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## **IT Artefacts as Socio-pragmatic Instruments – Towards an Integration of the Pragmatic, Social, Semiotic and Technical**

**Göran Goldkuhl**

Department of Computer and Information Science, Linköping University and  
Department of Informatics, Jönköping International Business School, Sweden

**Pär J Ågerfalk**

Dept of Computer Science and Information Systems, University of Limerick, Ireland

### **Introduction**

Development and implementation of an information system (IS) is a very demanding task, and many times the expectations from such endeavours are not met. Unexpected negative effects often arise while anticipated positive effects fail to appear. There are many attempts to explain IS failures in general terms. Some of them refer to a socio-technical gap; a gap between what is socially required and what is technically feasible (e.g. Ackerman, 2002). Such explanations tend to make a sharp differentiation between the social and the technical. For example in the socio-technical tradition represented by Mumford & Weir (1979) there are discussions about balancing the technical system and the social system. This is built upon a view that computerized Information systems are technical systems with social and organizational effects and that there exist a “serving system” to support a “system to be served” (Champion & Stowell, 2002). There are criticisms towards such a conceptualization. For example Nurminen (1988, p 82) writes “by removing the social dimension from the systems entity, we imply that the technical system is basically non-social”. In the same spirit, Goldkuhl & Lyytinen (1982) suggest that the traditional view “technical systems with social Implications” should be inverted to “social systems, only technically implemented”. As pointed out by Mead (1934): “Language does not simply symbolize a situation or object which is already there in advance – it makes possible the existence or appearance of that situation or object, for it is part of the mechanism whereby that situation or object is created.”

Instead of a separation into a social realm (humans acting in the IS environment) and technical realm (the IS), another approach is preferred. Using “social” and “technical” as dimensions of the realms to study. The theoretical way to proceed is to articulate a common theory for both the IS and its organizational context. The concepts of social and technical are however not found to be sufficient. The purpose of this short paper is to outline a theory appropriate for interpretation, description, explanation and evaluation of the interaction between information systems and their organizational context. The developed theory involves besides “social” and “technical” also generic constructs as “instrumental”, “semiotic” and “pragmatic”. We call this theory *socio-instrumental pragmatism*, aligning with the work of Goldkuhl (2002).

For illustrative purposes we will use a simple example of an IS. The example is brought from an extensive empirical study. This study involves an action research

endeavour including development of an IS in an eldercare setting. The IS and its supported workpractice were developed through a participatory design approach. We will not describe this case study in any detail; but rather use part of the developed system and the workpractice in order to illustrate our theoretical endeavour.

### **Actions and instruments in workpractices**

Let us start the discussion with the eldercare practice before computerization. The eldercare practice consists of nursing assistants giving care to elderly people living in their own residences. The elderly people need assistance with ordinary tasks like hygiene, dressing, cleaning and simple medical attention on a daily basis. Each client is visited by a nursing assistant at one or more occasions each day. The visits are regulated by daily schedules, which inform the nursing assistant what tasks to perform. There exist different schedules depending on what kind of tasks to perform and at what time of the day. There are typed contents on the schedules but they consist also of hand-written annotations. Besides the schedules, there are also more informal communication between the nursing assistants, such as hand-written notes and oral utterances. Quality assurance problems were encountered in the eldercare practice, which rise to the development of an IT-system to support communication and documentation. Schedules are nowadays mediated by the IT-system, and this has improved the quality assurance and individualization of the eldercare, which are important objectives of the workpractice.

In order to understand what the new IT artefact does, we need to understand its role in the workpractice. In order to do this, let us focus on three different types of actions in the workpractice: (1) Production/reproduction of daily schedules; (2) reading of the schedules before home care visits; (3) care service provided to the elderly clients. We have here made a theoretical choice that needs to be commented: We focus on actions as a kind of basic unit of analysis. This is done with the assumption that this is a fundamental way to understand social practices. The way social practices appear as meaningful to an inquirer is through making the actions come visible; what people do in the workpractice. This is a pragmatist position (e.g. Mead, 1934). If we do not understand what actions are performed, it is very hard to understand the practice.

The two first kinds of action (creating and interpreting the schedule) are two inter-related parts of a communication process (Clark, 1996). One nursing assistant may for example annotate something to the schedule at one occasion as a formulation of a message to her colleagues (“remember to take out the laundry”). Another nursing assistant reads the note when she is about to visit an elderly. And she takes this into account during her visit to the elderly (taking care of the laundry). The first two actions are actions dealing with language (writing and reading) and are thus parts in a communication process. The last action is not a linguistic action. It is material action; changing physical objects in the world. This reasoning is illustrated by the simple model of social action depicted in Figure 1.

Actions are usually considered to be interventions in the world. There are many such actions (such as 1 and 3 in the example), but there are also

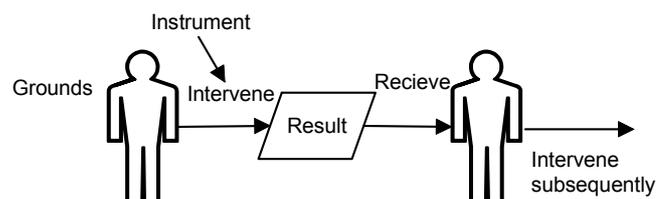


Figure 1: A simple model of social action

interpretive and receptive actions (such as 2 in the example). Interventive actions may be communicative (such as 1) or material when changing physical objects (such as 3). Interventive actions create external results as utterances (1) or as changed objects (3). All three actions are social actions, although they might all be performed in solitude without any direct interaction with another human. The first nursing assistant might write her note without any other colleague around her, but the communicative action is, of course, directed towards and intended for another human; i.e. the nursing assistant to visit the elderly. All actions described have social grounds and social effects (Weber, 1978).

All these actions, which are genuinely social in character, are performed by use of different tools, or instruments. The reading of the schedule requires the schedule being presented in a readable form, and annotating it requires a writable form. Both the 'pen and paper' used initially and the subsequently introduced computerized IS afford these actions. In both cases, the instrument is used in interpreting and expressing semiotic results as a basis for and as a result of social action. In general, workpractices are full of instruments for actors to use in their social endeavour. These are often technical instruments, such as computers and washing machines. The usefulness of these instruments within a practice is contingent upon the meaning attached to them by the actors. From this perspective, computers are mainly means to improve communication (Flores, 1998). Indeed, IT artefacts are technical instruments. Their main functioning within a workpractice, such as eldercare, however, is as instruments for social action.

This means that we can view IT artefacts in a workpractice as (a) technological artefacts with physical properties, (b) as semiotic artefacts affording interpretation and communication, and as (c) social instruments used to express actors' intentions, values and beliefs. These three aspects of IT artefacts may be analytically distinguished. Important to see, though, is that IT artefacts are not simply isolated technical systems related to a social practice, in whatever intricate way. Rather, their physical properties are what enable and restrict possible semiotic interpretations and expressions required to form the social practice at hand. To paraphrase the quotation from Mead (1934) above: they are not simply objects which are there – they make possible the existence or appearance of that situation, for they are part of the mechanism whereby that situation is created.

### **Conceptualizing socio-instrumental actions and socio-pragmatic artefacts**

Information systems (as IT artefacts) are technical systems. This is obvious. They consist of hardware and software. They are technical instruments, usually not aimed for direct support of material action. Instead they support communication and other types of information handling. As such they are communicative and semiotic devices. Information systems consist of representations such as texts and other signs.

Beyond the technical aspect, an IS is also a socio-pragmatic instrument used to perform social actions. These social actions are communicative in nature. An IS must thus be a semiotic instrument. It must have capabilities to process signs. In doing this in a sophisticated way, information systems rely on advanced technical equipment. This technical equipment needs to be managed by a human being who wants to utilise its semiotic capabilities. An IS is an instrument for producing messages to other

people. Usually, an IS has a pre-defined set of communicative possibilities as defined by its functionality and vocabulary (usually defined by its database schema); not everything can be said. An IS is also an instrument for getting informed by others; otherwise it would not be a communication instrument. It must support both parts of the communication process; i.e. to express and to interpret. Information systems have the capability to execute communicative actions according to its predefined action repertoire (determined by its programmed software). This capability makes it an organizational agent. An agent is someone who does something on behalf of someone else. An IT artefact (being an organizational agent) does possess some action capabilities, but lacks typical human attributes (consciousness, intentionality, emotionality, social awareness, empathy). In some situations it is appropriate to view the IT artefact as an instrument (to be used by humans). In other situations it may be appropriate to foreground its agent capabilities; and hence its possibilities to interact with humans as other organizational agents.

One key feature of this sketched theory (socio-instrumental pragmatism) is that it should be used both for understanding the IT artefact and its human and organizational workpractice which it is part of. According to this theory, actions are multifunctional; performing an action does several things. An action can at the same time be: a response to an action made by someone else (i.e. socially responsive); an expression of subjectivity; a utilization of immaterial instruments (such as knowledge and language); an utilization of external instruments (e.g. technical artefacts); a compliance to organizational norms (e.g. role expectations); a production of action results (semiotic or material objects); a realization of values and intentions; an attempt to influence someone else (i.e. exerting power).

Being multifunctional, actions are also multi-dimensional. Actions performed by a human user when acting through an IT artefact, can be described as social (social grounds and social purposes), semiotic (using and producing signs with communicative intent) and technical (managing some technical device) at the same time. Altogether this means that socio-technical systems (with or without the hyphen) should be understood as socio-instrumental practices. This provides IS designers with a pragmatic view to direct attention to the whole of the workpractice and to its constituent parts of human, organizational, communicative and technical characters.

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