The Philosophical Foundation of Conceptual Knowledge – A Sociopragmatic Approach

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Abstract. Information Systems Research is still said to have no substantial philosophical foundation. As human inquiry relies on social contextualization, shared language and common practice, several consequences for conceptual models and conceptual knowledge are resulting. With the approach of "sociopragmatic constructivism", we seek to develop a philosophical foundation for the understanding of conceptual knowledge and its possible representations, posing the primate of the social over the individual.

As we discovered only recently, this paper is a response to exercise 7.9 in Sowa's book "Conceptual Structures – Information Processing in Mind and Machine":

> Select some […] philosophical point that was not mentioned in this book. Relate it to conceptual graphs and show whether it helps to confirm the current theory or requires some extension or modification of it." [12]

Instead of focusing on conceptual graphs, we target philosophical foundations of conceptual knowledge and knowledge representations in general. Starting from the simple notion of data processing in the early 50s, we seem to have reached the 'knowledge age' in our so-called 'postmodern' society as well as in computer science [3], [5], [2]. In the domain of artificial intelligence, the notion of knowledge representation has a long tradition. But the promise of computerized knowledge representations, regarding substitution of human cognitive capabilities, did not yield the expected results.

To overcome this unsatisfying situation, a broader approach was chosen, involving other disciplines like neurology, psychology, linguistics etc., which eventu-

ally led to the nascence of the (transdisciplinary) discipline of cognitive science [10]. This development fits well into the tradition of the paradigm concept expressed by Kuhn, who identified crises within scientific disciplines as the main motivator for the reconsideration of fundamental assumptions and presuppositions [6].

Looking for an explanation of this crisis, main causes can be traced back to the early ideas of the *computational theory of mind* [9] or the *information processing models of cognition* [11], and with these, the idea of a *physical symbol system* [7]. The notion of symbols found there is quite appealing, but can at the same time be considered as their main obstacle. We believe there is no such thing as a *physical symbol system*. By referring to the semiotic triangle [8] we argue that there is no objective relation between the symbol (something energetic or material used to represent the symbol) and the referent (the object symbolized by the symbol). The very essence of a symbol rests in the transcendence of this relation, which is neither a property of the symbol representation nor of the referent. It is a capability unique to humans that enables them to establish a reference between something present and something not present.

In the context of knowledge and knowledge representations, the relation of IS research to philosophical disciplines (e.g. ontology, epistemology and semiotics) is evident. A review of contemporary literature reveals that mainstream research in IS and AI is based on a positivist paradigm. Even where authors do not explicitly state their epistemological position, an implicit positivistic orientation is prevailing in most cases.

The positivist approach towards knowledge assumes that all experiences are based on the sensual experiences of the given (positive), and the non-experienceable is not real or at least not recognizable (empirism). Knowledge exists if "real" objects with their innate properties and relations are represented (mapped) in the human mind with the same properties and relations. The human being with its consciousness is then understood as a medium for the representation of "reality". In analogy, a model is regarded as a representation (mapping) of the true "reality". This representational notion of model presupposes a direct relationship between the model (the representation – model of conceptual knowledge) and the model source (the original – conceptual knowledge). A model is "good" or "true" if it is in correspondence to "reality" – the essence of the *correspondence theory of truth*, and basis for the prevailing concepts of model quality. Having described the concept of model and knowledge in positivism, the similarity to the semiotic triangle becomes obvious. For physical symbol systems the correspondence between symbol and referent is assumed – a positivistic concept!

Critically summarizing positivism in this context, we regard it as problematic that the meaning of the given is supposed to "be there" before any experience is to be made, i.e. all experiences made by any being have the same, pre-existent

meaning. However, the meaning of an experience is not given by the experience itself, but is grounded in its preconditions.

On the very opposite of positivism, constructivists question the direct relationship between knowledge (as well as models or symbols) and "reality". Since constructivists assume that there are as many realities as individuals, realities are subjective, therefore knowledge, models, and symbols are subjective too. Consequently, for them models become existent only if there is 'something' *used* as a model (more precisely: a model representation) by a human. This notion of model is congruent with the notion of the semiotic triangle by Ogden and Richards [8]. Models are no longer considered to be an objective representation of reality, but are subject to the context-dependent interpretation of the individual – with the context provided by his/her social environment.

The latter argument can be seen as a criticism of the paradigm of radical constructivism [4]. The fundamental problem of this approach lies in its assumption, that cognition (*nous, intellectus*) is derived from reason and the corresponding senses (*aesthesis, sensus*). It misses its aim because it insists on the individual mental states of single individuals as the sole instance of knowledge acquisition.

With its emphasis on the social aspect of cognition, sociopragmatic constructivism seeks to explain human actions and their consequences (e.g. conceptual models or knowledge) by giving an accurate description of the underlying forms of practice. Human action is distinguished by its specific form of co-operative organization that manifests itself in the form of practices such as communication. The acquisition of conceptual knowledge takes place in a human community – it is not the sole achievement of a single individual [1].

Our socio-pragmatic thesis is that common action is realized on the basis of symbolically constituted "worlds of meaning" (Sinnwelten). A completely isolated human action – even thinking, knowing, believing – is impossible from a genealogical point of view: This claim explains a socio-pragmatic position that roots the creation of conceptual models in a pre-existent common practice of communicating and acting. Analyzing the community means looking for the conditions which render possible common human action. Consequently we propose a socio-pragmatic constructivism that poses the primate of the social over the individual: The practices of knowledge acquisition and modeling are no solipsistic acts of creation *ex nihilo*.

Due to the fact that conceptual knowledge is itself a model of knowledge, it will thus be necessary to confirm/reassure oneself's understanding of these representations in order to work with them. This means that conceptual models will only be usable within communities, who understand the "models behind" the corresponding representations of conceptual models. As a result of their shared language and common practice the communities' members become capable of interpreting them. Models of conceptual knowledge are bound to the language used for their representation – e.g. Simon's analysis of think-aloud protocols of

expert problem solving [11] is not necessarily an analysis of experts' problem solving, but of the way experts *describe* their problem solving.

Sociopragmatic constructivism is not only a method or route to something; not only a theoretical reflection onto theory and practice of information systems is it's goal. Rather, it offers a meta-reflection which is capable of practical implementation. On the one hand, transparency of different scientific, practical, and technical methods has to be critically achieved, on the other, guidance for use in everyday work with data, information, and knowledge has to be offered.

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