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Sten Carlsson

Karlstad University, Sweden, [Sten.Carlsson@kau.se](mailto:Sten.Carlsson@kau.se)

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# INFORMATION SYSTEMS DEVELOPMENT: PARTICIPATION AND INTERSUBJECTIVITY – IS THIS JUST A MATTER OF COMMUNICATION?

Sten Carlsson

Information systems, Karlstad University 651 88 Karlstad Sweden

Phone: +46 54 700 11 35, Fax: +46 54 700 14 46

email: Sten.Carlsson@kau.se

## ABSTRACT

*In this paper I will present some ideas about successful communication to obtain intersubjectivity/mutual understanding in systems development. I discuss the possibilities of obtaining mutual understanding according to the rationalistic and constructivistic views of language and how this is normally handled in the tradition of systems development. Why is it so important to consider learning and also teaching in the systems development process? This is due to the fact that the communicators cannot fully express the meaning of something by means of language. The gap between what you can and cannot express has to be bridged by means of pedagogical support. The issues of learning and teaching are primarily discussed in relation to some common forms of co-operation in systems development, such as dialogues, group work and assembly meetings. The pedagogical premises for supporting communication and using methods to obtain mutual understanding are presented by means of various examples.*

## 1. INTRODUCTION

The theory on information systems is thoroughly discussed in the perspective of language by Langefors (1969). Goldkuhl (1980), for example, defines an information system as a formal system aiming at informing someone about something. To be informed by this formal system about something means that the communicating actors have to be intersubjective about what they are communicating about. Otherwise they are not able to understand one another about the intention of the message. If they are not intersubjective, they do not interpret this message in the same way. Accordingly the issue of intersubjectivity is integrated in using an information system.

This also means that the communicators in systems development also have to be intersubjective about what is to be communicated by means of the information system during that development. According to Langefors (1977), interpretation and understanding have a double relationship with information systems. Firstly there is a relation between interpretation, understanding and the contents of the information systems. Secondly there is a relation which concerns interpretation, understanding and intersubjectivity in the development process. The importance of obtaining this intersubjectivity in this process is thoroughly presented in Goldkuhl (1993). In this paper the requirements to obtain intersubjectivity in the systems development process are discussed. This will be presented as follows:

- Intersubjectivity according to different linguistic traditions
- How mutual understanding is handled in the tradition of systems development
- Why obtaining mutual understanding is a pedagogical matter
- Some theoretical premises which are presumed to support obtaining mutual understanding
- Some conclusions

## **2. INTERSUBJECTIVITY ACCORDING TO DIFFERENT LINGUISTIC TRADITIONS**

In this part I am going to discuss what intersubjectivity means and the prerequisites to obtain that by means of language and why the systems developer and the end-users have to perform a dialogue to obtain this intersubjectivity.

Intersubjectivity or mutual understanding means that people understand and interpret a linguistic sentence or conception in the same way (Carlsson, 2000). You know how another person interprets the meaning of a sentence, which does not mean that you share the other person's opinion of the consequences of acting according to that meaning. For example you know precisely how a person thinks of child minding but you do not like at all how he/she is doing it. So, if you are intersubjective with a person about something, you can still get into a conflict with this person about what you are talking about. But if the conflict is handled in the spirit of intersubjectivity you know that you are negotiating about something that both of you interpret in the same way. There are, however, different opinions about how you can obtain mutual understanding according to different linguistic traditions. In this paper I am going to discuss this with regard to the rationalistic and constructivistic perspective.

Apel (1972) has criticised the rationalistic tradition. He asserts that it offers two possible premises for obtaining mutual understanding. The first premise is that language is objective in itself. The second premise is that the actors' behaviour can be understood by means of causal explanations (Apel, 1972), i.e. that you do not need to ask a person or communicate with him/her about the meaning of the behaviour. You manage to obtain mutual understanding by means of the explanation.

According to the first standpoint, mutual understanding means that the actors have learned the same words. Learning is a question of integrating as many words as you can. In this sense communication is successful if the transfer of information can be carried out without any distortions and be effectively decoded by the linguistic code model in the human brain.

I do not accept these assumptions and premises for obtaining mutual understanding. Instead I prefer the constructivistic standpoints of how knowledge is established and mutual understanding obtained. According to this tradition, knowledge is not facts given by nature. Knowledge is socially distributed. Mutual understanding is obtained by means of a dialogue in a face-to-face situation. Taking part in this face-to-face dialogue will give rise to a we-relation (Berger & Luckmann, 1971) which is the best condition for getting deeper intersubjectivity with a person. It is by means of this face-to-face dialogue that people learn from each other what they really mean by something in the deepest sense. You learn it by means of the reactions from the other person to what you reply and say to him or her. If you are outside this we-relation you are not able to make use of the other person's reactions so he or she can support your understanding of what is said. Therefore, the more you remove yourself from this we-relation the more difficulty there is for you to understand the other person in a deeper sense. From this position I assert that the systems developer and the end-user have to learn to understand each other regarding the meaning of the design situation. The reason is that they have not previously been together in the design situation in accordance with what characterises a we-relation.

## **3. HOW MUTUAL UNDERSTANDING IS HANDLED IN THE TRADITIONS OF SYSTEMS DEVELOPMENT**

The rationalistic view of language has been criticised in the literature of information systems. Goldkuhl & Lyytinen (1982) have done so according to a linguistic perspective. Nissen (1984) thinks that the rationalistic perspective is too narrow with regard to what research on systems development really should take into consideration. But you can still find traces of rationalistic ideas in literature about methods for developing information systems. In Boman et al. (1993), you can read as follows:

Through a judicious use of language we can make an argument precise and explicit and check whether it is valid or not. (ibid., p 27)

My interpretation of the quotation is that the authors think that it is possible to understand a linguistic sentence if it is formulated in an appropriate way; that is to say the sentence is interpretable from its structure.

According to Winograd & Flores (1986) and Ricour (1976) a typical rationalistic argument is to assert that you are able to understand and interpret the sentence just from its form and pattern. In this case the intersubjectivity is already there through the form of the sentence and its contents.

Concerning the support of communication in systems development, the emphasis has been on description techniques and diagrams (Nilsson, 1995). In *Structured systems analysis and design method* (SSADM) (Downs et al., 1988) you can read that the support of communication depends on the form of the models.

The specific standards adopted within SSADM for diagram construction are intended to be sparse where the diagrams may be shown to users. This is a deliberate attempt to aid communication. (Downs et al., 1988 p 186)

There are two possible interpretations concerning the meaning of the quotation regarding successful interpretation of a diagram. Pedagogically it might be easier to interpret a sparse diagram than a complicated one. In a linguistic sense it might be the opposite. In terms of language a sparse diagram perhaps does not contain enough information for the reader to be able to interpret it. From a semantic point of view you cannot regard the possibilities to interpret systems development documents from their structure or how sparse they are. According to Ricoeur (1976), a sentence is not just a more complex word. It is a new entity. Consequently a diagram is not a more complex component of the components of which the diagram is composed. Systems development documents are also new entities. The meaning of the documents depends on what the drawer means by the documents. Therefore you are not able to interpret the documents by means of their form and structure.

Another way of using description techniques to support communication is to mark the components of the graph with linguistic illocutionary types from language action theory. See figure 3.1.

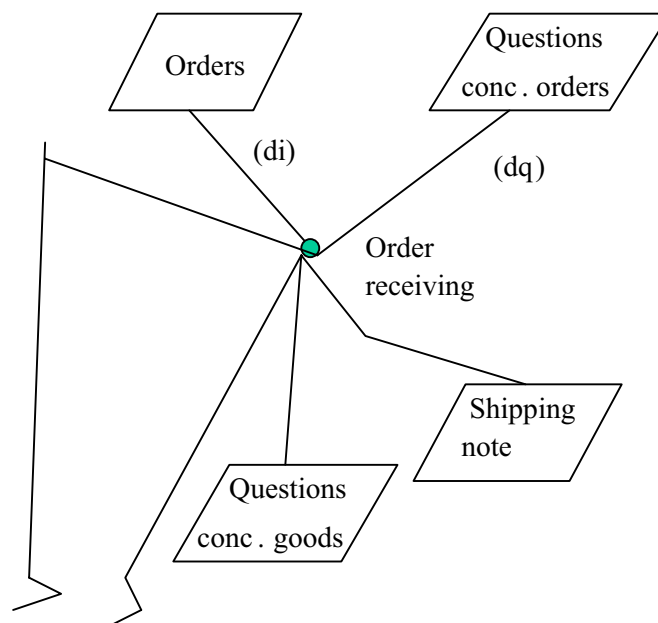


Figure 3.1 Extract from xA-graph (Goldkuhl & Lyytinen, 1983, p 14)

In Goldkuhl & Lyytinen (1982; 1983), for instance, the authors have tried to improve the analysis of the information system by marking the graphs with what types of language actions with the types of languages actions that are going on in the company.

I agree that these marks of illocutionary types may help when studying what types (di, dq) of communicative actions there are in the company. But they do not help very much if you want to understand the meaning of what is said about these actions. These types are nothing other than labels of these illocutionary types and not semantic keys to the interpretation of the speech acts.

My conclusions regarding the benefits of emphasising documentation as support for communication are that neither a diagram nor a model can tell you the meaning of something any more than a written sentence can. The meaning of something is not accommodated in the structure of any representation of sentences or models. Therefore, the actors in systems development have to learn to communicate as a complement to what is common in systems development today, namely just leaning back and trusting the documentation. The aim of the documents is to support oral communication not to supersede communication

What you can see in the literature is that there has not been of any great interest in handling the communication to obtain mutual understanding in the area of systems development. I do not know if this is due to the fact that the concentration has been on description techniques and diagrams. But, if there is any methodological advice in the systems development methods it is too general and empty.

Concerning the support of communication in Object-Oriented Analysis (OOA) (Coad & Yourdon, 1991), I have found three typical classes of arguments (There is a deeper description of the analysis of these arguments in Carlsson (2000)).

The first class I call arguments of general advice on how to communicate, such as: Ask the end-users what they do. Listen carefully!

The second one is where the actors are recommended to use concepts which concern human thinking. The recommendations are such as: Make abstractions of the world around you and try to associate what you can see and hear with something.

Thirdly the arguments concern how the models in the method support human thinking. There are four ideas about this support:

- how concepts are presented
- the amount of documentation which is presented
- the grouping of the models according to parts and the whole
- the design of the model into structures

Even if Coad & Yourdon's arguments are not quite wrong, as you will see when I discuss how documents should be used in a pedagogical perspective, their arguments are poorly substantiated theoretically (Carlsson, 2000). The arguments are just statements. However, the arguments in other method books are hardly better. What is suggested can be classified as common advice. Examples of suggestions are that the end-users should be active (Hugosson et al., 1983), the ways of showing something should vary (ibid; Eriksson, 1989), and the systems developers should perform an interview (Apelkrans & Åbom, 1988).

My conclusion concerning this part about language and communication is that the actors have to learn to communicate to obtain mutual understanding in systems development. To be able to obtain that mutual understanding they have to take pedagogical theories into consideration. Obtaining mutual understanding is not just a linguistic matter, it is also a pedagogical one.

#### 4. WHY OBTAINING MUTUAL UNDERSTANDING IS A PEDAGOGICAL MATTER

Why is it so important to consider learning and also teaching in systems development? This can be explained in at least two ways. One way is to argue that the aim of systems development means that something is changed. In a relational pedagogical perspective changes mean learning (Svensson, 1984). When something is changed you have learned to consider the external world in a different manner.

The second argument concerns the idea that learning and teaching are integrated in language. I have constituted the premises for learning and teaching in communication from Ricoeur's (1974) discussion about the dialectic of event and meaning. In this dialectic relation there are, according to Ricoeur, some important conditions which must be fulfilled if the actors are to be able to understand each other. To be able to interpret what is said, the smallest part of a sentence – the predicate – has to be identified and related to the subject. This is the objective side of an utterance. The intention of that predicate and the speaker's meaning of the sentence may now be interpreted because the sentence refers back to the speaker. In the dialogue, Ricoeur asserts, the possibilities to interpret the illocutive intention and the intention of propositional content increase. As he wrote, "the dialogue reduces the field of misunderstanding" (ibid., p 17). It is then in the dialogue that the pedagogical problem will be evident, since you are not able by means of language to express fully what you are thinking of. The listener then by his/her intention of recognition (ibid.) tries to bridge the gap between the utterance and what the speaker is not able to present of the meaning of the sentence through language. It is this intention, the dialogue and the reference which constitute the pedagogical premises for those who try to explain something. My conclusion is that you have to present what you want to say in a way that makes it easier for the listener to recognise what is said.

What can the communicators do if they want to improve the possibilities to bridge over what is not possible to present through language? They can do it by using pedagogical strategies. It must be easier for the listener to understand what you mean if you use a pedagogical strategy which supports his or her intention of recognition, so it will be easier to recognise the meaning of what is presented. That is why communication and systems development concern learning and teaching. The listener tries to learn to understand in the dialogue and you try to teach him/her to understand.

As a closing remark in this part I will say that what has to be fulfilled in a dialogue in order to obtain mutual understanding also concerns all other types of communication. You will never make it easier to obtain mutual understanding by using other forms of communication. The difficulties are the same as in a dialogue.

#### 5. SOME THEORETICAL PREMISES WHICH ARE PRESUMED TO SUPPORT OBTAINING MUTUAL UNDERSTANDING

In this part I am going to present some premises for how you can support the possibilities to obtain mutual understanding by means of pedagogical theories in systems development. These examples concern forms of collaboration in systems development such as the dialogue, group work, and assembly meetings. Furthermore some methodological examples will be presented.

An overall pedagogical idea concerning this presentation is that the pedagogical strategy should be built upon how the learner thinks about the contents of what is discussed or learned. By knowing these premises the development actors can enhance the possibilities to obtain mutual understanding by steering the dialogue towards each other's thinking about the contents.

**Dialogue.** The first example describes the premises for handling the communication concerning the reference the actors have about the product. According to Ricoeur (1976) you always refer to



something which legitimates the truthfulness of the utterance. To be able to obtain mutual understanding it is then important to know that the actors can manage to talk about the same reference. I assume that the systems developer and the end-users have not participated in a design situation according to a *we*-relation. Consequently they probably do not refer to the product in the same way when talking about it.

Depending on the actors' knowledge of the reference, I assume that there might be four different references integrated in the dialogue. These four references are:

- the end-users' obvious knowledge of the product
- the end-users' projected knowledge of the product
- the system developer's obvious knowledge of the product
- the system developer's projected knowledge of the product

By obvious knowledge I mean experienced knowledge, for instance the end-users' experienced knowledge about an invoice system and the system developer's obvious knowledge, which in consequence of what was said above are not the same. By means of projected knowledge the end-users and the systems developer guess how they might develop the invoice system.

In order to obtain mutual understanding the actors now have to make sure that that they are talking about the same reference in the dialogue. Otherwise they cannot understand each other.

The second example concerns how the actors think of actions and objects. To support guiding the communication towards human thinking in the dialogue, it is important to know the guiding premises for how actions are related to objects. In order to understand an action the actor thinks of the aim of the action. At the same time this actor thinks of what objects he/she has to use and their shapes. If you want to obtain mutual understanding with that actor about his/her action and what objects he or she uses when performing it, you have to guide the communication towards the action, its aim, where it starts and where it will end.

The third example concerns how the actors think of objects. According to Winograd & Flores (1986), actors think of objects between present-at-hand and readiness-to-hand. When the object is present-at-hand, you think of what it looks like, its shape and so on. When it is ready to hand you don't. What the object looks like will come into your mind if there is a break-down (*ibid.*) of some sort when using it. When you write you do not think of the pen. But you will become aware of the pen if the flow of ink stops.

Both these perspectives have to be discussed in systems development. The first one has to be discussed when you have to decide what contents there should be in an index. The concept of readiness-to-hand will be relevant when discussing the usefulness of the object.

It is important to be aware of which of these perspectives you are thinking about in the dialogue and of the guiding premises for it. With regard to mutual understanding it will not be easier to understand each other if the actors do not talk about the object in the same perspective. Another problem is that you cannot fully understand the issue of readiness-to-hand without using the object (*ibid.*). Therefore you have to think of what problems will arise when an actor who knows how the object is used is trying to show its usefulness to another actor, who does not, with the help of a picture of the object present-at-hand.

**Group work.** Communication when the actors collaborate in group work is one form of co-operation in systems development. The problem of communication in group work is partly a psychological one and partly a pedagogical one. To support the person in a psychological way in this context you have to enhance his or her self-respect (Hägerfors, 1995). The actor must feel that his or her position is no less authoritative than the other actors in the group. The feeling must be that the actors take part in the group work on equal terms. If as project leader you are going to support the communication, the actors must feel as if they are presenting something, not that you are examining them. The discussion should

contain a mixture of questions and assessments of what is presented. Assessments alone will lead to failure.

Learning may be supported in communication if learners can participate on their level of knowledge, if they can control their language strategies. Barnes (1978) asserts that this depends on what he calls inner speech. We use our language not just for communication. We also use it to support our thinking. In a way we speak to ourselves when we are arranging our minds according to our problems. To be able to use our inner speech for this support, the problem has to be on the same level as our language capacity. If the problem is too difficult our capacity to talk about the problem is not enough. Therefore we cannot take part in the discussion. As a project leader you have adjust the problem to actors' language capacity. You can do that by permitting the actors to work with the problem by themselves.

**Assembly meetings.** In assembly meetings the understanding of information may be supported if you realise how you can help the listener to get a conception of internal relevance of the contents (Hodgson, 1995). This means that the listener tries to put the contents into his or her working situation. If the listener gets a conception of external relevance of the contents, he or she will have a superficial interest in those contents. An acting conception of relevance may help the listener to be interested in the contents later on. Such a conception is not related directly to the contents. But if the lecturer is enthusiastic or is able to show good examples to the listeners, they may get such a conception.

One way of getting the listeners interested in the contents of such a meeting for introduction of a project is to ask what they want to know during that meeting (Carlsson, 1987; 2000). They want to know for instance (ibid.):

- *Overall conditions in order to start the project:* Is the project relevant? What does the project mean for the working situation? Who does the project concern? Can we rely on the fact that the members of the project team have enough competence?
- *Questions which concern the project when it has started:* What are end-users possibilities to influence the project? Who is responsible for the project? How do we get information during the project?
- *Questions which concern the implementation of the result:* the need of training related to the working situation; how the implementation is to be performed; if we are going to use parallel systems?

**Method.** The suitability of the method to human thinking is supported if the method may be suitable to represent the differences between present-at-hand and readiness-to-hand in the actor's actions. As I mentioned above, you cannot fully understand the issue of readiness-to-hand without using the object (Winograd & Flores, 1986). Therefore you cannot make an analysis by means of models which just show what is analysed according to a present-at-hand perspective. If the problem of analysis in the perspective of readiness-to-hand has to be fully understood you have to make the analysis in that perspective. That is why prototyping must be used now and then in systems development. It is the only way to present a dialogue with a computer in a readiness-to-hand perspective.

It is also important that what is represented by the method is adapted to the way that thinking switches between parts and the whole. When you interpret something your thinking switches between parts and the whole. What you get out of the interpretation of a part depends on what wholeness you have taken into account. If you and another actor are discussing a part, both of you have to be aware what wholeness you are thinking of. If you do not think of the same one how do you know that you will understand what is discussed mutually? That is why I assert that we have to represent both the part and the whole in the documentation. Then the chances are enhanced that we talk about the same problem and the same background of that problem.

The suitability of the method also concerns how you search for objects. According to Coad & Yourdon (1991) the natural way of thinking is to do it according to the objects, which is asserted to be



an advantage for object-oriented methods. In Carlsson & Christiansson (1999) we explain why it is not. According to Schutz & Luckmann (1974) the objects come into your mind when you are going to perform an action. What objects you think of then depends on the aim of the action. Therefore the meaning of the suitability of the method is that you have to search for the objects by asking for the aim of the action and the action itself.

## 6. SOME CONCLUSIONS

Learning in order to support communication in systems development has not been in focus to the extent that it should have been. The emphasis on research on that support has instead been on models and diagrams. My suggestion concerning this is that the actors in systems development have to learn to communicate as a complement to just leaning back and trusting the documentation.

In my view, an important issue of learning concerns how to obtain mutual understanding in communication and to enhance the members' ability to be good communicators. In that sense the actors have to be aware of what premises there are to be able to obtain mutual understanding according to a constructivistic view of linguistic theory. Such guiding premises are, for instance, that people very often interpret words and sentences differently and that intersubjectivity is a question of the ability of obtaining mutual understanding in a face-to-face situation. Understanding language is not a matter of strictness in using language and models. The only strictness I recommend here is to be observant that the actors try to speak about the same thing from the same context. They should also be observant of the way in which people think of objects with regard to actions and concerning the act of interpretation they should be conscious of what whole they are talking about. To support this, the communication has to be guided towards the actors' thinking so that the actors recognise what is said to them.

In group work open communication has to be supported. To this end it is necessary to develop the members' communication competence and encourage a discussion which permits the members to act at their level of language competence.

The communication in assembly meetings can enhance the listeners' interest if the contents will help them to get an internal conception of relevance of those contents. This means that listeners try to understand what the contents mean to their working situation.

Furthermore the methods used have to suit how actors think about objects and how their thinking switches from part to whole.

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