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# Meta-communication in the Language Action Perspective

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## Abstract

Meta-communication has not received much explicit attention in LAP literature, but in view of application of the LAP to system specification and IC system design, meta-communication needs to be taken seriously: all discussion about communication tools (such as languages, but also systems dedicated to specific contexts and tasks) involves meta-communication. In this article, we discuss the place of meta-communication in the LAP, linking it to such subjects as the discussion and discourse layers, the claim to comprehensibility and other validity claims, context, and definition theory. We also discuss Polanyi's framework of tacit knowledge and introduce the notion of 'semantic reassurance'. We conclude with a discussion of some implications for IC system specification and argue in favour of the support of controlled discussion-level meta-communication in future IC systems.

## 1. Introduction

"Meta-communication" is the general term for communication *about* communication that in everyday life is often part and parcel of any conversation. A simple request "can you repeat that?" is already a kind of meta-communication, and so are requests for clarification and dialogue management functions such as "let us come to a conclusion". In this article, we focus on meta-communication,

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placing it in context of a small set of communication-oriented theoretical frameworks (most but not all of which have been previously introduced in the LAP literature). We will work towards a discussion of some implications for the field of information and communication system specification.

The driving idea behind this article is that specification processes<sup>1</sup> are executed by means of a range of language-related techniques and “tools” which enable people (and potentially also automated intelligent agents) to communicate about means for communication and, along the same lines, about communication systems [Hoppenbrouwers 2000]. Such tools include conceptual devices like lexicons, ontologies, syntactic conventions, and conversational conventions. Tool selection and design is vital to any engineering effort, and if this holds for functional IC system specification as well, communication tools and *modes of conversation about them* deserve to be taken seriously as such, systematically studied, and improved.

The paper is organized as follows. First we will present an overview of the discussion concerning meta-communication in LAP literature so far. Central to the discussion will be such topics as Van Reijswoud’s model of the *Discussion Layer*, *Conversation for Clarification*, and the place of *Definition* in Speech Act Theory (section 2). Next, we will further explore some fundamental aspects of conversation for clarification, relating it to Polanyi’s ideas on tacit knowledge and to the introduction of the notion of *semantic reassurance* (section 3). We conclude by discussing some implications of the matters presented for IC systems specification (section 4).

This article is for a large part related to ongoing PhD research [Hoppenbrouwers, in progress; Hoppenbrouwers 2000], and has an explorative character. We are aware that consolidation of our ideas through confrontation with the practice of IC system design/use is called for, and plan to include an empirical component into our continuing research, to back up our theoretical ideas.

## 2. Meta-communication in the Language-Action Perspective

“Meta-communication” is the general term for communication *about* communication. It is most typically viewed as taking place at breakdown (ex post meta-communication), but any toolkit or system designed to support communication implies anticipation of breakdown, and pro-active discussion about communication (ex ante meta communication). As an explicit topic, meta-communication has so far received little attention in generally available LAP literature, though ‘between the lines’ reference to meta-communication can be found in abundance. The one notable exception is the work of [Schoop 1998;

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<sup>1</sup> We are concerned only with those involving functionality specification and user-oriented requirements engineering, and therefore not with matters of implementation.

1999], who explicitly mentions “the metalinguistic level” [1999:65] but does not address the matter from a broad perspective, focusing mostly on the need for clarification of terminology and ‘translation’ between professional groups. While similar fundamental matters underlie Schoop’s discussion as well as ours, we hope to present a somewhat wider view on meta-communication, linking explicit conversation about language and definition to various modes of specification. Central to our discussion will be the *discussion layer* and *discourse layer* described by [van Reijswoud 1996] as part of his Transaction Process Model (TPM), and their relation to *conversation for clarification* which concerns the *claim to comprehensibility* [Habermas 1981; Schoop 1998, 1999].

First a classic quotation [Winograd and Flores 1986:66]: “Conditions of satisfaction are not objective realities, free of interpretations of speaker and hearer. They exist in the listening, and there is always the potential for a difference among the parties. This can lead to breakdown [...] and to a subsequent conversation about the understanding of the conditions.”

Most typically, if communicative transactions fail this is because there is disagreement about some aspect of the propositional content, which is at least successfully communicated. However, the propositional content may not come across successfully in the first place. In such a case, there are three main possibilities:

- Immediate breakdown occurs on account of clearly perceived incomprehensibility of some utterance;
- The listening/reading party suspects incorrect interpretation on her behalf, because of a perceived mismatch between what is said and what is to be expected in the wider context of the conversation. She may or may not start a conversation for clarification;
- No misunderstanding is perceived and problems may arise only later, if at all.

We will focus on those cases in which the listener expresses the suspected occurrence of comprehensibility failure and thus enters into a *conversation for clarification* [cf. Winograd 1988]. We are concerned here not only with clarification based on incomprehensibility of the propositional content, but also of expressions of illocutionary force [Schoop 1999:65]. We thus include all cases in which the language/utterance used notably fails to do its intended communicative job. In sections 2 and 3, we mostly (but not exclusively) take as central breakdown as it occurs in actual language use; we put anticipation of breakdown central in section 4.

## 2.1 Discussion, Discourse, and Text about Communication

In Van Reijswoud's Transaction Process Model [1996:95], three layers of conversation are distinguished: the Success Layer, the Discussion-and-Failure Layer (further called "Discussion Layer" in this paper), and the Discourse Layer. The Success Layer is where transactions take place that do not suffer breakdown. If, however, breakdown occurs (or threatens), the Discussion Layer is entered. At this level, "the participants in a communicatively oriented transaction process discuss whether the claims incorporated in a communication act and laid down in a transaction state are *true*, *justifiable* [elsewhere called *appropriate*], and *truthful*" [italics added] [1996:97]. "However, in some situations a discussion relates to the background conditions of a group of related transaction processes. These discussions, called *discourses* [italics added], are dealt with in the discourse-layer [...]." [1996:100]. "Discussions about validity claims, on the one hand, relate to a particular instance of a transaction type, e.g. the order with the order #93154. Discourses, on the other hand, abstract from particular instances of a transaction type, and focus on the underlying rules of a particular transaction type." [1996:165].

Meta-communication can be placed in this model without much trouble. Conversation about the meaning of a term, for example, can occur for clarification of communication taking place in the success-layer. Important is that at discussion level, statements are made concerning the meaning of X *in context*. There is an enormous difference in interpretive depth between an isolated linguistic expression (for example, a sentence) and a fully contextualised utterance *including* that sentence, and evoking an *interpretation* [cf. Dik, 1989]. Discussion for clarification concerns a particular utterance in some context, which is complex and may be for a large part implicit. Because it is contextualised, it is difficult to anticipate and is a hard subject for *ex ante* (anticipatory) meta communication. There is a correspondence between instantiated (contextualised) linguistic utterances and conversation at Discussion level.

Discourse for clarification, on the other hand, typically involves more fundamental and persistent, 'decontextualised' issues, grounded in communal rules and norms, which are more general since they cover a type of situation rather than one particular, instantiated situation. In this sense, there is a parallel between generic elements of language (general word level, syntax) and the Discourse level in that they both involve community-based rules and norms [Weigand and Hoppenbrouwers 1998]. Discourse level is therefore also likely to be the primary arena for *ex ante* meta communication.

If semantically rich, contextualised meanings are evoked by linguistic utterances using more generic elements, then it can be argued that such generic elements are *communally grounded tools used to evoke contextualised meanings in individuals*. Such a functionalist perspective on language [Dik 1989, Harder 1994,

Weigand and Hoppenbrouwers 1998, Hoppenbrouwers 2000] implies not only that linguistic form is seen as ‘being used to evoke meaning’, but also that this involves social construction of signs (combinations of form and meaning). This is in line with the semiotic and language-action perspectives. As [van Reijswoud 1996:45] explains: “a constructivist principle assumes that meanings are constructed, and continuously tested and repaired, through people using syntactic structures to organize their coordinated action. The repair is taking place when they judge that the language action relationships have failed.” We agree on this, and consider meta-communication to concern such ‘repair’, or else construction in anticipation of breakdown.

As said, we follow Van Reijswoud (and ultimately [Stamper 1993]) in embracing a semiotic point of view, and the distinction between a number of semiotic domains (the ‘Semiological Ladder’, cf. figure 1).

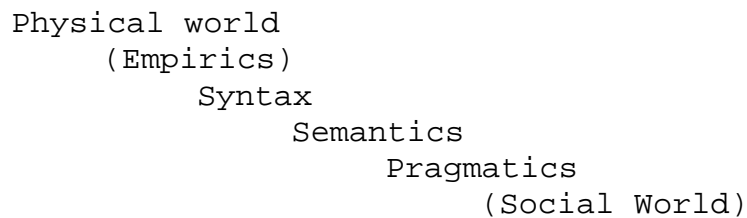


Figure 1: the Semiological Ladder (Stamper 1993)

In the *physical world*, signs are examined as phenomena: physical properties of signals and marks are studied. At the *empirics* level, statistical properties of signs are studied. *Syntax* is concerned with rules composing complex signs from simple ones, focusing on form. The *semantic* domain is concerned with the meaning of signs. The *pragmatic* domain is concerned with the relationships between used signs and the resulting behaviour of responsible agents in a social context. In the *social world*, the focus lies on actual, or perlocutionary effects [Van Reijswoud 1996:45].

Let us return to the discussion and discourse layers in van Reijswoud’s TPM. Various kinds of breakdown may send a conversation into the discussion layer. The type we are concerned with concerns a failure (or suspected failure) in one of the domains of the semiological ladder. In this paper, as we have nothing in particular to say about the Social World and the Empirics layer, we will further discard these levels, and for now assume a four level semiotic model. Breakdown (or anticipated breakdown) in either of the levels may trigger meta-communication. In other words, once breakdown in any of these layers occurs, discussion follows:

**Physical:** discussion about the material markers/signals used: “Why don’t you use email instead of a fax?” “Speak up, please, I cannot hear you”. The physical level is strongly related to the notion ‘media’.

**Syntactic:** discussion about correct *formulation* whereby syntactic rules are the cause of confusion, as in the following example: “Two cars were reported stolen by the Aachen police yesterday”.

**Semantic:** any discussion about the meaning of some sign (word, or even sentence –a complex sign): “What do you mean here by ...” (contextual); “What does ... mean? (general)”.

**Pragmatic:** meta-linguistic discussion about pragmatic concerns questions like “Do you really mean you want me to ...” about some pragmatic interpretation. Note that meta-communication about pragmatics should not be confused with discussion about e.g. a claim to appropriateness concerning some linguistic act. It purely concerns *correct interpretation*.

If the validity claims challenged and discussed in the Discussion Layer are not agreed upon, in most cases the transaction will simply fail and be broken off. However, it is also possible that as a result of the discussion of a specific utterance in context, more general questions are raised, and the communal norms and rules underlying the discussion are subject of conversation in the Discourse Layer. Examples of questions raised in such discourse might be:

**Physical:** can you use email for confidential information?

**Syntactic:** should the \*-sign have priority over “/”? (example from arithmetic)

**Semantic:** does term X really mean Y in the common vocabulary of language L?

**Pragmatic:** is illocutionary marker M really commonly understood as giving

illocutionary force I to utterance U in language L?

Because the discourse layer concerns communal norms and rules, it may involve any text known to the community in which such norms and rules are described [cf. Weigand et al., 1999]. Dictionaries are the most straightforward example, but similar texts are also imaginable at other semiotic levels (grammar books, interaction protocols, guidelines for the use of materials and communication equipment). Note that in cases where a set of norms and rules used is mostly based on NL, those norms and rules are mostly left implicit, but that in more restricted, artificial communicational set-ups, norms, rules, standards, and explicit descriptions or definitions thereof are imaginable and indeed occur across all semiotic layers. This is especially and increasingly the case in environments in which information and communication technology is deployed. Note that such

texts often play a role in active construction of language rather than just making implicit rules and norms explicit.

## 2.2 Validity Claims and Comprehensibility

Consider the following illustrative dialogue from Lewis Carroll's *Through the Looking Glass*:

- HD: 'there's glory for you!' (*assertion, still in the success layer*)  
A: 'I don't know what you mean by "glory,"' (*objection; conversation is taken into the discussion layer*)  
HD: 'Of course you don't -- till I tell you.' (*indicates individual (stipulative) perspective on meaning*)  
'I meant "there's a nice knock-down argument for you!"' (*explicit clarification*)  
A: 'But "glory" doesn't mean "a nice knock-down argument,"' (*objection. Claim to truth? Appropriateness?*)  
HD: 'When I use a word, it means just what I choose it to mean -- neither more nor less.' (*meta-meta claim, discourse level*)  
A: 'The question is whether you *can* make words mean so many different things.' (*challenge of meta-meta claim*)  
HD: 'The question is which is to be master -- that's all.' (*claim to power*)

Comprehensibility of utterances expressing the semantics which in turn 'serve to carry out some goal' (pragmatics), is crucial to the communicative effort as a whole. Nevertheless, the status of comprehensibility in speech act theory varies. For example, in some discussions of validity claims underlying transactions [e.g. Van Reijswoud 1996], the *claim to comprehensibility* as introduced by [Habermas 1981] is not adopted. [Schoop 1998; 1999:65-6], however, does adopt it, and argues it is relevant to all five types of speech act (Assertive, Commissive, Directive, Expressive, Declarative) and both related to Propositional Content and Illocutionary Force. We side with Schoop in adopting the claim to comprehensibility, but discuss it in relation to other validity claims, and to the semiotic levels.

As for the relation between the Comprehensibility claim on the one hand, and the claims to Power, Truth, Truthfulness, and Appropriateness on the other, we believe there is more to it than a division in five types if meta-communication is concerned. Once the claim to comprehensibility is challenged and a conversation for clarification is entered ('I don't know what you mean by "glory,"'), we enter into a new linguistic domain in which terminology but possibly also all other aspects of language are tuned to meta-communication. Such a conversation has its own dynamics and properties, which may be quite different from those active at the level of the 'success layer', including all four validity claims and authority structures. It is therefore not enough to associate meta-communication with the claim to comprehensibility alone. Let us illustrate this by considering examples of



claims concerning all five validity claims. For sake of the argument, we will discuss them in a somewhat unusual order, Comprehensibility last.

*Power* in meta-communication may seem a difficult claim to substantiate, because thought control is not something that can be easily exerted, and meaning is a hard thing to 'control' in the best of circumstances. However, the claim to power can certainly be made, realistically or not, and up to a certain point successfully. Texts can play a role here, but as we have seen they can only enforce a skeletal, decontextualised form of communicational norms and rules. At the *Discussion* level, power is most easily exerted. If one of the communicating parties, for example, makes the claim to power (Humpty Dumpty: 'The question is which is to be master - - that's all. '), and the other party (Alice, who is a polite English girl), does not want to break off the conversation, then the latter is forced to adopt the meaning of a word at least for the duration of the conversation; yet she can 'drop' that meaning the moment it ends. Note that a situation is possible in which power is exerted at the meta-communicational level, while at the same time no such power can be exerted in other respects.

Whether in meta-communication *truth* of some element of language (for example, the meaning of a word) can be questioned at all is already matter of debate. Can some word meaning be fundamentally 'true' or not? Is it possible to identify a 'false illocutionary act'? One of the oldest questions in philosophy is on the debate between nominalism and realism. Where realism asserts that concepts exist somehow in reality, nominalism accepts the existence of individual objects only; in this perspective, words are arbitrary signs denoting some set of objects. Another question is whether reality has to be reduced to the objective-scientific abstraction of it. A complete overview of these questions is beyond the scope of this paper, but in section 3 we will consider some answers provided by Polanyi.

In explicit meta-communication about meaning, claims are perhaps most typically based on its social use. Language is (at least from one point of view) an inherently social phenomenon ([Habermas 1981], among many others), and it is therefore reasonable to base claims concerning word meaning or use of grammar on *appropriateness*. General usage dictionaries are based on this principle, and if sufficient authority is attributed to such an explicit *text* describing word meaning, a certain meaning of a word may even become mandatory. But even if linguistic conventions are left implicit (as is usually the case), they are crucial in communication because language is based on *common ground* between language users [Weigand and Hoppenbrouwers, 1998].

Linguistic conventions may play a crucial role in language, but the interpretation aspect of communication, which in our view goes in fact far beyond language as such [Winograd and Flores 1986, Harder 1996, Weigand et al. 1999], has also a very individual, subjective component in it. Apart for a claim to appropriateness, therefore, discussing meaning often involves a subjective opinion, and meta-communication an attempt to get across such an opinion. In these cases,

the central claim is *truthfulness*: whether or not someone is sincere about what she ‘feels’ a word to mean. Note that though such a claim can in principle concern general usage of a word, it will most likely be made *in context*.

So what about *comprehensibility*? It is violation of the claim to comprehensibility which may trigger discussion about communication, i.e. meta-communication. However, also at the level of meta-communication, the claim to comprehensibility holds. Since meta-communication needs a language of its own, it is not impossible that this language, and utterances composed using it, include elements not shared by all parties involved, which may lead to breakdown, (meta-) meta-discussion, etc.

Summarizing the validity claims as applied to meta-communication:

<i>power:</i>	<i>X means Y because I say so</i>
<i>truth:</i>	<i>X means Y because that’s the way it is</i>
<i>truthfulness:</i>	<i>X means Y because I can’t imagine anything else (so that’s the way it is)</i>
<i>appropriateness:</i>	<i>X means Y because everyone uses X that way (so that’s the way it is)</i>
<i>comprehensibility:</i>	<i>You know what ‘mean’ means</i>

But what about the meta level in meta-communication? Should communicational rules and norms be community based or may they be enforced by a power-exerting party? “*Can we make words mean so many different things?*” Discussion of such norms and rules applying to meta-communication, whether they exist in a particular context or in general use, is *meta-meta-communication*.

Whereas various claims are made in meta-communication, we do not know yet whether there is one claim that prevails. To answer this question, we will proceed by first discussing some types of word definition.

### **2.3 Definition as a Speech Act**

One of the central activities in meta-language discussion is *definition*, most typically definition of word meaning. Quite appropriately, this immediately calls for a definition of ‘definition’. Here is a nice one taken from (Vanderveken 1990; also mentioned in Viskil 1994:134) (although we will see shortly that it lumps various different kinds of definition together in one):

*"To define is to declare, by way of stipulating, the meaning of a word in a certain linguistic context (e.g. a text or a conversation). From the moment of utterance, the word or phrase defined is taken to have the meaning*

*thereby given (propositional content condition). [...] A definition can fix the sense as well as the denotation of a linguistic expression."*

Below we present a speech-act related, functionalist view on definition as put forward by Viskil (1994), as a concluding part of his elaborate and in-depth discussion of definition. Some of the findings mentioned by Viskil (most relevant to this paper) are:

“Precision of definition is always connected to a certain goal or a certain context. No statement can be expected to hold absolutely or universally; only that it is precise enough for the goal and context for which it was brought forward” (1994:3) [translated from Dutch].

“The break-off point of definition is determined intersubjectively: language users participating in communication together decide whether enough clarity has been achieved –for what they want to achieve” (1994:3).

Viskil, after a thorough comparison of many accounts of definition, distinguishes four main types of definition:

**Stipulative definition:** speech-act type = *language use clarification*; records word meaning with the purpose of clarifying (statement). For example, “With X, I mean Y”; the definition concerns a particular instance of use of a word; the person defining describes subjectively what the word means to her.

**Lexical definition:** speech-act type = *language use assertion*; describes word meaning as attached to a word in usage by language users (observation). For example, “In Dutch, X means Y”; the definition concerns the meaning of a word as it is perceived by ‘people in general’; the person defining takes an objective attitude.

**Stipulative-lexical definition:** speech-act type = *language use clarification through language use assertion*; combines stipulative and lexical definition in that it is an assertion (statement) about word meaning explicitly grounded in observed usage. For example: “X means Y in Dutch, and therefore it also means Y in this particular case”; the definition concerns a particular instance of use of a word, but the person defining chooses to stick to the ‘common’ meaning; the subjective agent conforms to previous objective observation defined meaning, usually as expressed in some authoritative dictionary.

**Factual definition:** speech-act type = *assertion*; empirical description of a fact; not meta-language. A definition-like description is used to explain some object, situation, state, process, etc.; however, such a definition has no meta-communicational function.

Further discarding factual definition (which does not concern meta-communication), there are some interesting relations between various aspects of meta-language as previously discussed and Viskil's definition types:

<i>definition</i>	<i>scope</i>	<i>prevailing claim</i>	<i>TPM layer</i>
<b>lexical</b>	general	Truth	discourse
<b>stipulative</b>	in context	Truthfulness	discussion
<b>stip-lex</b>	in context	Appropriateness	discussion

Figure 2: Relations between definition types and some meta-communication properties

We distinguish discussions on the meaning of a concept from discussions on the reference of a term. In [Weigand and Hoppenbrouwers, 1998], it is argued, in line with Functional Grammar, that a speaker uttering a term performs many linguistic acts: he not only utters words, but also (by uttering a word or idiom) *evokes* a concept and (by expressing a term, consisting of a category and restrictors) *refers* to some entity (that satisfies the conditions that the speaker puts into the term). A question about concept evocation is a question about meaning (definition). A question about the reference of a term is a question about denotation (interpretation).

According to Vanderveken (see above), the illocutionary force of a definition is declarative. This would imply that a definition does not make a truth claim. In the next section, we will go into the nature of a definition, which is closely intertwined with our view on knowledge and concepts.

Without going into the detail here, we must remark that in organizational contexts, definitions are often heavily loaded with normative statements. Think about the definition of an employee, or of a staff member. If a definition influences the obligations and authorizations of the members of the organization, then the definition makes a claim about the appropriateness or rightness of these obligations. A discussion about such a claim has to be distinguished from a conversation for clarification proper.

### **3. Conversation for Clarification**

We will now elaborate on some mechanisms fundamental to conversation for clarification. As mentioned, interpretation in context involves *implicit* information concerning that context, which is not carried by language as such. To clarify the link between implicit (tacit) and explicit interpretation, we will present helpful

ideas put forward by [Polanyi 1958, 1969] concerning tacit and explicit knowledge. We take Polanyi's view on knowledge and its tacit component as a starting point.

### **3.1 The tacit dimension**

When developing their hypotheses regarding knowledge creation, [Nonaka and Takeuchi 1995] draw heavily on the distinctions between explicit and tacit knowledge made by Polanyi. It should be recognized, however, that Polanyi assumes knowledge to exist on a spectrum where *all* knowledge has a tacit dimension. 'Tacit' is opposed to 'explicit' or 'conscious'. "We can know more than we can tell" [Polanyi 1958:95]. The reason for this is that knowledge, according to Polanyi, is first of all acquired by our body and the daily activities we are engaged in. Therefore, it is not only often impossible to externalise this knowledge – think of an attempt to explain someone how to ride a bike – but also not desirable. Knowledge is something that resides within us, and manifests itself through our actions, and we therefore do not *need* to document it for our own sake. We just use it. Should we have to express our tacit knowledge in words, it would not be for our own sake but for the benefits of someone else in our organization or community. Again, according to Polanyi, all knowledge has a tacit dimension. For riding a bike, this dimension prevails. But in many organizational tasks, there is both a tacit and an explicit dimension; the explicit dimension (e.g. business rules) lends itself to inclusion in an automated system.

According to Polanyi, tacit knowledge has two distinct properties: *distal* and *proximal* (also see [Stenmark, 2000]). The proximal term is the part that is 'closer' to us, while the distal part is 'further away'. He exemplifies this by describing how the police helps a witness who is unable to describe a perpetrator to create a phantom picture by selecting pictures from a large selection of human features such as eyes, noses and hair. By attending *from* the first, closer image that resides within (tacit), *to* the second, more distant picture collection, the witness is able to communicate her awareness of the face.

What does this mean for language? Polanyi views language as just another bodily action [Polanyi 1969:193]. It also involves relying on our subsidiary awareness of some things (for example, the syllables) for the purpose of attending focally to a matter on which they bear (the sentence meaning). Only in the case of a breakdown, the speaker can focus his attention on certain parts, but then he cannot focus anymore on the whole. However, Polanyi also accepts at least a weak form of the Whorfian view that our thinking is heavily dependent on language:

*"In learning a language, every child accepts a culture constructed on the premises of the traditional interpretation of the universe, rooted in the idiom of the group to which it was born, and every intellectual effort of the*

*educated mind will be made within this frame of reference. Man's whole intellectual life would be thrown away should this interpretative framework be false" [Polanyi 1958:112].*

Yet this commitment to the centrality of language in our thought does not make him a logicist. In relationship to our tacit knowledge of concepts as proximal term, language is the distal term. It provides clues for the communicating subjects, but does not describe the meaning exhaustively. This holds both for normal sentence meanings and for lexical definitions. In our view, Polanyi in this respect comes very close to the functionalist perspective on language [also see Hoppenbrouwers 2000].

According to Dik's Functional Grammar [Dik 1989:81-], meaning definitions are to be given in natural language and he discards any logical description of conceptual meaning in some formal meta-language. The problem with these meta-languages is not only that they need to be grounded again, since it cannot be maintained that they are self-evident, but also that they ignore the tacit dimension and *assume* from the outset that a set of necessary and sufficient meaning conditions can be found. Dik supports the use of meaning definitions in natural language but emphasizes that these definitions will not provide an exhaustive definition. We could say that the criterion is not whether the concept is described completely, but whether it is *described sufficiently for linguistic purposes*. We call this the functionality principle. For a structuralist this would mean: in order to be able to distinguish the term from sister terms. For example, in the definition of "lending" as opposed to giving or selling, the features "for money" and "temporarily" are significant. In the spirit of Polanyi the functionality principle would mean: in order to be able to communicate and evoke the right tacit knowledge: "*is it a useful clue?*" As far as lexical definitions are concerned, Polanyi can afford to be quite liberal. A metaphor or story can be as revealing as a list of properties. He can be that liberal because the definition is just a vehicle for communication and thinking, not a complete articulation.

Finally, it must be remarked that Polanyi is still a realist. Not in the Platonic sense, believing that concepts exist somewhere outside as ideal entities, but in the sense that the structure and order of (tacit) knowledge reflect structures and orderings in reality. *In that sense, definitions make a claim to truth*. An example [Polanyi 1958:111] is the scientific discussion in the 1930s on the definition of isotopes after the discovery of heavy hydrogen. Heavy hydrogen did not obey the meaning conditions of isotopes as elements chemically inseparable from each other. But the result of the discussion was that it was generally felt that hence the definition should be modified or, one could say, sharpened. "This demonstrates the principle which must guide us when adapting the meaning of words, so that what we say shall be true: the corresponding conceptual decisions must be right- their implied allegations true". In the course of time, meanings are adapted when we

learn more. “Languages are the product of man’s groping for words in the process of making new conceptual decisions, to be conveyed by words”.

### 3.2 Semantic Reassurance

Depending on the argumentative framework that is used, different foundations of discussions about meaning will be deemed necessary or satisfactory. Very often, just exchanging statements (‘X means Y’) is enough to reach consensus (often it is really just clarification: one party asking for more information). In this case, the argumentation form (using Toulmin’s theory of argumentation) is as follows:

```
Claim
  -> X means Y
Data (on which the claim is founded)
  -> X evokes Y with me
Warrant (fundamental, non-inferential justification)
  -> Paraphrasing (Xp) shows recurrent evocation of Y by Xp.
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‘Proof by paraphrasing’ is subjective, but a sincere person will be honest in answering the question ‘do X and Xp both mean Y for me’. Semantic claims on an individual level are never decisive. Semantic claims on a social level may be, but authority is then derived by quantitative means (enough people agree).

Individual meaning is very much association-based. A certain sign evokes a certain association (the proximal term). Also, this is a matter of *explicitness*: a concept can only be ‘seen’ once it is made explicit through some sort of language, where we hope that this representation evokes the same interpretation as intended. Note that some degree of dissatisfaction in explicitly expressing some concept is commonplace.

A primary way of making ‘sure’ that X means Y for an individual, or rather means Y for *various* individuals (the communicating parties), is to express the particular bit of meaning in various ways, not only directly but by various means of expression that all trigger a certain, important aspect of that concept. This includes semantic relations such as PART-OF, ISA, antonyms, etc. It is important to see that such exemplary conceptualizations are presented in the context (with the goal) of finding one isolated bit of meaning. Once enough examples intended to evoke a particular bit of meaning seem to indeed invoke a certain bit, the individuals will become more and more *reassured* that that particular meaning is meant. This all hinges around a question we assume every individual has, so to speak, in the back of her/his mind: how likely is it that all these different ways of evoking one specific association indeed render an identical association while it is still a ‘wrong’ association (i.e. differing crucially from that of the other party)?

If the conceptual meaning cannot be fixed in one step, a process of stepwise lexical decomposition [Dik, 1989] can be followed. This implies that some simpler underlying concepts are defined first. Once these are assured, they can be used to assure the meaning of the focal concept. Note that “simpler” does not mean “more abstract” (higher in a generalization hierarchy) but closer to the basic level of everyday knowledge.

Procedures to establish semantic reassurance presuppose that the person in question already knows the concept (or underlying concepts) tacitly. If this is not the case, the procedure will fail. The partners have to decide whether the issue is essential or can be ignored. If it is essential, some form of learning procedure must start, for example, by giving the person in question hands-on experience (real-life, by means of video, or a story). A good reason to ignore the issue could be reliance on the *division of linguistic labour*, as [Putnam 1975] called it. According to Putnam, ordinary people do not know the exact procedure to determine the true extension of concepts such as “gold”, or “uranium”, but they still distinguish these concepts because they rely on the fact that experts, such as chemists, have a means to keep them apart.

#### **4. Meta-communication and ICT Systems Specification**

As we have seen, meta-communication very directly concerns communication about ‘communication tools’. Considering communication tools at large (including the whole range from NL to specialised ICT applications), there is a gliding scale from quite generally applicable tools (e.g. the basics of NL) to highly specialised tools (like a database or a workflow engine) which support a very particular kind of situationally adjusted communication. In principle, every IC system can be seen as a complex communication tool dedicated to specific purposes [cf. Winograd and Flores 1986:155]; a purpose-specific language. Therefore, talking *about* communication systems functionality falls under our definition of meta-communication, more specifically *ex ante* meta-communication. Though it is has not been so explicitly stated in the LAP literature, this idea has always been an implicit part of the LAP enterprise. However, making it explicit, and looking at it more closely, some questions come to mind as to how meta-communication relates to system specification and design.

Winograd and Flores make it clear that anticipation and prevention of communication breakdown should be at the core of IC system design. Meta communication is an inherent part of the design process of any information and communication system. A system, being fixed (a text), dictates the language that system users have to work with; design of such a system involves *ex ante* discourse about and construction of that language.

[Winograd and Flores 1986:156]: “In a computer-mediated system (as opposed to direct communicational action), it is difficult to maintain [...] the potential for a



dialog in the face of breakdown”. [1986:158]: “New computer-based communication technology can help anticipate and avoid breakdowns. It is impossible to completely avoid breakdowns by design [...]. But we can partially anticipate situations where breakdowns are likely to occur [...] and we can provide people with the tools and the procedures they need to cope with them.”

However, practical consequences for IC system specification and design derived from this perspective only include anticipation of breakdown (ex ante meta-communication). Yet in any situation where background information and interpretation play a role, breakdown threatens [also see Hoppenbrouwers 2000]. Given that in such situations, breakdown can not always be accurately predicted, ex post meta communication should be considered as a potential solution to the problem.

In view of a growing demand for more flexible IC systems, it becomes more and more interesting to provide means for the user to specify (where necessary and if possible) certain properties of the system she works with. For example, specification of ad hoc workflow [cf. Hoppenbrouwers, in progress] and other ad hoc activities cannot be expected to be a part of the design phase.

It is neither possible nor desirable to explicitly conceptualise and communicate at every level of abstraction. For example, for a piano player to make explicit and talk about all her intricate finger movements is not only of little use, but it also interferes with her capacity to play fluently. Explicit conceptualisation may raise barriers for some types of action, for example those involving our muscular and nervous systems at a very low, ‘physical’ level. Care should be taken that such a level is not touched upon in conceptual system specification, but that only higher levels of abstraction are entered which lend themselves to constructive linguistic expression.

If specification of IC systems is considered in view of specification techniques that are currently common practice (e.g. formal conceptual modelling, scenario-based requirements engineering), it may well seem a rather naive idea to introduce ‘run-time specification’ by users rather than pre-use design and iterated upgrades. However, there are opportunities for the development of techniques for the support of more informal meta-communication. Such techniques might aim for semantic reassurance in a controlled and goal-oriented, systematic way, building on previously determined concepts engrained in the system. Feedback of such discussion level meta-communication may eventually be carried on at discourse level (involving system managers) and so influence the more fundamental system specifications *inspired by actual use of concepts*, but it may also simply play a role in the solution of ‘local’ breakdown due to violation of comprehensibility.

In [Schoop 1998:129] it is claimed that “In routine interaction, comprehensibility problems are usually solved by rephrasing and translating. These problems can be easily overcome in face-to-face communication. However, if communication takes place via a written document, there is no simple solution

for comprehensibility problems. There must be some kind of rephrasing according to the different requirements in order to avoid a breakdown due to non-comprehensibility.” As a solution of observed problems of this kind in a case involving digital communication between two professional groups (doctors and nurses), [Schoop 1999:65] proposes a ‘translation system’ taking care of terminological differences between the groups. Such a translation system is an excellent example of an application that both takes the communally determined language apparatus seriously, and will involve a great deal of (ex ante) meta-communication to develop. As argued, however, a translation system will still fail in some circumstances requiring immediate response to breakdown. In such cases, a dedicated system helping agents involved in reaching quick semantic reassurance or possibly a working definition may be very valuable indeed.

Run-time specification of meaningful structures used in communication can be expected to become an increasingly desirable capacity of IC systems as inter-organisational and distributed digital communication increases (e-business, inter-organisational workflow, etc.). While run-time specification cannot be expected to work miracles (given the limited capacity, motivation and resources of most users as well as implementation problems), it may push systems into a level of flexibility and semantic accuracy not achievable through traditional ‘pre-specification’ in the design phase. Once we understand the basic problems facing run-time specification in an IC systems context, which concern (at least in part) meta-communication, we may be able to develop dedicated support mechanisms for it. Some of our future research will develop along these lines. Note, however, that we consider it absolutely vital for such a discussion-level mechanism to be closely linked to discourse level and pre-specification, both procedurally (in terms of system modelling and maintenance) and conceptually (conforming to and complementing the more rigid, formalised conceptual structures of the system).

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