A Language Action View of Information Systems*

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ABSTRACT

A new approach to information systems theory is presented in which an information system is regarded as a social, linguistic entity. The approach is based on a theory of communicative action, which studies information and communication from the point of view of social interaction. The theory has its roots in the speech act theory, hermeneutics, and the sociology of knowledge. Consequences of adopting the new approach are discussed by making some comparisons to a more traditional view. Topics discussed are the nature of information system development, possible functions of information system development methodologies, and properties of information systems. A possibility of a fruitful synthesis, in the light of Habermas' theory of knowledge interests, is noted.

INTRODUCTION

Information system science is a young discipline with comparatively limited academic traditions. It should be noted that considerable research has been done and information system science is now recognized as an academic discipline. An information science paradigm, which would constitute the entire constellation of beliefs, values, techniques, and puzzle solutions shared by the members of the research community (Kuhn, 1972), is being established. Several attempts have been made to identify the general nature of the subject (Merton, 1981) and its paradigmatic ontological ingredients (Davis, 1974; Langefors, 1976). These definitions view information systems primarily as "technical systems with social implications" (Goldkuhl, 1981). It follows, therefore, that information systems development has been considered technical in nature. It can be based on "laws" with empirical content. These "laws" are interpreted as statements about observable events, which, given a set of initial conditions, make predictions possible (Auerbach, 1972). Consequently, the purpose of information system science is to produce knowledge that is technically exploitable. It is bound to cognitive

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interest in technical control over objectified processes (Habermas, 1972).

In this paper we regard information systems as "social systems only technically implemented." They are formal linguistic systems for communication between people which support their actions. This change in paradigmatic assumptions has several implications for the development of information system science as an established scientific discipline. It is not just a science studying objectified events and processes (Lyytinen, 1981). Information system development should also be regarded as social practice tied to a practical interest. The purpose is then to disclose reality under a constitutive interest in the preservation and expansion of intersubjectivity and understanding (Habermas, 1972). Accordingly, information system science is also a discipline for studying conditions and rules for achieving intersubjectivity in understanding and effective communication.

This paper is organized as follows. The second section discusses the linguistic ontology of information systems. In the third section we study the consequences of the projected ontology for information systems. In the fourth section we outline implications for the development processes. The fifth section includes a summary of the paper and a presentation of research projects, where this paradigmatic view of information systems is being applied.

INFORMATION SYSTEMS ARE TIED TO LANGUAGE USE AND ACTION

The interpretation of the central concepts information and communication has a great impact on our conceptions of information systems as kinds of phenomena. Information seems often to be interpreted as an "element," as something being transformed or transmitted (Tully, 1974). At the same time communication seems to be interpreted as the transportation of elements (information). In this context information is no longer "a process of someone being informed about something." Communication is no longer "an act of making something common between people." This reductionist approach (also described by Saugstad, 1980) is probably due to a positivistic striving to reduce human subjectivity in science. If we accept that people are rational, intentional, and acting social beings, then we have to reconstruct the earlier meanings of information and communication (Habermas, 1979).

Communication consists of communicative acts and interpretative acts. To communicate is to intentionally aim at a mutual understanding of something. The most important means for communication is language. Communication is, in this more restricted sense, language use. There are different dimensions apparent in a (linguistic) communicative act. To perform a communicative act is to

A. utter a sentence with a certain structure,
B. predicate and refer (a propositional content),
C. perform something, i.e., to establish interpersonal relations, and
D. intentionally try to influence the listener/reader.

These different aspects are described in speech act theory (Austin, 1962; Searle, 1969; Habermas, 1979). These aspects are important for an understanding of the process of a (linguistic) communicative act. The uttering of a sentence (A) is governed by syntactic rules. In B the propositional (cognitive) part of the sentence is expressed. We not only predicate and refer to something in speech acts, we also do something (C). We may command, assert, question, sug-

gest, promise, etc. By the speech act an interpersonal relationship between a speaker and a listener is established. This is called the illocutionary aspect of a speech act. These three aspects (A, B, C) are all governed by linguistic rules of differing character (syntactic, semantic, and pragmatic rules). When performing a speech act the speaker will intentionally (try to) influence the listener (D), i.e., to establish a so called perlocutionary effect. The structural, propositional, and performative features of the speech act are used to accomplish the intentions underlying the communicative act. The A, B, and C parts of a speech act are governed by linguistic rules, but the D part goes beyond the linguistic conventions and depends on other social conventions as well as psychological factors.

To interpret the message of the communicative act is to assign meaning to it, it is a "sense-making" process. The listener makes an active reconstruction of the intended meaning of the communicative act. This interpretation builds on the pre-understanding of the listener: expectations, concepts, conceptions, values, linguistic competence, etc. There is no such thing as presuppositionless interpretation (Palmer, 1969; Schutz, 1970). Through the interpretation process, the listener can be informed about something. The listener's understanding and knowledge can evolve and be used for future action.

The communication process aims at an intersubjectivity between the speaker and the listener. This intersubjectivity cannot, however, be reached unless a sufficient intersubjectivity exists before the communication. The intersubjective understanding must consist of knowledge both about language rules and use, and the relevant activity field.

To summarize, communication is primarily action and interpretation by means of language based on intersubjectivity. This always involves "in order to" and "as." One acts "in order to" achieve something (Schutz, 1970; Searle, 1969) and one interprets something "as" something (Palmer, 1969; Habermas, 1979).

Information System, Language, and Action

In organizations, many communicative acts become institutionalized as action patterns (Berger & Luckmann, 1967; Schutz, 1970). To invoice, or to order, etc., is to perform typical (i.e., institutionalized) communicative acts. These communicative acts will be governed by linguistic rules and other social conventions. Institutionalization means that linguistic acts are typified with respect to types of actors and these actions are only understandable through the availability of linguistic rules governing this behavior (Berger and Luckmann, 1967). Institutionalization concerns different types of message treatment, such as to formulate and exchange messages, or to perform judgments and calculations, etc. In an activity realm within a company, e.g., invoicing, there evolves a restricted and accommodated language, a so called professional language (Lyytinen, 1981). A professional language is developed and used by people for some professional purpose, i.e., performing professional tasks in a specific field and communicating about them. A professional language consists of vocabulary (terminology and concepts) and types of communicative acts (including typical intentions). A professional language is not only used for talking about an activity field (a universe of discourse); it is also a part constituting it (Israel, 1979). Without concepts such as invoice, payment, credit time, etc., there can be no invoicing activity.

When talking about information systems, one usually means some organized treatment of messages. This means that an information system comprises a professional language. In this paper, the authors restrict the analysis to computerized and formalized information systems. They comprise a specific type of professional language, a formal language including systematic ways of processing.

An information system (IS) can thus be defined as communicative action including inferences by means of a formal professional language. Information systems consist of a prestructured symbolic reality. An IS is used to perform pre-specified communicative acts. Its limits of expressability (Searle, 1969) are thus closed. An information system is intentionally arranged by certain people and its prupose is to inform some people about something as a support to their action.

Figure 1 depicts an information system in its context. In this figure we have also illustrated different dimensions of communicative action (as propositional, performative, and intentional). An information system consists of a language rule part and a language usage part (communicative action). The usage part consists of formal messages and message processing. The formal language rules define what kind of message and inferences are allowed in the formal language.

The ontological description of information system also implies a need for intersubjectivity (Goldkuhl, 1980) between three different types of actors ("information system roles"): rule owners, input users, and output users. One person can, of course, appear in all three information system roles (Goldkuhl, 1982).

An Alternative Paradigmatic View of Information Systems

The concept of a paradigm presupposes that there may be several competing paradigms (Kuhn, 1972). Research communities can share different ontological, methodological, epistemological, and ethical considerations in different paradigms.

To simplify the discussion we will herein consider two paradigmatic views. One is the language action view presented in this paper. The other, put forth here mainly to clarify characterizations of the language action view, is called a traditional view. According to this perspective, information systems are considered from a technical point of view. They are the most complex technological products that humans have ever created (Senko, 1975). The purpose of an IS is "to provide relatively exact, efficient, unambiguous model of...a real world enterprise" (Senko, 1975).

The output of an IS is used to keep an enterprise in the state of equilibrium, or in the optimum performance as any other verifiable, objectified, and causally behaving process (Boland, 1979). Information has an additive economic value (Davis, 1974).

Information systems are integrated, non/machine systems utilizing hardware, software, data, procedures and management, and decision models (Davis, 1974). They obey as other technical products a "life cycle." Uses of information systems and development are thus understood in this perspective in the framework of technical instrumental action (Habermas, 1972). Information systems science is regarded as a branch of engineering which aims to reduce human action and information systems to objectified, external, and explicit behavior that is mainly predictable. Social aspects, if considered at all, are treated with

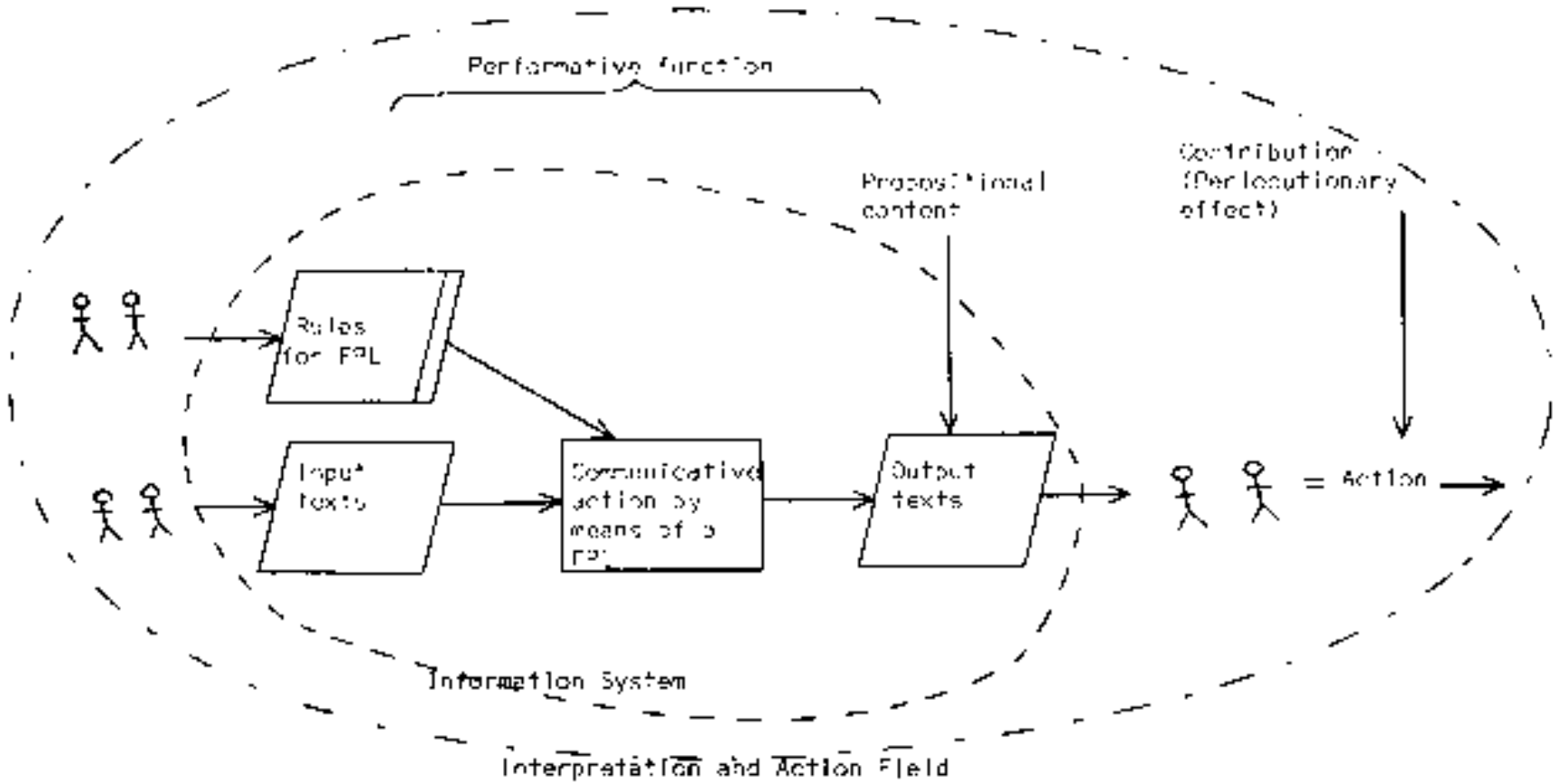

Figure 1. Information System Constituted by a Formal Professional Language (FPL)

the purpose to obtain a "balance" between technical and social "designs" (see Hawgood, Land, and Mumford, 1978). Furthermore, social aspects are normally understood in terms of behavioristic social sciences (Davis, 1974).

LANGUAGE ACTION VIEW AND USE OF INFORMATION SYSTEMS

Further Characterizations of Informations Systems

Information systems are human products--they are the results of ongoing social dialectics (Berger and Luckmann, 1967). Information systems are externalizations of subjective meanings and intentions. At the same time we view them as parts of objective reality. The institutional nature of IS does not allow us to apprehend them as non-human facticity--i.e., as reified. The view of information systems as social-linguistic systems requires us to see information systems first as rule-based human products. We cannot reify the rules that have been "delegated" into the system. We should not blame a computer instead of rule givers. The human beings behind the information system should be visible. Communicative acts are always performed by human beings. This is the case even if people use computers for communicative action.

Information systems are parts of the organizational sense-making process (Boland, 1979), where social situations are interpreted, defined, and evaluated. Information systems thus play a role in shaping situations and providing a context for social interactions. Information systems as symbolic universes are an institutionalized framework for action and interaction. The universes are maintained through an ongoing "game" that reproduces the social realities. The universes also legitimate institutionalized action, i.e., explicate and justify its existence (Berger and Luckmann, 1967).

The formal nature of information systems permits repetitive communicative acts to proceed with a minimum effort (Berger and Luckmann, 1967). The strict institutionalized order of repetitive communication tasks also allows more energy to be devoted to other levels of communicative action, which are more decisive for the management process (Mintzberg, 1975). The formal and closed nature of information systems implies a need for information communication channels side by side the formalized information systems. It must be possible to expand the communication topics and also to "switch" to metacommunication.

Implications for Information Systems

The contributions and support made by the use of information systems varies according to which paradigmatic view is taken. Alternative properties are attributed to information systems as conditions for their efficacious use. We can classify these properties as desirable, i.e., what properties are seen as ideals for information systems, and as characteristic, i.e., what properties information systems characteristically possess. Finally we can identify those properties that constrain efficacious information systems use.

Desirable properties form an internal development ideal for information systems development. Internal development ideals for the two paradigms studied are depicted in Table 1.

According to the language action view the internal development ideal is to enhance rational and successful communication (Grice, 1975; Habermas, 1979). Social visibility means that

Table 1. Desirable Properties of Information Systems

Paradigmatic View	Desirable Properties of Information Systems
Language Action	Rational and successful communication
	Social visibility of the system
Traditional View	Faithfulness and consistence of data
	Efficiency of an information system
	Technical operationality of the system

the "rule-givers" can be "seen" as well as the human participants in communication. According to the traditional view, the internal development ideal is faithfulness and consistency of data (van Griethuysen, 1982; Senko, 1977), and efficient technical control over data and processes (Couger, 1973; Senko, 1975).

Characteristic properties of information systems in both paradigmatic views are depicted in Tables 2a and 2b.

According to the traditional view (Table 2a) the information is objectified, to "a mirror" of reality, consisting of a collection of states-of-affairs (van Griethuysen, 1982). Information systems are seen as an integrated part of a control system (Boland, 1979), which require greater and tighter integration of IS. The goal is a total information system of an organization captured in the "enterprise view" of data (Senko, 1977). In an information system each user has a "local view" of the total view, which is the individual's "slice of reality" seen through an IS.

In the language action view, information is contextualized to a community of interpreters (Apel, 1967). In the spirit of linguistic relativity (Whorf, 1956) they maintain diversified symbolic universes. A user is seen firstly as a participant in the community of interpretation. Communication involves two levels: a level of propositional content reflecting the descriptive function of language, and a level of illucutionary content reflecting the universal interpersonal functions of language. This double nature of human speech is also a characteristic of information systems (Habermas, 1979).

Possible constraining factors of information systems development are depicted in Table 3.

LANGUAGE ACTION VIEW AND INFORMATION SYSTEMS DEVELOPMENT

Characterizations of the Development Process and Methodology

Information systems development (ISD) is to force parts of professional communication into a formal language use and to realize this use with a computer. The specification of an IS begins

Table 2a. Characteristic Properties of Information Systems According to the Traditional View

Property	Characteristic Value of the Property
Nature of Information	Information objectified
	Factual knowledge only
	"Model of reality"--conception for IS
	Consistency derived from facts
Relationship to Environment	Integration of IS to support control over environment
	Total information system assumed
	Enterprise view assumed
Relationship to the User	User's relation to depersonized data
Purpose of the Documentation	To help to run and maintain the system

with existing professional languages. The process involves developing and formalizing a language as well as systematizing its use. The design of an IS starts from a model of a formal language. In the technical design we realize a language with the objective of gaining efficient technical control over its use. The ISD-process is depicted in Figure 2.

Information systems development means to make common the rules of the language by achieving formal language intersubjectivity. It is metacommunication, i.e., communication about the communication through an information system. Metacommunication aims at understanding and elicitation. Information systems development increases the participants' understanding of the language, and its use and role in supporting human action. This process is facilitated by the use of appropriate models describing the information system and its environment. The elicitation means that intentions and requirements concerning communication are made clearer.

To develop an information system means to constitute parts of a socially constructured reality (Berger and Luckmann, 1967). It can be a process of expanding and developing forms of understanding. Information systems development influences existing forms of language use and makes the intentions of communication more explicit. Information systems development changes

Table 2b. Language Action View and Characteristic Properties of Information Systems

Property	Characteristic Value of the Property
Nature of Information	Information contextualized to a community of interpreters Double nature of human speech assumed Area of human communicative action Consistency derived from the purpose
Relationship to Environment	Integration within a community of interpretation Contextualized information systems Diversified symbolic universes with associated legitimations of potential action
Relationships to a User	User's relation to a shared community of interpretation emphasized
Purpose of Documentation	To also assist in making successful communication possible

Table 3. Constraining Factors of Uses of Information Systems

Paradigmatic View	Constraining Factors
Language Action View	Sharing of interpretation rules a constraining factor
Traditional View	Technical capabilities are the primary constraining factor Technical expertise contextually constraining factor

human action patterns in the interpretation and action field.

A specified process of an IS starts with unclear ideas and conceptions of the end result. It is a process of giving an exact form and interpretation to problems and requirements related to future information systems.

ISD is communication and intentional, instrumental action (Habermas, 1979). It is rule-governed social behavior. ISD is an institutionalized form of action (Berger and Luckmann, 1967). Institutionalization makes it possible to identify and to take part in actions that are understood as parts of ISD (Berger and Luckmann, 1967). Institutionalization allows description of different actor roles in ISD.

Institutionalizing rules for ISD can exist in the form of unwritten, socialized conventions and habits (Goldkuhl, 1982). Some forms of behavior grow through habitualization to accepted forms of institutionalized action due to their apparent success in various specification and design situations. The other way of institutionalizing ISD is through planned development, separated from ISD practice. These written and consciously developed prescriptions are called ISD methodologies. If these ISD methodologies are adopted as behavior controlling prescriptions, then they are institutionalized as acceptable action patterns of the ISD. In general, both ways of institutionalizing ISD exist simultaneously. The borderline between them is vague and changing.

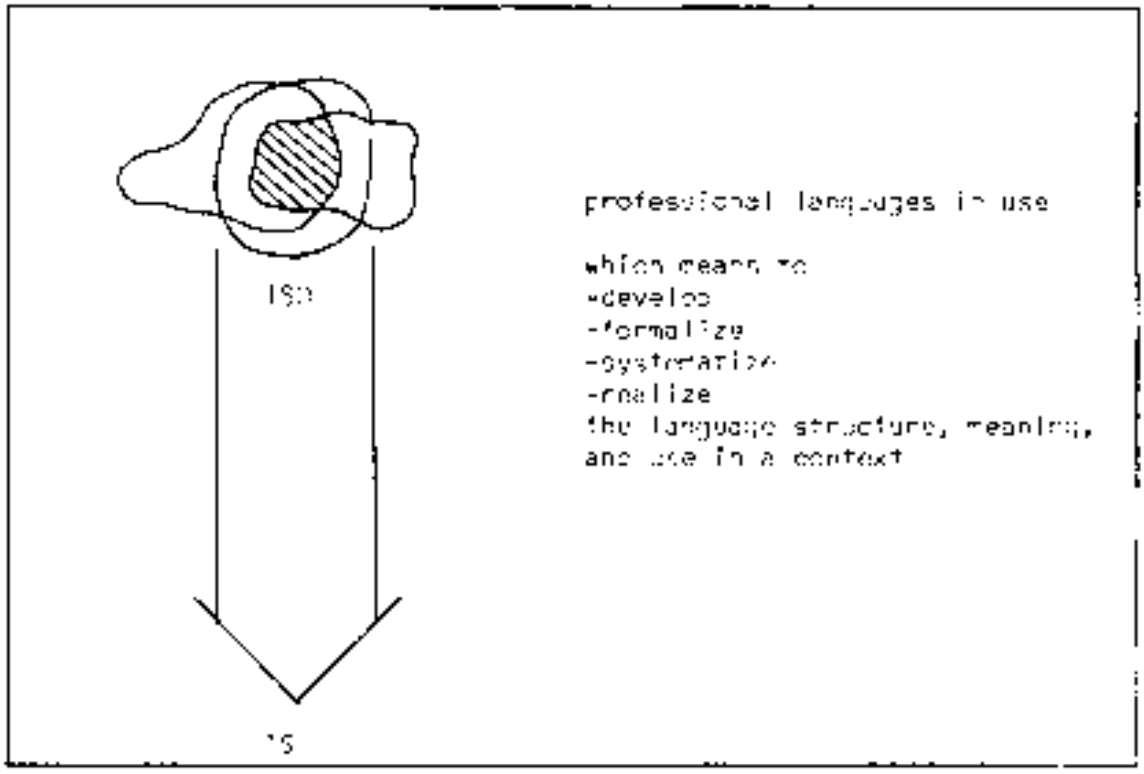

Figure 2. Information Systems Development

Implications for Information Systems Development

The use of ISD methodologies has to be accounted for in order to gain acceptance for them. The acceptance rests on how the ISD methodology can be legitimated and validated. The legitimacy of a methodology is shown by describing its contributing effects, *i.e.*, how does the methodology contribute to achieving desirable properties in resulting information systems, or in ISD. The validity of a methodology is shown by corroborating the relationship between desirable properties and the use of methodology. This is corroborated by empirical investigations of method application.

In each ISD methodology the desired properties for IS and ISD are derived from the underlying paradigmatic view. The methodologies derived from the traditional view base their legitimacy on their alleged capacity to contribute to the optimization of the functioning of an information system by gaining an efficient technical control over the information system and its environment (Auerbach, 1972). Possible contribution effects of a traditional ISD methodology are depicted in Table 4 (*e.g.*, Senko, 1975; Hawgood, *et al.*, 1978; Boland, 1979; Emery, 1971). The language action view legitimates the ISD methodology on the basis of its contributing effects to achieve formal language intersubjectivity and to expand and develop existing forms of linguistic understanding and symbolic interaction (see Goldkuhl and Lyytinen, 1982; Boland, 1979).

The validity of an ISD methodology can be analyzed by studying elements of a methodology in terms of their functional applicability. By a functional applicability we mean the power of the methodology, in practice, to achieve the contributing effects which legitimate its use. Observed elements affecting functional applicability are depicted in Figure 3. In Table 5 we illustrate in what way different elements can contribute to the functional applicability. The columns represent the different paradigmatic views. The rows describe different elements in a methodology. An entry in the table describes how a particular element is constrained by the paradigmatic view. In the language action view the functional applicability is subordinated to the aim of achieving successful and rational metacommunication. This aim controls the development of description methods and cooperation principles. The restriction of the scope is made in order to obtain descriptively adequate specifications of communication situations (Goldkuhl and Lyytinen, 1982). The phase structure is derived from the insight that ISD involves a reconstruction of users' linguistic realities.

In the traditional view the functional applicability is principally determined by the ultimate capacity to "deliver" a good technical system. The scope is restricted to those entities that make technical control possible. For example, Couger (1973) underscores that the objective of systems analysis

> "is to examine all aspects of the system--equipment, personal, operating conditions, and its internal and external demands--to establish a basis for designing and implementing a better system."

The classical model for the scope specification is Simon's theory (Newell and Simon, 1972) of "Bounded rationality" with a limited search-space. Description methods are used primarily to "predict" future behavior of the IS. For example Bubenko, Karlsson, and Gustafsson (1981) equate the use of description methods to the set-up of equations in engineering sciences. The phase structure of the traditional ISD methodology has the

Table 4. Possible Contributing Effects of an ISD Methodology

Paradigmatic View	Possible Contributing Effect
Traditional ISD Methodology	Information system effectiveness
	Technical quality of IS
	Fit between the technical system and the social system
	Internal effectiveness of the ISD
Language Action ISD Methodology	Stepwise formalization through rational communication
	Formal language intersubjectivity
	Critical construction of reality
	Uncovering of communication intentionality
	Ownership of formal language rules

function to reduce the inherent complexity of ISD. Through the phase structure as "systems life cycle" model (Couger, 1973), we achieve a leveling of technological problem solving tasks, in which we go from "what" to "how" and from "function" to "behavior." We achieve a clear responsibility of tasks, predetermined rules, and advantages of a division of labor that increase the efficiency of ISD. Cooperation principles are devised in order to make a systematic review of user "needs" possible at the beginning of the development process (Jarvinen, 1981). The professional designer acts as a principal problem solver, delivers an optimal solution, and finally implements it by initiating and controlling the change (Hedberg, et al., 1976; Boland, 1978). The control of the development act is never surrendered by the professional.

SUMMARY AND CONCLUSION

An information system is Janus-like, with a "technical face" and a "social/linguistic face." Earlier we described these faces as being opposed to one another. But like the god Janus, we see each face having the same origin; two complementary areas of human action, aiming at efficient technical control and deeper mutual understanding (practical interest), respectively. Hence, the faces and associated interests form a nested structure depicted in Figure 4. In the nested structure paradigmatic views augment each other, when we go from

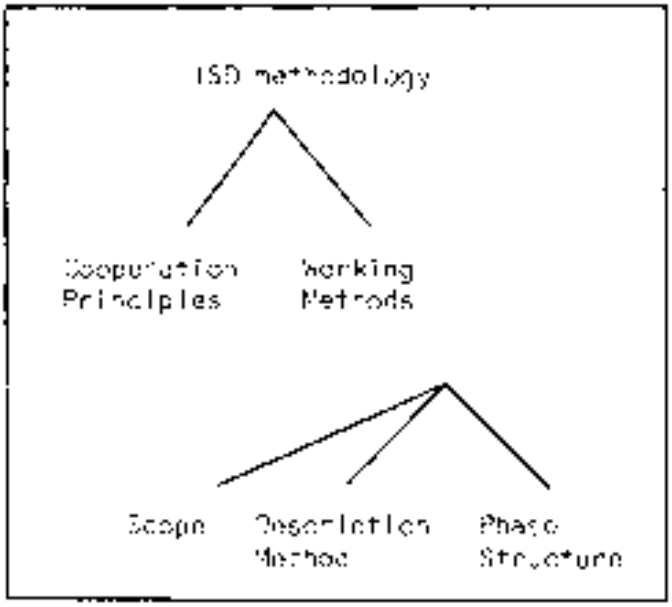

Figure 3a. Hierarchical Structure of ISD Methodology

Element	Description
Scope	What entities are considered
Description Method	How entities are identified and described in models
Phase Structure	How the development process is partitioned into steps
Cooperation Principles	What roles are assumed and what organizational structure is applied

Figure 3b. Elements of an ISD Methodology

Table 5. Elements of a Methodology and Functional Applicability

Elements of a Methodology	Capacity to Contribute to Functional Applicability	
	Language Action View	Traditional View
Scope	Recognition of intersubjectivity as essential rules of formal languages and their uses	Recognition of elements that enable efficient technical control over the IS and its environments
Description Methods	Adjustability to enhance rational communication	Capacity to predict and validate the consistency of models
Phase Structure	Promotion of systematic and unbiased formalization	Promotion of systematic and efficient construction of a technical system
	Promotion of efficient technical realization	Promotion of systematic transformation between models
	Transparency to different kinds of development	Transparency to transformation tasks
	Promotion of closeness to other user activities	Repeatability
	Adjustability to different development environments Internal evolvability	Evolvability in relation to technical progress
Cooperation Principles	User participation, necessity in order to achieve Intersubjectivity	User participation needed to obtain user acceptance of the delivered system
	Organization to support authentic user-participation	Systematic analysis, review, and validation of user "needs"
	Development controlled by users	Development controlled by specialists
	ISD professional functions as a catalyst	ISD professional functions as a technical expert

"out to in." The opposite of going from "in to out" is not possible, however, because the nesting hinders us from going beyond the face we are "bound" to. Furthermore, the inner face must fit to the outer face that is, all properties of IS and principles applied in ISD must be subordinated to the interest of expanding understanding.

The shift in the ontology of information systems requires us to consider research methods and the nature of information systems science. Clearly, information system science is a subject-object science on the level of language action (Goldkuhl, 1981). The nature of phenomena and the laws pertaining on this level are not reduceable to causal objectified phenomena (Lyytinen, 1981).

The information system theory we are proposing aims at a development of a sociological theory of information systems. In this sense our attempt is different from attempts to specify an information system theory on the concept of an individual and information processing styles (Mason and Mitroff, 1973).

We are currently working on two subfields of information system development which stress practical applications based on our paradigmatic view. The first is a development of a working methodology for change analysis (Goldkuhl, et al., 1982). Change-analysis precedes practical information system studies. The language action view suggests to us that organizational problem analysis is a hermeneutic problem where a common language and a shared symbolic universe is established, where something is seen "as" a problem. The second subfield is a development of an information analysis methodology that relies upon speech-act theory (Goldkuhl and Lyytinen, 1982; Winograd, 1980). Here, we regard information analysis as a process of specifying rules for the form, interpretation, and use of a formal language. The process results in a number of models of the language, that are based on various abstractions of actual communication occurring in an information system. The study of current modeling methods has revealed that they, to a large extent, ignore the intentional intersubjective, rule-based nature of information. Accordingly, a "reinterpretation" and fur-

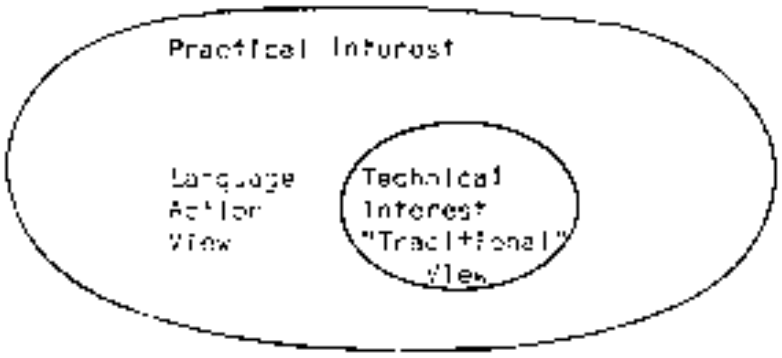

Figure 4. Nested Structure of Knowledge Interests and Associated Paradigmatic View of Information Systems

ther development and expansion is required before they can be put in effective "reconstructive" use in information modelling.

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