

The Context of Conversations

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Section One

Texts and Communities

1. Introduction

In their influential book **Understanding Computers and Cognition**, Winograd and Flores not only introduce the use of speech acts in modelling communication, but also present a fundamental critique of the rationalist view of cognition that underlies most work in Artificial Intelligence and Computer Science. Drawing on the philosophy of Heidegger, they attack the possibility of making complete models of (parts of) the world that can subsequently be used for building intelligent systems incorporating these models. For example, they argue that (Winograd, T. & Flores, F. :1986, p34-5):

- a. Our implicit beliefs and assumptions cannot all be made explicit
- b. Practical understanding is more fundamental than detached theoretical understanding.
- c. We do not relate to things primarily through having representations of them.
- d. Meaning is fundamentally social and cannot be reduced to the meaning-giving activity of individual subjects. The world is encountered as something already lived in, worked in and acted upon before we start thinking possible utterance presupposes it. That which is not obvious is made manifest through language. That which is obvious is left unspoken, but is as much a part of the meaning as what is spoken (Ibid: p58). In this paper, the researcher likes to arrive at a deeper understanding of what is meant by **explicit** and **implicit**. Roughly speaking, “explicit” versus “implicit” is mostly taken to mean “represented by symbols” versus “being present in peoples minds”. Vague as this may seem, it is often the bottom line in most non-theoretical discussions which involve these notions. Mostly taking an individual perspective, cognitive science deals with concepts as part of the question how our mind/brain works. It is better to avoid this field as

such, taking the neutral stance that it is still unclear whether or not symbolism is fundamental to cognition, or whether symbol manipulation is just one of the many tricks up the sleeve of the human mind. The most prominent alternative to symbolism is connectionism (Bechtel and Abrahamsen, 1991) However, communication being a social activity, it requires not so much an individual but a social, **communal** approach to knowledge. **Communal knowledge** refers to knowledge people share, or have in common.

Communication is based on the existence of some common ground between communicating parties, but this common ground may include quite a few different kinds of knowledge. The most basic common ground human beings share is that they are all humans, with some shared experience as a result of their inherently similar biology and basic psychology. At some level, this includes an innate capacity for acquiring language (Pinker, 1995). On top of all this, there are many similar experiences as humans grow up, which, however, may differ to a considerable extent (culture and personal history). Beyond this, experiences can be shared right up to highly specific domain level (e.g. specific work) and even situations, for example a task. All these experiences result in the acquisition of knowledge, of many kinds and at many levels.

In and through social interaction, humans create communal norms, values, and rules. Norms and rules are not necessarily explicit; in fact, many are not. Communal signs, i.e. “agreed on” (shared) combinations of forms and meanings (most typically words) could be seen as akin to other kinds of agreement (e.g. implicit rules, norms, values). Agreement on sign systems enables people to communicate, provided that they are part of the same community and thus partake in a certain number of communal agreements. When used in conversations, signs are interpreted with in the background a wealth of contextual agreements in addition to some information provided in the actual conversation In some cases, people “fix” agreement by means of texts. This may be done either deliberately or coincidentally. In any case, it involves symbolic constructs (usually complex): independent objects (artifacts) information revealing their origin, but how this information is interpreted and whether it is deemed important depends on the interpreting party just as all other information contained in

the text. Note that not every explicit conceptualization represents agreement which holds outside the conversation. Whether or not it does depends on the authority assigned to the text and whether it is valid at the time of interpretation. Very domain-specific shared meaning can still be communal knowledge, even though the community may be very small. And very general knowledge may exist in a very explicit form, for example in the case of formalised international laws. So it is not possible to say that implicit knowledge is general and explicit knowledge specific.

Essentially, humans always act upon internalised knowledge. Text is not knowledge; it is of course just a representation. However, text may well have a strong control over internalised knowledge: depending on the authority (incl. trustworthiness) of a text, it may actually shape internal knowledge.

Section Two

2. A new Model of Conversational Context

In this paper, the researcher wants to develop a new model of context in line with the Language/Action Perspective. It is preferable to draw on the three levels of communication used by Dietz (Dietz, 1990). Dietz distinguishes between a documentary level, an informational level, and an essential level. At the documentary level, one can see messages going around represented in some medium. The medium can be speech, writing, computer records, or whatever. At the informational level, the operation at a level of abstraction is higher than the medium and the focus is on the content of communication: the information that is exchanged. At the essential level, usually it is focused on what communication brings about, on what has effect in the intersubjective world¹. Note that the documentary level and informational level together make up what is traditionally called the “sign” as a combination of a token and a signifier (de Saussure, 1916). Linguistic acts (referring, predicating) are performed by means of utterance acts (Searle, 1969). Linguistic acts themselves are instrumental in the execution of speech acts (Weigand, Hoppenbrouwers, 1998).

The researcher claims that context can also be viewed on these three levels:

a. Context at the documentary level. location in which the message is represented. For example, a message “the price of product X is Y” can occur in a price catalogue, but also in a strategic scenario. The context of the message plays a role in the

interpretation.

b.Context at informational level.. A message contains information, but this information is most often only partial. As Dik (1989) states, messages are more like Delta's: they specify a kind of operation that the Hearer must apply to the shared knowledge. At the informational level, the context is the total of background knowledge relevant to the message that the communicative agents share. The fewer contexts they share, the more explicit the message has to be.

C. Context at the social level. The effect of communicative acts is dependent on social institutions or conventions. As Derrida has spelled out, a communicative act would have no effect if it would be unique, without precedence or possible succession. The speech act of marrying is rooted in the age-old institution also simpler speech acts like asking a secretary to copy something depend on role definitions of a secretary and sometimes on task descriptions that an organization has fixed.

In other words, context has a locational character (the physical or virtual space), a symbolic character (the knowledge space), and a social character (the social world). Secondly, the researcher distinguishes implicit and explicit contexts. There is always a context, but it need not be explicit: it is only explicit when it uses symbolic signification ("language"), and when its boundaries are clear and serve some identifiable purpose. On each of the three levels, this means the following:

a. Documentary level. The context is explicit when it is separated. A whiteboard offers an explicit context in group discussions. A company product database is also an explicit context. An explicit context is finite. In contrast, everyday language sometimes draws on the whole body of world literature, for example, when a reference is made to a biblical image. This context is implicit.

b. Informational level. The shared knowledge of the agents can be left unexpressed, or it can be made explicit, typically in the form of a text. In the case of an organization, the explicit informational context consists of all kinds of shared knowledge resources, also called "organizational memory" (Reimer 1998).

C. Social level. The context is explicit when it is institutionalized, for example, in the form of an organization (Taylor 1993). Other examples are an auction, or an edifact agreement. The context is implicit for example in family life or in business as long as

it is based on notions which are usually not further defined, like “fairness” and “trust”.

It is better to should keep in mind that the three levels are levels of abstraction, the case when they are not separate domains. This is also applied to explicit context. For example, an edifact agreement is a contract (agreed-upon procedure) at the social level, but it takes the form of a text (informational level) written on some identified piece of paper (documentary level).

Note further that at all the three levels of abstraction, it is possible to distinguish atomic and complex objects. For example, on the documentary level of message, it is not only there are characters, but also words, sentences and message sequences. On the social level, it is not only there are elementary speech acts, but also larger conversational units. In (Weigand & van de Heuvel, 1998), five aggregation levels are distinguished: speech act, transaction example, the speech act of requesting cannot be seen without taking the transaction (request/commit) into account, since only in this context, the request becomes meaningful. In another context (another transaction), the workflow, contract/interaction, scenario. In some sense, larger units function as a context for smaller units. For meaning of the request may be quite different. Although differing in details, a similar aggregational notion of context was already introduced in the Milan Conservation Model (De Michelis et al, 1994) that stresses the situatedness of conversations in "work practices". In this paper, the researcher will not focus on this aggregational notion of context.

2.1. Implicit vs. Explicit Context

The distinction that the researcher has made between implicit and explicit context needs some further discussion, since in the researcher's view, the distinction has not been sufficiently recognized in current LAP approaches. A notable exception is Taylor (1993; 1996a; 1996b), to whom the researcher will come back shortly.

Winograd & Flores have stressed that language is performed in a given world, which is an open-ended, not explicitly given life world. This life world constitutes the context for speech acts. In other words, W&F make a distinction between implicit context and explicit language. However, this binary distinction hides the fact that explicated context (explicated by means of language) can itself function as context for new language acts, and in this case, the researcher has to do with an explicit context. It

might be argued that the implicit context is never exhaustively explicated, and hence the explicit context does not totally replace the implicit context. .But what is important at this point is that there are explicit contexts and that they do play a role in the interpretation of communicative acts.

There is one important condition for the existence of explicit context, and that is that the language acts that explicate the (implicit) context have effect over a longer period of time. Therefore, the possibility of explicit context is closely bound to the existence of writing as opposed to oral speech. It is not absolutely necessary, since a language act can for example also be kept in memory and retold in the form of myths, be recorded, or whatever, but obviously, the existence of a writing system greatly facilitates the representation of explicit context. Although the possibility of explicit context is not worked out in Winograd & Flores, it is completely in line with the phenomenological approach that they take. They show how language creates a new world against the background of an implicit life world. Much in the spirit of Derrida, it is possible to say that in writing the power of language is even more clearly visible than in dialogue. Therefore, writing should not necessarily be seen as opposed or orthogonal to communicative action, but rather as capitalizing on one of its main functions, that is, the disclosure of the world. Before taking a closer look at “text” and “community”, and the relationship between them, let us give some concrete examples of “text” in an organizational environment.

1. An interface specification between two systems
2. A database with personnel records
3. An EDIFACT agreement between two companies
4. An employee’s contract
5. A mission statement
6. A map of the company building
7. The budget overview for the next period
8. A management report
9. A product catalogue
10. A web-site with articles on some topic
11. A name sign on the door of the room

12. A (paper) telephone guide

In all these cases, the researcher is dealing with persistent linguistic objects. They describe or explicate the implicit context. In some cases, the focus is on social relationships: for example, an edifact agreement that describes explicitly the obligations and rights of two parties. In other cases, the focus is on shared knowledge of the world: for example, the telephone guide. Also subjective views and intentions can be explicated: the mission statement is an example. But apart from describing the implicit context, the texts provide a context for the conversations in the organization as well. For example, in the presence of a product catalogue, an order procedure can refer to a product number instead of describing the product completely every time. So texts have two faces: a face towards the implicit context on the one hand and a face towards the conversations on the other. Most of the examples are texts that are closely related to a certain organization. Articles are typically positioned at a more generic level. Even if they describe a certain situation, e.g. a case study, the underlying goal is to come to a more general understanding. In other words, articles do not describe the contexts of a particular organization, but are part of a body of communal knowledge (see section 2.3). The other examples are all related to a particular organization, or its environment.

2.2. Texts

James Taylor (1993; 1996a; 1996b) has described, in a series of articles and books, the importance of text for organizations. Conversations and texts are dependent on each other in an entangled hierarchy. On the one hand, conversations can be viewed as occurring in an organization, in other words, against the background of texts; on the other hand, the organization and its texts are created and maintained over time by means of conversations. In this way, text and conversation are complementary but irreducible worldviews. Not surprisingly, many of Taylor's arguments are derived from the philosophy of Jacques Derrida, which can be called a philosophy of writing (Derrida, 1988).

According to Derrida, there has historically been a prejudice to see dialogue and speech as primary and writing (text) as derived and secondary. The rationale for this assumption is that with writing something has been added (a "supplement"): marks or

traces that persist beyond the moment of their production. However, what is special about writing, according to Derrida, is that, unlike speech, it can be detached from the speech situation, author, and original recipients and hence has a certain degree of autonomy. It can be used and reused in many situations just because it is not bound to any specific situation. In this way, writing is not an add-on to, but the enabler of communication.

The only way communication can occur is if an utterance can exist independently of its speech situation. It is only because the speaker draws on this potential that she can put it to use in the specific speech situation. Signs that do not rely on a given autonomous potential are limited to indexical or iconic behaviour: pointings and grumblings. So in this way, even utterances of ordinary conversation are themselves a form of writing (Écriture).

Taylor also builds on the work of Ricoeur (1986) on "distanciation". According to Ricoeur, discourse (language) differs according to whether one can think of it as an event or as work. Discourse as an event is seen as realized temporally, in the present, referring to a specific situation, addressed to someone. Intention and meaning overlap. Discourse as work is seen as fixed (in writing), referring to a general world, accessible to everyone. Intention and meaning are dissociated. By writing the discourse down, it is "objectified". Taylor identifies no less than six degrees of separation when a conversation is translated into a text (space does not allow us to repeat them here).

Whereas most LAP approaches today focus on the description of communication structures, the researcher suggests to take another dimension into account as well: the line that goes from conversations to explicit context (texts) to implicit context. Once one can do take texts into account, besides conversations, several interesting questions can be posed. For example:

- a. What exactly is the role of texts (for example, a signed contract) in relation to conversations? How do we formalize that subsequent communicative acts derive their effect from such a text, and are not effective otherwise?
- b. How is an implicit context disclosed in explicit context, and why?
- c. In which cases are explicit contexts needed, and in which cases not?

d..What is the effect of an explicit context on the form of conversation? It seems that there is a trade-off: the more explicit context is given, the shorter and more direct the conversation can be. On the other hand, in the absence of explicit context, the conversation should be more elaborate and explicit itself.

2.3 Communities

In (Clark 1996), a functional approach to language in which language is viewed as a form of joint action. It is the joint action that emerges when speakers and listeners perform their individual actions in coordination, as ensembles. Clark argues persuasively that conversations as joint activities presuppose certain common ground, and also add to it. Common ground is defined roughly as “a shared basis of propositions where every member of the community has information that the shared basis holds, and knows that the every member has this information” According to Clark, common ground is essential for coordination. In fact, he asserts that for something to be a coordination device, it must be a shared basis for a piece of common ground. An explicit agreement made by two parties can be a coordination device, but also a precedent can take this function; as long as it is part of common ground. If common ground is an essential condition for coordination, how do language users find the shared bases for common ground? To answer this question, Clark comes to communities. People could be categorized according to what they know or believe. The main categories are cultural: for example, nationality, profession, hobbies, language, religion or politics. A cultural community is a set of people with a shared experience that other communities lack. Ophthalmologists do not all live in one place or know each other, but what makes them a community is a shared system of beliefs, practices, nomenclature, conventions, values, skills and know-how about eyes, their diseases, and their treatment. It must be stressed that a community is more than a collectivity of people. It is only a community when there is a certain "consensus" on "common ground" (cf. Weigand & vd Heuvel, 1997).

What are the contents of communal common ground? Clark gives a tentative answer. First, it contains information about human nature. This is grounded in the fact that humans share similar bodies. Secondly, there are what Clark calls communal lexicons. Different languages offer different lexicons, but within one language,

sublanguages can be distinguished that have their own “slang” or “terminology”. In some sense, it can be argued that any lexicon is communal: conventional word meanings hold only for words in particular communities (Lewis, 1969). Thirdly, there is a body of cultural facts, norms and procedures. This includes knowledge about (social roles, such as those of husband, or neighbour, and what can be expected from them. It is the kind of knowledge that AI has tried to capture in the form of scripts.

The question of how to find the shared basis for common ground can partly be rephrased as a question of how people recognize someone to belong to a community. Different kinds of evidence can be used to determine community membership. The simplest is natural evidence: for example, if someone starts talking in French, you know he is a speaker of French, and probably a member of the French culture. But there is also deliberate display of community membership. Examples are dress codes (male/female, white-collar/blue-collar etc), or badges used by certain personl.

The relationship between text and community is two-directional. On the one hand, communities “ground” texts. A text that is not supported (anymore) by a community, for example, an old Babylonian constitution, can be interesting for a group of scientists as an object of research, but it is not effective anymore. The community is also a reference point when interpretation conflicts arise. On the other hand, texts can help to “identify” communities. The common knowledge of a community need not be explicit, but especially in the confrontation with other communities, or in the face of internal conflict, texts can help to establish the identity of the community. Examples are national laws, a canon of scientific journals of a certain field, but also mission statements in companies, or just a company logo.

2.4. The Ambivalence of Texts

Fixing shared meaning and making it explicit helps by limiting the options people have in interpreting communication. Since communication creates overhead, action with a minimal need for prescriptive and supporting communication is optimally efficient. (Note: if computerised systems consisting of symbols count as texts, computerisation is the ultimate form of text: it makes procedures explicit to the level of actually automating them). In this respect, texts are a mixed blessing at best: they help fix agreements of interpretation (and hence help decrease uncertainty), but unless

they are completely formal, they themselves allow relatively much room for interpretation compared to most verbal, situated conversation. To make the context of a text clearer (thereby reducing uncertainty of interpretation), other texts may be used. Thus, texts may help delimit the “interpretation space” of other texts. For example, national law requires jurisprudence to be interpreted. Many actions (including linguistic and communicative actions) require a degree of flexibility in behaviour which cannot be statically prescribed. Therefore, fixing agreements (i.e. making shared knowledge explicit) can easily have unfortunate consequences, especially if such agreements concern procedures of a mandatory nature, and then become an impractical burden. They may cause situationally inappropriate actions to be carried out even if the agent responsible is aware of this (i.e. the authority of the text overrules individual, situationally determined action). This is the well-known problem of bureaucracy. The use of texts may have some further unintended consequences. In the first place, texts are entities with an existence of their own. This means that they are owned by somebody or some group. The owner may restrict access to the text, consciously or unconsciously, and thereby make it difficult for outsiders to understand the conversations that occur. The owner may also restrict the updating of the text.

If communicative agents have put their way of working in a text, and then want to change their way of working, the text must be changed. In that case, the owner of the text must cooperate. As a practical example, consider the case of a piece of software (based on some design document). If users want to change the software or the design document, they have to apply for these changes at the IT department, since this is the subject by which the software is owned, or at least maintained. There is abundant evidence of cases in which this process is cumbersome and time-consuming. It might be suggested that in some cases the owner can be eliminated, or that the group itself is the owner. However, even if this is possible, there needs to be some procedure by which the group can come to updates of the texts, since it must be a coordinated action.

Simone (1997:33) discusses a related problem that she calls **linguistic opacity**. This involves "the uneasiness people may experience in moving in a linguistic framework which is perceived as unfamiliar". Opacity arises from the discrepancy between the knowledge possessed by the cooperating actors and the knowledge

needed for the interpretation of the messages they exchange. There is a negative feedback cycle here. A group tries to harmonize its knowledge, and deliberately builds up a common set of references. This leads to the people simplifying communications by exchanging ambiguous and incomplete information (without the intended common ground) whose interpretation can become difficult in the presence of different sets of references. The chaos system (De Cindio et al, 1986) tries to address the linguistic opacity problem by supporting the "creation and maintainance of contexts". This includes not only "linguistic" knowledge about concepts and actions, but also organizational context and public commitments. From a more philosophical point of view, the text can be seen as a world in-between our conversations and the social lifeworld. As such, it may take on a life of its own, and hence obscure the lifeworld. Both Foucault and Derrida have described the process in which we become dominated by the texts that humans create themselves. Language imposes a map of the world, and humans only have access to the world through this map. In Cooper's words (cited in Taylor), "writing is the process by which human agents inscribe organization and order on their environments". Having done so, they also have to live in this environment. In the work of Habermas, the distinction between lifeworld and system world plays a central role (Habermas, 1994). The lifeworld is what communicative action is grounded in. But system worlds have arisen because of increasing rationalization, and these system worlds sometimes support, sometimes take over (colonize) the life world. It would be interesting to see in what respect Habermas' system world corresponds with our text level. In both cases, there is something that exists between communicative action and the lifeworld. Habermas does not discuss text (or writing) as such. He focuses on communicative action, and although this does not exclude the use of written media, it is usually interpreted as being a synonym of conversation. Note, however, that the definition of communicative action as coordination of action on the basis of a shared understanding (Verständigung), i.e. the idea of a "common world model", a shared context, not as a given but as something (jointly created, already contains what is called the textual character of communication). If system world and text have a common denominator, this would be quite interesting since it would show that system worlds are not necessarily opposed

to communicative action, but intimately connected to them, as texts and conversations are. It would but also can take the form of a simple text that is agreed upon by a group of subjects. Of course, there is another show in which system worlds are not necessarily as huge as "the market", quantitative difference in impact, but there would be no qualitative difference. Finally, Ricoeur has pointed to the fact that text as "work" may give rise to styles and professional customs concerning this "work". This is a natural development. But sometimes the professionalism may hinder the transparency and accessibility of the texts. In former days, writing was a skill that only a few possessed, and for that reason, access to writing automatically divided the more powerful and the powerless. Nowadays, computerized information systems, for example web-sites, may become the exclusive domain of technically or perhaps artistically skilled people. Although it is abstracted from this aspect when one considers the text on the informational or social level, it has to be taken into account when one tries to represent or design a real-life communicative situation. In the next three sections, the explicit context model developed so far is illustrated by three cases: the design of a communication tool, the management of Organizational Memory, and the support of professional communities. The three cases exemplify the three abstraction levels at which context can be studied.

2.5 Contextual Knowledge

The distinction that the researcher has made between explicit and implicit context corresponds roughly with the difference that is often made in Knowledge Management literature between explicit and tacit knowledge. Although tacit knowledge is often connected with personal experiential knowledge, Nonaka & Takehuchi (1995) draw a further distinction between individual and organizational knowledge. The latter kind is shared by the members of the organization. The process of knowledge generation is described as a never-ending spiral that involves four modes of converting tacit and explicit knowledge: **socialization** (tacit to tacit), **externalization** (tacit to explicit), **internalization** (explicit to tacit), and **combination** (explicit to explicit). They also stress the communal basis of organizational knowledge (Nonaka & Konno, 1998) The ambivalence of texts should be taken into account when organizations promote knowledge externalization and knowledge sharing. Following

the previous discussion of textual ambivalence, the following remarks can be made:

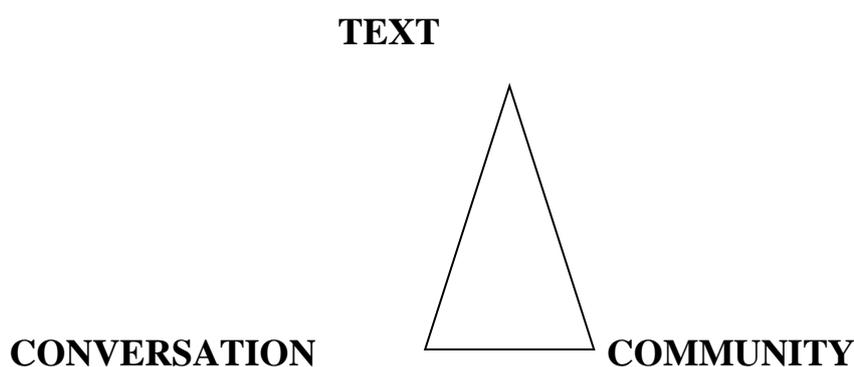
Writing down knowledge is a creative process that requires some effort. This effort should be recognized as such, and not considered as just “typing in what is already there” (say, in someone’s head). Even an apparently simple task like making minutes of a meeting requires more than a mere transcription of the conversation. It involves active selection, translation from speech style to written style, highlighting decisions and action points, etc. If the knowledge thus made explicit is intended for potential use in other Knowledge is only relevant when it is connected to the communication processes, i.e. ongoing contexts, care must be taken that ambiguities and potential interpretation problems are avoided. Knowledge is not an individual affair. For example, when a senior consultant is asked to frame his expertise in a knowledge base for the benefit of junior consultants, this is a reasonable request only if there exists a mode of communication between the seniors and juniors in which the former have the role of coach and the latter the role of student. Alternatively, one could ask the senior to write a report after every finished job, and use this as a basis for evaluation. In this case, the knowledge creation is embedded in a conversation between the senior and her manager, and its use as a part of organisational memory would be secondary. A third possibility is to develop knowledge through a group communication process, e.g. by means of a workshop or Electronic Meetingroom session. Any method can be chosen, but the attempt to share knowledge should be connected to some communication process. Explicit knowledge (texts) and community are complementary. Consider the following real world example. In a large bank, a Knowledge Management program in a certain department was rather unsuccessful in spite of good will of the people involved and the availability of tools. An electronic forum had been set up in which people could bring in topics or questions, but often there was no response, which of course was rather discouraging. After some time, it was concluded that the forum did not contribute to knowledge sharing. One reason for this failure turned out to be that the people of the department were all located in one and the same room. For urgent (important) questions, they simply walked to the desk of the person in question. For less urgent questions, things felt to be of more general interest, they (sometimes) used the forum. Hence, the forum never achieved much

functionality. There was no real need for a textual knowledge level between conversation and community.

Explicit knowledge (texts) and texts, conversations may be reduced in volume or size. The extreme case is where all knowledge is put in the text, conversation are complementary. This means that as knowledge is put into and the conversation has become superfluous: superfluous and full automation has been realised. But also in more general cases, some knowledge is then also the actor has become taken away from an actor, and comes under the authority of a third party, or at least becomes public property. This may threaten the identity of the actor as a communicative agent.

2.6. Conclusion

The researcher has introduced a model of context in line with the Language/Action Perspective. Whereas most work within the LAP has concentrated on modelling communicative actions (as processes) against a given social background, it is argued that this social background should be more clearly described as composed of an explicit part -- text -- and an implicit part -- the community --. The researcher has shown how explicit and implicit context play a role in practical applications. In the discussion, it has also become clear that the three elements -- conversation, text and community are closely interrelated. The researcher could summarize the relations in the following triangle:



Texts are only effective as long as they are supported by the community. The community can strengthen its identity by means of texts. Communities perform conversations, but at the same time, the community evolves and persists in the conversations. Finally, texts are created, adapted and managed in conversations. However, texts authorize conversational actions and can reduce the need to be explicit in the conversation all the time.

The current model should be seen as a starting-point. Though there are many models of communicative action as a process are existing, including ones with formal logical semantics, very little research has been done on modelling texts, and its interdependencies with conversation. Therefore, one of the first goals is to develop formal models of text and on text-creating conversations.

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