communicative comprehension

Following the concept of the brain's plasticity, the interactive feedback of what is said and understood or not understood can be described as a *plasticity of communication*. Human communication is oriented towards wanting to understand, not rejection. Interactive feedback with mutual statements on understanding or non-understanding serves this purpose.

[15] See for an explanation of the concept ‘structural coupling’: Maturana: Kognition (as ref. 14).

The model of communicative comprehension described here only in broad outlines permits an understanding of the transfer of knowledge between persons. In order to represent realistic conditions, the model must take into account a variety of circumstances and life situations that each individual experiences in the course of his or her life as a member of social communities. Many factors in the process become so familiar that they can only be perceived as components of the process after a thorough analysis.

We transfer the basic model to the process of reception from externalized information sources (cf. Figure 5). Now the process is only controlled by the recipient and must abstain from the mutual observer role for success control. The knowledge acquirer takes an active role, which requires interest and curiosity. He is actively striving to expand his own knowledge and takes responsibility for his own state of knowledge.

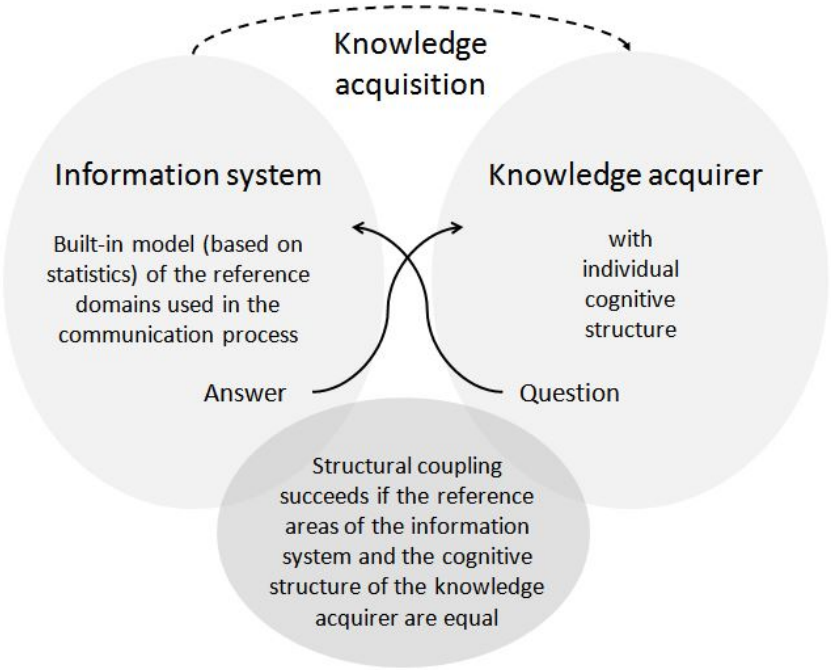

Figure 5: A constructivistic model of knowledge acquisition from an information system

Nowadays, a second understanding of roles can often be observed: a passive understanding. The knowledge acquirer sees himself in the addressee role of the efforts of others and would like to have knowledge presented and consumed. This can go as far as the idea of acquiring knowledge as entertainment. With this view, the responsibility for one's own knowledge acquisition and knowledge status is delegated to others.

It is more difficult to give a test for equality of the externalized information with the cognitively generated information than in the case of direct communication. A test based on a communicative action cannot be carried out, a simple self-confession of the figure 'I have understood' is also not sufficient.

A test of success can only be carried out on the basis of a subjective assessment or the judgment of a third party. In order not to base the statement about success solely on meanings and interpretations, communicative action tests should at least be used in a figurative understanding. It makes

sense to base the decision on success on conditions which everyone uses as an internal model in order to verify his idea of the existence of a fact.[16]

For the example of the action 'Peter drinks a glass of milk', three cognitive representations of 'drinks', 'glass' and 'milk' must be created and confirmed as conditions before the whole statement can be cognitively confirmed. Many factors that do not need to be mentioned here can prevent confirmation. Every statement with reference to reality is made with the help of such fulfillment conditions.

Such conditions of fulfillment, however, can already be different for different communication partners, especially in their application to a test for information equality for externalized information. The medial representation of a situation, i.e. an externalization, once again varies the requirements that must be ensured in order to confirm the conditions of fulfillment.

Two cases can be distinguished. In the first case, the information adopted leads to an action involving an object of objective reality, such as the successful assembly of a piece of furniture according to instructions. A recourse to the communication situation results from the idea of the presence of a partner whom one can ask for advice.

This pattern can be transferred to the second case - the abstract situation. We are familiar with this case from exercises. As a prototype one can think of an abstract task that has to be analyzed in order to find a solution. It can be helpful to assign individual components of the exercise to reference ranges in order to be able to use the cognitively adopted information specifically for finding the solution. For the model situation, success can be tested by comparing it with an existing (sample) solution. The idea of the presence of an advising partner can also build a bridge to the communication situation.

Equality of information within the framework of a reception process from externalized information sources can now be explained in this way: Information equality can be established if the result of information generated cognitively by the act of reception is equal to the information prior to the act of externalization. In other words, if the medially externalized information and the result of cognitive reception can be thought of as the result of a structural coupling in the same reference domain and the same fulfillment conditions apply.

Individual factors naturally have a significant influence on the success of reception process. They cannot be included into the externalization result - perhaps in contrast to personal recordings. For the externalization process, it is only possible to assign reference domains to the information and to make the assignment as transparent as possible. By this approach, a form of zeitgeist (social, cultural, scientific) is provided to the externalized information as structural knowledge. The greater the correspondence between the reference domains of the recipient and those of the externalized information, the better the reception process will succeed. It is an obvious consequence that the chance of success of a simple reception with a time lag to externalization becomes smaller. It must therefore be strongly questioned that there is always an opportunity to access *world 3* knowledge. Ensuring this possibility requires the transfer of time-dependent structural knowledge and the appropriate incorporation of reference domains into externalization.

Once again, it should be stressed that the acquisition of knowledge does not simply mean the simple insertion of a new building block into a gap. Rather, by establishing further connections to already existing elements, a change in the existing knowledge structure must take place.

We had described the ability to make such alterations of the cognitive structure as plasticity. In the context of interpersonal communication with interaction and feedback, the ability can be understood as the plasticity of communication. The concept cannot be applied directly to the externaliza-

[16] For an elaboration of this concept under the name 'Conditions of fulfillment' see: John R. Searle: Geist : eine Einführung,, 2nd ed., Frankfurt am Main 2006, pp. 198-204.

tion of knowledge and its reception, we can only specify conditions for the success of a reception. Interpersonal communication is based on the recognition of the non-similar, without patterns for this already being present. The aim of this recognition is not to reject the unknown, but an interactive dialogue across the border between the already known and the unknown. The transfer of the plasticity of communication to situations with non-human partners requires the implementation of corresponding skills in the technical system, without solutions already being known for this. Currently, the success of reception is supported solely by the cognitive plasticity of the human partner.

This allows us to take a side look at the ideas of communication that are currently being discussed, for example in connection with autonomous systems, as communication between humans and robots or between robots. Such forms of communication can be seen as a further extension of the model in which knowledge is externalized and perceived.

The condition for successful communication between technical systems today is often described as *Semantic interoperability*. *Wikipedia* characterizes this concept as follows:

> „Semantic interoperability is the ability of computer systems to exchange data with unambiguous, shared meaning. Semantic interoperability is a requirement to enable machine computable logic, inferencing, knowledge discovery, and data federation between information systems."[17]

It is immediately evident that there is no idea of plasticity in this process. If a simulation of the process of interactive communication with communicative plasticity for autonomous systems is to be carried out, it must go beyond the principles of semantic interoperability. Communication within the framework of semantic interoperability can only consider, 'understand' and further process what has already been considered in the model. What is not taken into account is rejected or must first be implemented. Implementation can mean both extension and adaptation. If this latter often occurs, the structures involved will flatten out and deviate further and further from the ideas of plasticity.

For the inclusion of all forms of knowledge - in particular everyday knowledge - further considerations to support the presented model for externalization and reception of information are helpful. The question to be asked then is: How does true reality - both objective and social - become cognitive reality?

4 Collective Knowledge and Institutional Reality

Our model of the individual reception of knowledge provides a basis for an idea of collective knowledge, regardless of whether its origin is assumed to be individualized or externalized. Knowledge is collective when a person (or another instance) is able to express this knowledge to others. With regard to the survivability of *Popper's world 3* knowledge, one might ask: Does collective knowledge still exist when it is present in an externalized form, but there is no person who can represent or explain it? Or is it then lost? *Popper* would probably affirm its existence. An understanding of knowledge oriented towards cognitive construction would connect the answer to the question: Does the ability to construct actual reality still exist or is it lost? It is therefore worthwhile to look for further influencing variables for an answer to the question.

For this purpose, the three worlds of *Popper* will be supplemented by borrowings from the theory of mind and connected with the consideration of cognitive reception processes. This connection is established by two concepts used in the theory of mind to describe the reference to reality: the distinction between *First-person ontology* and *Third-person ontology*.[18]

First-person ontology = Cognitive states based on the experience of a 'Self / Me',

[17] https://en.wikipedia.org/wiki/Semantic_interoperability [Last visited on: 01.04.2019].
[18] Cf. for example: Searle: Geist, (as ref. 16), p. 108.

Third person ontology = The existence of a phenomenon is independent of the experiencing subject, ontologically objective.

It makes sense to establish the following identification:

First-person ontology = World 2

Third person ontology = World 1

It remains to be clarified which framework conditions permit the embedding of World 3 in such an understanding in order to take account of its special significance for externalization and reception processes.

In order to make these framework conditions more precise, we supplement our externalization and reception model with a further differentiation of forms of reality, as proposed by *John Searle*. He distinguishes an *objective reality* from an *institutional reality*. Both can be experienced by people and an exchange between them is possible.

Objective reality (we call it also true reality in this paper) includes matters whose existence does not require human activity, such as the presence of a mountain or the fact that the earth is at a distance from the sun. Facts of *institutional reality*, on the other hand, are created by human beings by using linguistic symbols.

The term *institutional reality* may seem ambiguous or misleading because the concept does not require the existence of an institution in the corporative sense. *Searle* reserves this term for all concepts created and used by human beings in the social context. The use of 'institutional' should aim to ensure that these are not volatile concepts in a more private environment.

One can imagine the creation of an institutional reality as follows. Speech acts assign a collectively recognized status function to already existing objects, e.g. 'being money'. The starting point for the assignment may be a material object of physical reality: a piece of metal, a shell, a cut and printed piece of paper. However, not all such objects have the property of being money; it can be assigned to objects and withdrawn again. Decisive for the creation of a social fact is the assignment of a collectively accepted status function, here the function of 'being money', by means of a graded system of speech acts. For complex concepts it will be necessary to take an already created concept (e.g. 'central bank') as a starting point for an institutional concept of the next stage (e.g. 'monetary value'). The process often passes through many stages.[19]

The use of language is constitutive for the issues of institutional reality and its exchange between people. This does not imply that language is the basis of all thought. Items or objects of thought are either related to a physical (true) reality or to a reality whose existence is created by linguistic acts (actual reality).

Objects and facts of *objective reality* exist independently of humans. They can be perceived by humans and be the cause of activities based on cognitive processes. This form of thinking need not be limited to the use of linguistic symbols or structures. Objects and facts of *institutional reality* are created by human beings by linguistic expression. Thinking about these objects is always bound to language.

Our previous calendar example with the two statements 'Today is Friday, 22nd of December 2018' and 'Today is the last full moon of the year 2018' gives a clear indication for this assertion. The day to which both statements refer may be accessible to language-independent thinking as a fact of objective reality. The statement itself - independent of the concrete linguistic form - can only be produced and understood with reference to a calendar system whose existence and description,

[19] For further details: Searle: Die Konstruktion der gesellschaftlichen Wirklichkeit (as ref. 13), p. 40.

however, presupposes various linguistic acts. None of the characteristics of being a 'Friday', the '22nd of December' or 'the last full moon of the year 2018' can be justified prelingually. Thinking about a calendar system, a fact of institutional reality, therefore is only possible linguistically.[20]

The now extended externalization and reception model not only considers facts of an objective reality but also structural references, contexts, cross-connections and spatio-temporal contexts of the institutional reality. It thus provides framework conditions for the reception of the concepts of scientific knowledge, but now also of general topics. The framework conditions include the observance of conditions of validity and truth in order to ensure the comprehension of the externalized contexts.

Thus, the prerequisite can now be determined how an individual *world 2* can be created from the elements of an objective reality. The acting Self has to be able to focus its attention on something that lies outside of itself and that can be described within the framework of *third-person-ontologies*. *Searle* calls this prerequisite (individual) *Intentionality*[21] and by this he means:

> "The property of the mind by which it directs itself to objects or facts in the world independent of it."[22]

The cognitive processing of this attention - caused by intentionality - results in individual knowledge by way of a construction of actual reality and can be understood as a constitution of *world 2* (cf. fig. 6). The communicative exchange between people or the reception from externalized sources of information can refer either to concepts of third-person ontology (objects or facts of an objective reality existing independently of the acting subject) or to first-person ontology. The concepts of a first-person ontology are not created by reference to real-world objects of physical reality; rather, their existence is based solely on assignments within the framework of speech acts (institutional reality).

This allows to indicate the following relationships, which now also assign a place to *world 3*:

True (objective) reality = World 1

Institutional reality = World 3

The creation of an analogy between *institutional reality* according to *Searle* and the *world 3* according to *Popper* would probably not be accepted by both authors without contradiction. However, there are statements by *Popper* that suggest such an interpretation:

> "Of course, theories are products of human thought (or, if you will, human behavior - I don't want to fight for words). Nevertheless, they have a certain degree of autonomy: they can have objective consequences that no one has thought of before and that can be discovered, discovered in the same sense that an existing but previously unknown plant or creature can be discovered. It can be said that World 3 is human work only at the beginning, and that theories, once they are there, begin to have a life of their own: They create unforeseen consequences, they create new problems."[23]

The concept of *intentionality* introduced by *Searle* is a suitable basis for a model of knowledge transfer and knowledge acquisition in the context of communication and reception processes of externalized information. Thus, a more precise model of the transfer processes between *world 3* and *world 2* can be derived now, which considers not only scientific knowledge but also everyday knowledge.

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[20] Cf. the presentation: ibid., pp. 73-74.
[21] Cf. for the explanation of the concept: Searle: Geist (as ref. 16), Searle, John R.: Die Wiederentdeckung des Geistes, München 1993. Therein: Chapter 6: Die Struktur des Bewußtseins : eine Einführung, pp. 153-154.
[22] Searle: Geist (as ref. 16), p. 187 (Translation by authors).
[23] Popper/Eccles: Das Ich und sein Gehirn (as ref. 2), p. 65.

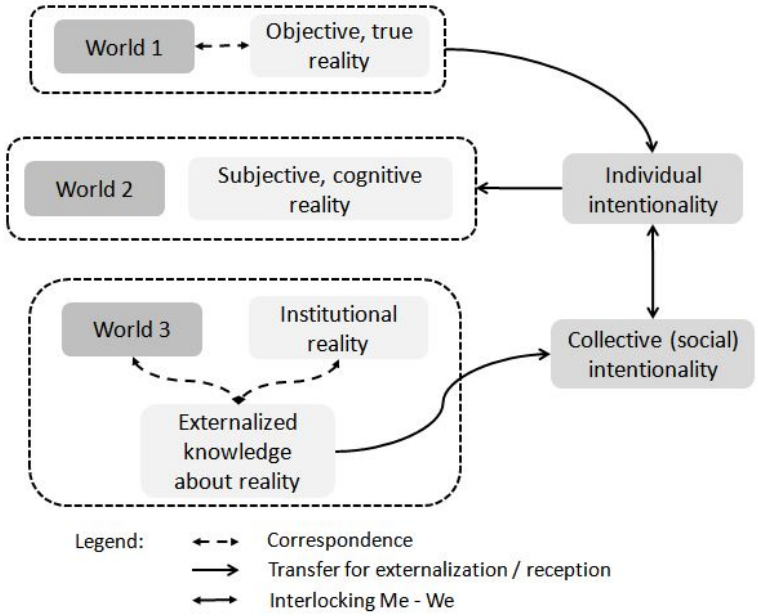

Figure 6: Connecting the Theory of mind with the Three-world theory

Communication between people and the reception of issues from externalized information sources require, in addition to individual intentionality, a second prerequisite in order to be successful. This additional prerequisite is a 'we' idea that contains the following motivation as a necessary element: I want to acquire, I want to understand what another says or has laid down'. Or, shorter: 'I want to establish a common understanding space'. In the externalization and reception model, this idea is expressed in the mechanisms of structural coupling and consensual parallelization. However, this is not yet sufficient for describing the 'we' concept completely. This description only becomes complete in the context of a concept that is called *collective intentionality* by Searle.[24]

This concept is best characterized by the attitude 'We intend something common'. *Collective intentionality* looks for the common in the individual intention (intentionality) as a we-intention and understands one's own intention as a part of it. The 'we intend' must not, however, be understood as an interplay of individual intentionality according to the pattern: We intend because I intend and think that you intend and think that I intend and think that ...'. What is decisive is that each of the partners involved sees their own intention as a specific part of a common we-intention that forms a generic context.

Searle illustrates the concept of collective intentionality by the intention of a defender in a soccer match who does not want the opposing striker to score. Actually, individual intentionality is sufficient to understand this special role. However, it is not sufficient to describe the overall objectives of the whole team. Only in the context of the collective intentionality of all players in a soccer match will the role of the defender become fully meaningful: the own team and not the opposing team should win the match. The role of a single player position in football matches is based on the common idea of a we-action and not only on the idea of the sum of individual actions.

As a further example of a concept that exists solely in institutional reality on the basis of collective intentionality, *Searle* cites a 'heap of money'. The 'heap' itself still exists without humans, but no longer has the function of money. In order to regard a piece of printed paper as money, its existence alone is not sufficient. It must be accompanied by the belief that it is money. In order to regard a

[24] John R. Searle: Kollektive Absichten und Handlungen, in: Hans Bernhard Schmid/David P. Schweikard (Eds): Kollektive Intentionalität : eine Debatte über die Grundlagen des Sozialen, Frankfurt am Main 2008, pp. 99–118.

piece of printed paper as money, its existence alone is not sufficient. It must be accompanied by the belief that it is money. This belief is not a property of the bank note, but an expression of collective intentionality.[25]

The collective intentionality as a characteristic of a social group of people naturally does not exist separately from the individual people. Rather, it is also a characteristic of each individual. Collective intentionality thus establishes a direct connection between all individuals as members of the group.

Thus the connection between *world 2* and *world 3*, which has remained open so far, is established and it is possible to explain how the construction of an actual reality takes place in order to build up an individual *world 2*. Figure 6 summarizes the connections.

The transfer between *world 2* and *world 3*, which is also still open, can be summarized as follows. World 3 is to be seen as a reflection and externalization of the constructs created as results of mental activity. Thus they are objects of institutional reality. By means of collective intentionality and its natural connection to individual intentionality, these constructs become the object of an individual construction of actual reality within the framework of a process of communication or reception. Thus they become part of the cognitive structure of an individual whose equivalent is *world 2*.

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[25] Searle: Die Konstruktion der gesellschaftlichen Wirklichkeit (as ref. 13), p. 33ff.