Comments on “Information Systems as a Social Science”

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This is a very good paper for this conference, because it lends itself quite well for triggering lots of discussion and debate. I found so many debatable issues relating to the FRISCO Report [Fal96] in the paper, that I had to give up the idea to discuss all of them in my comments. Therefore I would like to concentrate on just a few points which I consider the most important ones.

1. Philosophical Positions

The philosophical position advocated in the paper is labelled "radical subjectivism". A relationship between things in "reality" and signs or representations is assumed, carrying the "meaning" of the signs. The author rejects the notion of conception because conceptions are "empirically inaccessible". Rather, he advocates to work with the notions of "affordance", "pattern of behaviour" and/or "repertoire of behaviour".

Let me try to compare this view with the FRISCO constructivist position. According to FRISCO, some assumed "reality" is believed to exist, and parts of it (domains) eventually may be observed and represented. This process is structured into three sub-processes, viz. perceiving, conceiving and representing actions (ignoring the process of inner inspection and reflection for a moment). Conceptions may be communicated among people via representations, eventually leading to shared conceptions and shared knowledge.

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When the author speaks about "reality", he certainly does not mean "reality" in the FRISCO sense, I rather suspect he means "inter-subjective reality", in a many-to-many relation with signs ("meaning"). Otherwise it would imply a naive-realistic position, and I don't assume that the author is a naive realist. Now, what is "inter-subjective reality"? According to the FRISCO position, it is closely related to shared conceptions and shared knowledge. In the FRISCO Report [Fal96 Section 3.8 Definition E38], the following is stated about this issue: "When communication has resulted in shared knowledge regarding some domain, those sharing that knowledge may be said to have achieved "inter-subjectively negotiated conceptions" concerning an "inter-subjective reality"."

Thus, if one follows the author's view that conceptions are "empirically inaccessible", this inaccessibility applies inevitably to "inter-subjective reality" and to its relation to signs ("meaning") as well. Furthermore and even more importantly, it applies to "affordances", "patterns of behaviour" and "repertoires of behaviour" too, since they are subject to perceiving and conceiving processes as well, like anything else. It seems to me that the author tries (and of course fails) to escape from a principally inescapable dilemma.

Let me mention an important issue, which the author seems to ignore. I mean the peculiar human capability of inner mental inspection and of reflecting on its results. I think that this capability has been crucial for the development of human language, science and philosophy, thus I cannot see any reason to ignore it.

How does now the omnipresent notion of "meaning" (of representations) enter the picture? I think the process of inner mental inspection and reflection is the key to answer that question. An observer, perceiving a representation (being a special domain) with his senses, has to apply this process in general not only to this actual perception, but also to previously constructed conceptions or perceptions, for interpreting the actual perception in a proper, "meaningful" way. These previous conceptions may include all sorts of things, such as knowledge about the world at large or about a particular situation or event, knowledge about the rules of a language, or knowledge about other human conventions. When applying these mental processes to a representation and eventually coming to a conclusion, he will or could think or speak: "Aha, that's what it means!" Thus, "meaning" is certainly not a type of thing like any other, it comes about, at least in my view, as a result of more or less complex mental processes. To ignore these processes as a basis for any conceptual framework in general (as the author seems to do) would be quite counter-productive. These issues are highly important for grasping the meaning of "meaning" and for understanding "understanding".

In this context, let me quote the linguist C. Goddard [God98]: "[The semiotic approach to meaning] ... holds that it is a mistake to become preoccupied with "what meaning is", as though "meaning" were a thing of some kind. Since our whole lives are infused with meanings, since we are communicating in meanings even as we try to speak about them, we can never (on this view) escape from language and find a vantage point from which we can look back and describe what it is we have been doing.". Neither the author, nor the FRISCO authors, nor anyone else is or will probably ever be able to escape from that dilemma.

2. The Semiotic Ladder

It is good that the author gives a concrete example, marriage, to illustrate his distinction between the "semantic layer" and the "pragmatic layer". Let's look at it for a moment, from the viewpoint of the FRISCO approach, or any other (according to the author, "orthodox") approach:

In the first model (the author's paper, figure 1), persons are part of a community (during some time), which in turn belongs to a society (not necessarily forever). Persons may get married and divorced (at some time). Thus, we have a number of (time-stamped) relationships. Furthermore, numerous rules and constraints apply, in particular various temporal constraints and dependencies.

In the second model (the author's paper, figure 2), the first model is extended by some additional (time-stamped) relationships, viz. that a person may propose marriage to another one, and that the latter may accept that proposal. Numerous rules apply here as well, possibly more than in the first model.

It is quite obvious that the second one is a model of a somewhat larger domain than the first one. From a practical point of view, that is all there is to it.

However, there is more to it according to the author, who claims that the first one is on the "semantic layer" while the second one is on the "pragmatic layer". On what grounds is this claim made? Well, I suppose it is made on the grounds that in the second model, there is a predicator in the model ("propose") suggesting some sort of intention, which in turn is related to the orthodox linguists' notion of "pragmatics". I suppose the claim that there is an even "higher" layer, the "social layer", is made on analogous grounds. Since the author doesn't provide a concrete example for that, I refrain from commenting on that in detail.

My view on this issue is that these distinctions (semantic vs. pragmatic vs. social layer) aren't clear in every application case, and furthermore, and

more importantly, they don't contribute to the art of modelling. This does not imply that if you have a domain where a lot of "intention" has to be considered, such as in planning systems, you aren't allowed to create a purpose-specific meta-model whereby the predicator "intent" appears in the meta-model, and where the associated rules about "intentions" are incorporated there as well. But this is quite a different issue (see section 3 on modelling and meta-model hierarchies below).

I guess I'm not the only one to criticise these orthodox linguistic distinctions. Let me quote C. Goddard once again [God98]: "...Distinctions like [semantics vs. pragmatics] may sound clear enough in theory, but when it comes down to practical applications there is often disagreement about where the line should be drawn... Some linguists, such as Filmore, Langacker, and Lakoff, argue that it makes no sense to draw a hard and fast distinction between semantics and pragmatics..."

3. Modelling and Meta-Model Hierarchies

Whether you design a simple database, or construct a business system, or set-up social norms or laws, or even indulge in philosophical investigations, a major and crucial part of what you are doing is modelling a domain. So does the author when setting up his "ontological charts", which are just some special models. I fully agree with the author that models need to be precise and clear, and I am pleased to read that he advocates and aims at "canonical" models, which I guess are the same as "deterministic" models (see e.g. the DETERM approach [Fal93a, Fal93b]) (although I'm not sure when reading the paper).

It is a pity that the author ignores the approach concerning meta-model transformations and hierarchies [Fal96 Section 6.3, Oei95, OF94], which is by the way the basis for the step-by-step extensions and refinements of the FRISCO framework. Otherwise he would have recognised that his meta-model is nothing but a node in a meta-model hierarchy. The claimed observations about the effectiveness of his approach are probably due the fact that the applications he has in mind deal quite a lot with aspects emphasised in his meta-model. Thus we have here a case of a more or less purpose-specific meta-model, situated somewhere in a meta-model hierarchy. Whereabout it is, I cannot tell, since the author's meta-model is only very informally sketched in the paper.

It is a general (and somewhat trivial) trade-off rule, that universal meta-models support all sorts of applications, but not necessarily in the most adequate way, while purpose-specific meta-models support some applications very well, and others not so well (or not at all). I doubt that you can escape from that rule by inventing yet other and perhaps more

sophisticated meta-models. However, in case you have a complex and large application domain with various special and diverse sub-domains, you can "bend" that rule to your advantage by allowing different purpose-specific meta-models in your overall application, whereby all meta-models are linked by appropriate meta-model transformations.

4. Conclusions: An Alternative to the FRISCO Formalism?

Although the author's approach is presented quite eloquently, I doubt very much that it has the potential to become a serious alternative or challenge to the FRISCO approach.

The author advocates that one should use his meta-model ("ontological charts") as a basis for a conceptual framework, without attempting to link his meta-model to other, existing meta-models. Thus, the author's approach is based on "singular-view" thinking.

If you read the FRISCO Report carefully, you will recognise that the FRISCO approach is a significant and important step ahead of the widespread "singular-view" thinking, by advocating a "multiple-view" thinking in the form of meta-model transformations and hierarchy. Although it is not an easy task, I have no doubts that the various existing meta-models (including the author's one) can be arranged in a meta-model hierarchy and thus linked to each other, provided they are sufficiently well-defined.

Of course there are always detailed aspects which can be improved or refined in a large conceptual framework like FRISCO, but unfortunately the author's paper doesn't really contribute in this way, since his way of thinking appears to be radically different from the way of thinking underlying the FRISCO approach.

Whether FRISCO could be a good basis for a "Principia Informatica", I cannot tell. It certainly would be great if it were so. I do hope that the discussion triggered by the author's position regarding FRISCO will help deeper insights to emerge.

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