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Proceedings of the Inaugural Meeting of AIS SIGPrag

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Proceedings of the Inaugural Meeting of AIS SIGPrag

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Abstract

The Special Interest Group on Pragmatist IS Research (SIGPrag) was approved by the Association for Information Systems (AIS) council at its June 2008 meeting in Gallway. The motivation for this initiative is the growing recognition of the importance of theorizing the IT artifact and its organizational and societal context from a pragmatic and action-oriented perspective. SIGPrag's mission is to provide a much-needed centre of gravity and to facilitate exchange of ideas and further development of this area of IS scholarship. In summary, pragmatist IS research rests on the following set of assumptions: â€¢ Human life is a life of activity. â€¢ Humans do things that effect changes in their environment and/or within themselves. â€¢ Doing permeates thinking, conceptualizations and language use. â€¢ Human consciousness is a practical one that is in constant interplay with interventive, investigative, and evaluative actions. â€¢ Practical consciousness is formed by experience from previous actions and participation in social contexts. â€¢ IT and information systems are fundamentally symbolic language systems. â€¢ Linguistically expressed collective presuppositions, norms and categories (such as those embedded in IT and information systems) serve human activity and life. â€¢ The true value of IT and information systems lies in their potential to support human communication and collaboration central to human activity and life. For more information about SIGPrag, its mission and current activities, please visit <http://www.sigprag.org/>

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Proceedings of the Inaugural Meeting of

AIS SIGPrag

Paris, France, 14 December 2008

**In Conjunction with the
Twenty Ninth International Conference on Information Systems**

Pär J. Ågerfalk, Mark Aakhus and Mikael Lind



SIGPrag
Association for Information Systems
Special Interest Group on Pragmatist IS Research



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Proceedings of the Inaugural Meeting of AIS SIGPrag

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INTRODUCTION TO THE INAUGURAL MEETING OF THE AIS SPECIAL INTEREST GROUP ON PRAGMATIST IS RESEARCH

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Abstract

This paper introduces the inaugural meeting of the AIS Special Interest Group on Pragmatist IS Research (SIGPrag) to be held in Paris on Dec 14, 2008, in conjunction with the International Conference on Information Systems (ICIS).

AIS SIGPrag

The Special Interest Group on Pragmatist IS Research (SIGPrag) was approved by the Association for Information Systems (AIS) council at its June 2008 meeting in Galloway. The motivation for this initiative is the growing recognition of the importance of theorizing the IT artifact and its organizational and societal context from a pragmatic and action-oriented perspective. SIGPrag's mission is to provide a much-needed centre of gravity and to facilitate exchange of ideas and further development of this area of IS scholarship.

In summary, pragmatist IS research rests on the following set of assumptions:

- Human life is a life of activity.
- Humans do things that effect changes in their environment and/or within themselves.
- Doing permeates thinking, conceptualizations and language use.
- Human consciousness is a practical one that is in constant interplay with interventive, investigative, and evaluative actions.
- Practical consciousness is formed by experience from previous actions and participation in social contexts.
- IT and information systems are fundamentally symbolic language systems.
- Linguistically expressed collective presuppositions, norms and categories (such as those embedded in IT and information systems) serve human activity and life.
- The true value of IT and information systems lies in their potential to support human communication and collaboration central to human activity and life.

For more information about SIGPrag, its mission and current activities, please visit <http://www.sigprag.org/>

The Inaugural Meeting

The inaugural meeting of SIGPrag is to be held in Paris on Dec 14, 2008, in conjunction with the International Conference on Information Systems (ICIS). The meeting will consist of two parts, a scientific meeting and a business meeting. For the scientific meeting a call for position papers was issued in the summer of 2008, which resulted in the following papers being selected for presentation:

- *What Kind of Pragmatism in Information Systems Research?* by Göran Goldkuhl.
- *Pragmatic Approach in IS Projects Grounded on Recognised Frameworks* by Raija Halonen.
- *Co-Design as Social Constructive Pragmatism* by Mikael Lind, Ulf Seigerroth, Olov Forsgren, and Anders Hjalmarsson.
- *Pragmatism and Information Systems (IS): Neurophilosophical approach* by Garikoitz Lerma Usabiaga and Francesc Miralles.
- *Sustainability Communication: A role for IT and IS in relating business and Society* by Mark Aakhus and Paul Ziek.
- *Managing Ambiguity while Reducing Uncertainty* by Gianni Jacucci and Mike Martin.
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- *Habermas' theory in action* by Jan L.G. Dietz.
- *Challenges to Information Systems Development* by Roland Kaschek.

The idea behind this inaugural meeting was to bring together people that share an affinity with pragmatist IS research and to initiate a scientific discussion about the role of pragmatist research in IS. We certainly hope that this discussion will continue over the years to come. The papers are freely available for download at <http://www.sigprag.org/>

WHAT KIND OF PRAGMATISM IN INFORMATION SYSTEMS RESEARCH?

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Abstract

This paper investigates what pragmatism can mean to information systems research. It makes a division into three types of pragmatism: Functional, referential and methodological pragmatism. These three kinds of pragmatisms are explained through their different knowledge – action relations. Functional pragmatism is described as “knowledge for action”. Referential pragmatism is described as “knowledge about action”. Methodological pragmatism is described as “knowledge through action”. The paper identifies briefly how different trends in information systems research are related to these three kinds of pragmatism; as e.g. method development, design research, use of action theories, action research.

Introduction

There are different research paradigms operating in information systems (IS) research. One well-known differentiation is made by Orlikowski & Baroudi (1991). They describe three different “research epistemologies” in IS research: Positivist, interpretive and critical approaches. They follow an earlier division made by Chua (1986)¹. This division of IS research approaches has been acknowledged by several other scholars; e.g. Myers & Avison (2002) in their introduction to an anthology of qualitative IS research. Several scholars have written about interpretive research and made this in contrast to positivist research; e.g. Klein & Myers (2004) and Walsham (1995). The main competing research paradigms in IS seem to be positivism and interpretivism.

This paradigm discussion is not unique for IS. In organisation sciences there are corresponding debates. The above mentioned paper by Chua (1986) is written within accounting. Wicks & Freeman (1998) have also recognized this debate between positivism and interpretivism. They claim however that pragmatism should be seen as an independent and viable alternative to positivism and interpretivism. This discussion of pragmatism as a third research paradigm has been brought into IS research by Goles & Hirschheim (2000). The importance of a pragmatic approach in IS research has been acknowledged by several scholars; e.g. Baskerville & Myers (2004) and Goldkuhl (2004). This identification of positivism, interpretivism and pragmatism as three competing paradigms has also been done in psychology (Fishman, 1999).

There does however not seem to exist a clear and joint picture of what pragmatism should mean in IS research. The contribution of this short paper is to make a conceptualisation of different approaches to pragmatic IS research. Three different kinds of pragmatisms are recognized and described:

- Functional pragmatism
- Referential pragmatism
- Methodological pragmatism

¹ Chua (1986) uses the terms interpretive and critical research. She does not however use the term ‘positivist’. Instead she talks about ‘mainstream research’.

Three kinds of pragmatisms

This division into three kinds of pragmatism is made through the concept pair of knowledge and action; these are probably the most central notions in pragmatism. What kind of relations can be recognized between knowledge and action? One obvious relation is that knowledge is created and used for action. The main idea is here that knowledge should improve action; the purpose of scientific knowledge is that it should make a practical difference. This relation can be summarized as *knowledge for action*. This is however not the only interpretation of the role of knowledge in relation to action. Another important strand of thinking is that knowledge should be about actions. This had led to the development of many theories on actions, activities and practices. This relation is thus *knowledge about action*. A third relation can be identified: Action as the source of knowledge. In order to reach knowledge, actions need to be arranged, conducted and studied. This relation can be described as *knowledge through action*.

These three relations between action and knowledge are seen as the basis for division into the three types of pragmatisms. It is argued below that these three types of pragmatisms are all needed in IS research. Examples of these types of pragmatism research will be given and some of their philosophical underpinnings in pragmatic philosophies and theories will be identified. These three types of pragmatisms are labelled in the following way:

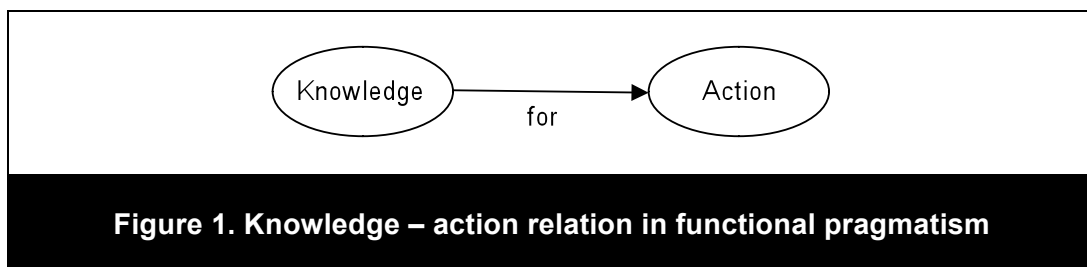
- Functional pragmatism (knowledge for action)
- Referential pragmatism (knowledge about action)
- Methodological pragmatism (knowledge through action)

These three types of pragmatisms are related to three foundational questions:

- *Why* knowledge? Action is the purpose!
- *What* knowledge? Action is the object!
- *How* knowledge? Action is the source and medium!

Functional pragmatism

In pragmatism knowledge is seen as a means to improve the world. Dewey (1931) writes, with reference to William James, that “reason has a creative function ... which helps to make the world other than it would have been without it”. This is based on a view of the world still in a state of becoming. Knowledge should be *useful* for action and change. Functional means that knowledge should be useful and applicable in action. The principal relation between knowledge and action, within functional pragmatism, is depicted in figure 1.



This means that knowledge that has a prescriptive character, as e.g. models and methods, is important in functional pragmatism. In information systems research there are many examples of models, frameworks, methods and other prescriptive knowledge products. Knowledge that is functional gives humans guidance in their practical endeavours. Prescriptive knowledge (in methods) is often formulated with a clear reference to proposed types of actions.

A pragmatically functional view on knowledge does however not entail that such knowledge always should be formulated in an explicit prescriptive fashion. Dewey (1931) writes, once more with reference to James, that theories should be seen as instruments. There are several scholars, following this line of thought, who have been working with the notion of *practical theory* in order to emphasise the instrumentality of theories; e.g. Craig & Tracy (1995) and Cronen (2001). In a practical theory, there is not always a clear link between formulations and subsequent actions. Practical theories have a function of *directing* actors' *attention* towards certain types of phenomena. Cronen

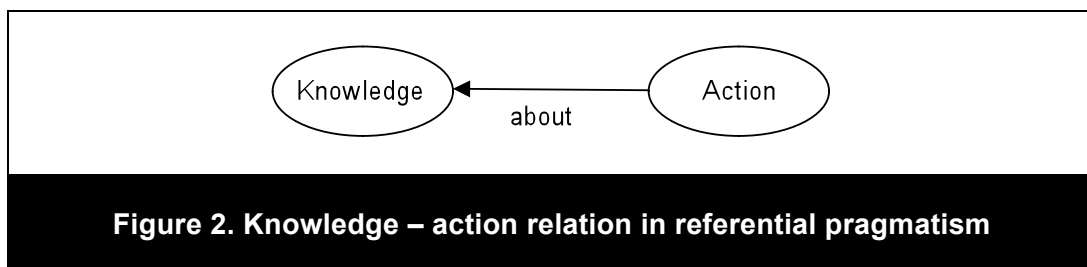
(2001, p 30) describes practical theories in the following way: “Its use should, to offer a few examples, make one a more sensitive observer of details of action, better at asking useful questions, more capable of seeing the ways actions are patterned, and more adept at forming systemic hypotheses and entertaining alternatives”. Goldkuhl (2008) describes explicitly the use of this notion of practical theory in IS research; confer also e.g. Dobson (2002). There exist however many theories in information systems which should be seen characterized as practical theories although not labelled in this way by their originators.

Within functional pragmatism, it is also possible to add the growing interest in design science and design theories (e.g. March & Smith, 1995; Hevner et al, 2004). This kind of research aims at developing knowledge useful for the design of information systems and other related phenomena. It is certainly about knowledge for action.

Should not action research also be seen as functional pragmatism since it aims at practical problem solving besides creation of scientific knowledge (e.g. Davison et al, 2004)? The main idea behind action research is contribute to local problem solving (ibid; Rapoport, 1970). In this way, one can talk about knowledge that is a locally functional. This is thus seen as special kind of functional pragmatism. Models, methods, practical theories and design theories (discussed above) aim at functional knowledge that goes beyond a narrow local practice¹. Action research will be further discussed below in ‘methodological pragmatism’.

Referential pragmatism

This kind of pragmatism is concerned with describing the world (in theories etc) in action-oriented ways. Herbert Blumer; one of the founders of symbolic interactionism (a pragmatic approach within social psychology and sociology), claims that “the essence of society lies in an ongoing process of action - not in a posited structure of relations. Without action, any structure of relations between people is meaningless. To be understood, a society must be seen and grasped in terms of the action that comprises it” (Blumer, 1969 p 71). A proper understanding of social issues entails thus action-oriented conceptualizations. The scientific knowledge (theories etc) should be explicit about actions and also its context in terms of actors and conditions for and results of actions. An action-oriented view of reality includes also acknowledging larger action items as activities and practices². The principal relation between knowledge and action, within referential pragmatism, is depicted in figure 2.



There are many action theories which have influenced research in IS. There are pragmatic theories on language, e.g. speech act theory (Searle, 1969) and conversation analysis (Sacks, 1992) which have had influence on theorizing in IS. The language-action approach in IS with its focus on communicative actions and structures of them into conversation patterns is an obvious example (e.g. Goldkuhl & Lyytinen, 1982; Winograd & Flores, 1986). There are also sociological theories on action that have great influence on IS research; e.g. theories of Weber (1978), Berger & Luckmann (1966) and Giddens (1984). Especially structuration theory of Giddens (ibid) have influenced IS research to a large extent; e.g. Orlikowsky (1992). Also activity theory (e.g. Engeström, 1987) and practice theory (e.g.

¹ Confer the discussion concerning local practice contribution (in action research) vs general practice contribution (in practical inquiry) in Goldkuhl (2008).

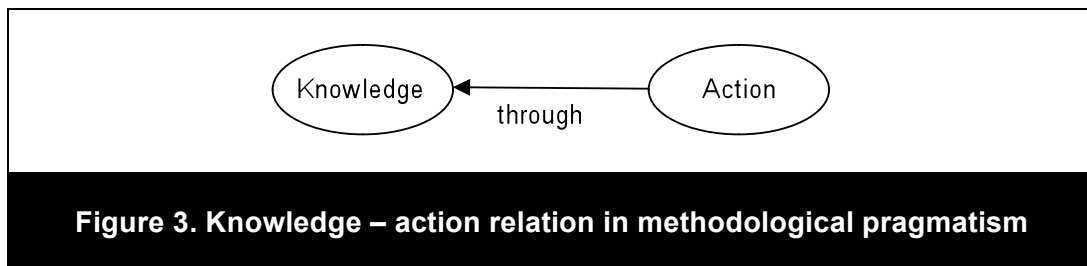
² There is a breadth of different pragmatic theories. There is no limitation to theories explicitly founded on American Pragmatism. Arens (1994) and Thayer (1981) present overviews of theories emanating from American and European scholars.

Schatzki et al, 2001) should be included in referential action theories. This list of action-oriented theories should not be seen as exhaustive.

There are methodological approaches, like e.g. Action Workflow (Medina-Mora et al, 1992) and DEMO (Dietz, 1991), which build on action theories; in this case mainly speech act theory. This means that such approaches (when comprising action conceptualisations and prescriptions for action) combine functional and referential pragmatism.

Methodological pragmatism

We learn about the world through action (Kolb, 1984). Methodological pragmatism is based on this basic fact. The development of knowledge is based on continual interaction between knowing and acting. Knowledge is based on actions, experiences and reflections on actions. Methodological pragmatism goes one step beyond pure observation for capture of empirical data. Intervention in the world with the particular intent to apply and test different strategies and tactics is essential in this kind of pragmatism. This involves also reflexivity (Giddens, 1984); that is an attention to conducted actions and their effects (success and/or failure). Inductive articulation of tacit tactics is important in this kind of reflexivity in order to arrive at new knowledge on actions. Acting in the world is seen as a primary source of knowledge. Methodological pragmatism is knowledge through action. The principal relation between knowledge and action, within methodological pragmatism, is depicted in figure 3.



Methodological pragmatism builds on the idea of a planned intervention in the world in order to gain knowledge as described by Dewey (1938) through his notion of inquiry; confer also Cronen (2001). Experimentation and exploration are pivotal in inquiry processes. Methodological pragmatism is adopted in action research. One key issue in action research is of course the contribution to a local practice (cf. discussion on functional pragmatism). Another key issue is the intervention and learning cycle: action planning, action taking and evaluation (e.g. Davison et al, 2004). Different measures are prepared and realised in order to value their effectiveness. Action research involves an exploration of new strategies and tactics and evaluation of their possible success or failure. One fundamental insight in action research is that the “true” nature of phenomena is shown first when try to change them. It is not sufficient to just observe them; we need to try to change them in order to arrive at deeper knowledge of their character.

In IS research there is a growing interest and recognition of action research; confer e.g. Baskerville & Myers (2004) and Davison et al (2004). The researchers’ involvement in real change and development processes are good opportunities for exploring new methods and approaches. The continual shift between action and reflection enables an appropriation and evaluation of new procedures. In IS research there is also a growing interest in how to combine action research and design research; e.g. Lindgren et al (2004) and Cole et al (2005).

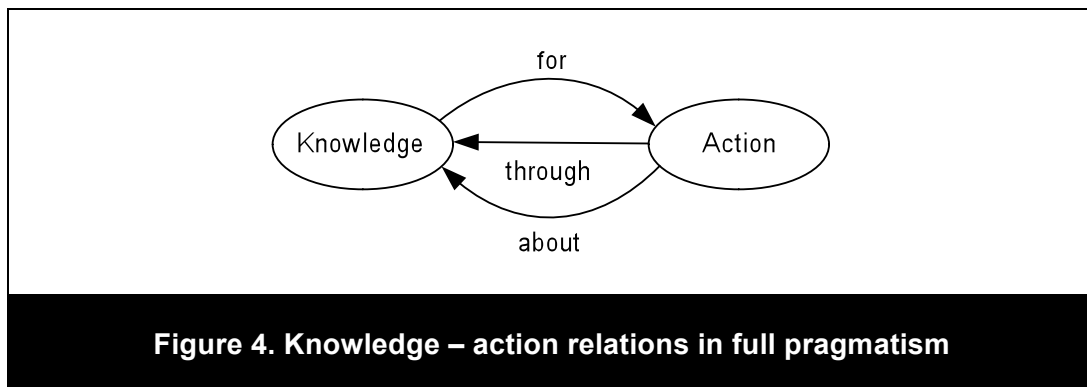
Concluding reflections

The formulation of the three kinds of pragmatisms has been made through continual reflections on IS research from a pragmatic perspective. Different readings of and reflections on classical pragmatic texts (cf e.g. Goldkuhl, 2004) have led to the formulation of these three kinds. A differentiation into functional and referential pragmatism has earlier been made in Goldkuhl (2006). The formulation process can be characterized as abductive. The process has thus not been deductive starting from existing formulations of different kinds of pragmatisms. Lovejoy (1908) presented 13 kinds of pragmatisms in a classical article. Rescher (2000) has discussed this classical division and also

contributed with other classifications. My ambition has not been to contribute to general pragmatic epistemology. My concern has, in a pragmatic vein, been to investigate functional divisions related to IS research. The division has so far had the role to sort different types of IS research into these three categories as indicated above. Further research can deepen this classification of different IS research contributions. Further research can also make more explicit connections with established divisions of different pragmatisms, as e.g. Lovejoy (1908) and Rescher (2000).

This paper should be interpreted as *a call for full pragmatism*, i.e. to apply and combine all three kinds of pragmatism in IS research (figure 4). Based on the notion of inquiry in pragmatism (cf. Dewey, 1938 and Cronen, 2001) I have elaborated on a research approach in IS called *practical inquiry* (Goldkuhl, 2008). As described (ibid), a practical inquiry can include principles and procedures from action research. In such a case there will possibilities for full pragmatism:

- An interest to describe, explain and theorize on actions in local practices (referential pragmatism)
- Both local and general practice contributions (functional pragmatism)
- Active participation in testing and exploring new ways of working (methodological pragmatism)



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PRAGMATIC APPROACH IN IS PROJECTS GROUNDED ON RECOGNISED FRAMEWORKS

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Abstract

This paper stands for IS projects that are carried out practically, using action-oriented approach and by grounding on recognised frameworks to serve as a foundation for better IS research. We introduce two different IS projects that were implemented to serve both practice and science. The projects differed in several aspects but despite that, both of them were carried out with the help of deep involvement and action-oriented approach that enabled the researcher to gain a full concept of the encounters and details in the IS projects. Thus, the research results are not dependent on interpretation and assumptions that should be made to fulfil apertures or blanks between observations. As one IS project was implemented keeping in mind a framework recognised in prior research, the other IS project was put into practice without any prior model or beforehand planning. With these two different cases we demonstrate the power of pragmatic approach when doing IS research.

Keywords: Action-oriented approach, IS implementation, pragmatic theory, recognised framework

Introduction

This paper emphasises the gains of pragmatic and action-oriented approach in doing IS research. In so doing, the paper answers to the call of Chen and Hirschheim (2004) when they asked for interpretivist researchers to continue opposite to positivist domination. Pragmatism approaches encounters from a dynamic, constructivist approach that focuses on understanding human action as a social and functional phenomenon (Elkjaer & Simpson, 2006) and thus it allows researchers to comprehend the varying side of incidences. Information systems are implemented or modified to meet the change that organisations from time to time undergo. Some of these IS projects take place continuously while sometimes there may be near twenty years intermission (Borum & Christiansen, 2006). This state builds the ground for IS research that is supposed to promote more sensible IS implementations.

We introduce two information system projects where action-related approach was used. Despite the cases were carried out in deviant ways, both of them added to the IS research due to their approach. In our paper, we conditionally accepted the definition introduced by Hirschheim et al. (1995, 22) “*An information systems development methodology is an organised collection of concepts, methods, beliefs, values and normative principles supported by material resources*”. We wanted to emphasise the role of people and collaboration and we did not deny a possibility of a loose organised collection that tended to realise in a reflective way in the other project. Furthermore, in widely accepted positivistic and interpretive IS research there is a problem of theory-practice inconsistencies that are found between researchers’ assumptions and the actual research with gained results (Smith, 2006). We believe that an approach that grounds on strong action-based research with realistic functional grasp leaves no space for dubious assumptions.

Basing on his literature review, Smith (2006) notes a problem of causality as a constant conjunction of events. Because empirical relationships are phenomenological instead of being theoretical, they lack the unobservable issues and causal processes that influence them. Therefore there is a gap between the entities. While quantitative research methods call for statistical tools, they necessitate questions such as “how many” instead of “how” and “why”. That

leads to breaks in empirical conjunction. Therefore, we emphasise the power of pragmatic and action-related research that reduces the gap.

Despite passed decades with IS research, many IS projects still fail to deliver the desired outputs. Luna-Reyes et al. (2005) claim that a significant set of these failures stem from social and organisational factors that are difficult to observe without continuous observing. In case of active doing, the researcher makes it possible to allow knowing in practice and thus, to find out how things are done in complex organisational work (Orlikowski, 2002). Orlikowski also notes how product development work is accomplished through the everyday practices of the organisation's members. She continues that the practices should be understood as independent, overlapping and intersecting through the activities of the participating individuals. Therefore, we propose that active observing is needed to get all available information gathered.

IS practitioners mostly understand the value and need of planned approach in IS projects but often the planning is humble or non-existent due to the amount of required scientific data or lack of time or skills to identify essential data. This situation widens the gap between research and practice (Chiasson & Green, 2007). In their study on ready-made software packages Chiasson and Green emphasise the significance of doubting when heading to IS implementations. In so doing, they tend to support both practitioners and customers to make conscious actions and informed choices that will be experienced positive even later. Their approach endorses our thoughts of being aware of what is being decided in IS projects.

As stated above, being near the research objective enables the researcher to get a broader picture of the encounters and events. Peirce (2000) explains this with an importance of reasoning that leads us to determine one inference instead of another and to act according the way we do. Peirce calls this action a guiding principle of inference. This guiding is supposed to lead us to correct conclusions from true premises.

Peirce's thoughts of the guiding principle were later refined into the concept of action research by Lewin (1946) who studied workers' intergroup relations and thinking. Lewin was surprised because the workers' knowledge of their own work was so humble. They did not know what should be done and they were not able to evaluate whether an action had led forward or backwards. Later, Rapoport (1970) defined the cornerstones of action research with four statements:

1. The need to get collaboration from members of an organisation to help them solve their own problems.
2. The operational research stream of mathematics, engineering and physical sciences concentrating on logistical problems of various kinds.
3. The group dynamics stream researching leadership, power, group dynamics, stress and identity.
4. The applied anthropology stream studying psychological warfare, intelligence and administration of occupied territories.

Action research targets to solve practical, real-world problems and at the same time, to expand scientific knowledge. Action research is strongly collaborative and it necessitates participation from both researchers and users or actors in the target environment. As action research is tightly connected with contemporary research settings and environment, its grounds are found in pragmatism with four essential premises: consequences defined by human concepts, truth embodied by practical outcome, logic of controlled inquiry and social context of action (Baskerville & Myers, 2004.) Of these four premises, we highlight the role of social context of action that can be revealed in action-oriented and pragmatic research but that easily is left out of questionnaires and surveys.

Rapoport (1970) sums action research as research that aims to contribute both to the practical concerns of people and to the goals of social science by joint collaboration within a mutually acceptable ethical framework. While Hirschheim et al. (1995) list abstract concepts and material resources as components of IS development methodology, Mathiassen (2002) emphasises the role of collaboration between actors. Mathiassen studied practice in close collaboration between groups of practitioners and researchers and he notes that a collaborative approach causes many practical problems and conflicts. He discerns the difficulty to find a suitable research method that enables practical ways to combine qualitatively different research approaches that support the joint goal. Mathiassen names his approach collaborative practice research and it combines action research, experiments, and practice studies. The research method constantly meets dilemmas between practice-driven and research-driven goals and general and specific knowledge interests. Due to that, we find it a fruitful method that necessitates constant reasoning and pondering.

Onwuegbuzie and Leech (2005) introduce a pragmatic researcher who utilises and appreciates both quantitative and qualitative research instead of supporting one and underrating the other. Onwuegbuzie and Leech highlight that pragmatic researchers are able to dig into a dataset to understand its meaning and to use one method to verify findings from the other method because they may utilise several methodologies within an inquiry.

In all, action-related and practice-driven research methods are recognised in prior literature, but despite that, they seem to get minor attention compared to positivistic research. Therefore, we wanted to add to the discussion with our two cases of IS projects.

The Cases

As said, the empirical material originated from two very different IS projects. The first case was an IS project that was built on the framework introduced by Hevner et al. (2004). In other words, a thorough literature review was carried out in order to find a suitable framework for the IS development project. The second research project aimed to find out how an information system is implemented in inter-organisational settings with several stakeholders and backgrounds. The two cases differed in several aspects, not to limit into issues with theoretical backgrounds. Consequently, the second case was an IS project that had no literature background but it was strongly action-oriented in its implementation. With these two cases we aimed to describe the research output that was related with real-life functionality in the projects.

Next, we describe the first case. The IS project was implemented to support user rights and their management in an organisation (called Ironmade) that was a global manufacturer of stainless steel. Even if Ironmade was present in several countries and cities, the current IS project was defined to take place only in one location with two thousand people and tens of information systems. In Ironmade, the user rights were to be restricted because the organisation wanted to control and shelter its business information and knowledge. Organisations have several tools to manage user rights but often the user rights are not properly controlled. That was the case in our target organisation, too, and the employees described the prevailing situation: “The biggest problem is that the superiors do not make any requests to remove access rights.” The IS designer was one of the users and there were no problems to get access into the several information systems and to get contact with the other users. The approach was decided to be collaborative and prior research was needed to find out how to start the IS project that was to serve both practice in the organisation and IS research.

Before we turn to the framework, we briefly describe the second case (called eMove). The IS project was an inter-organisational effort with several stakeholders participating with differing activities. While Ironmade was a private enterprise that was one of the world leaders in its business, eMove was an IS project that was carried out in the public sector and it was funded with public money. The need for eMove came from the public organisations as the organisations had to collaborate with each other ever more and they could not manage their collaboration with their contemporary information systems. In eMove there were two active groups, namely a project group consisting of future key users representing the participating organisations and a steering group consisting mainly of superiors.

We then present the framework introduced by Hevner et al. (2004) as described in Figure 1. With their framework, Hevner et al. aimed to inform IS researchers of how to do design-science research and how to evaluate and present it. The framework offers a rigorous model that reminds the practitioners to note essential factors in the development work.

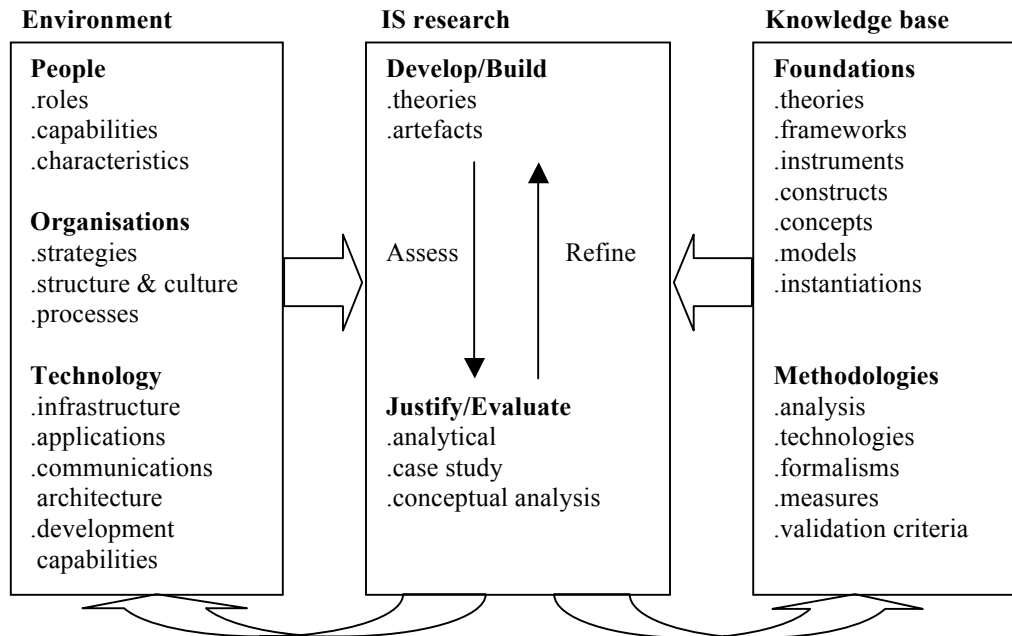


Figure 1. IS research framework (adapted from Hevner et al. 2004, 80).

While the framework promotes the output of the IS project, it also ties the project with the context organisation. In Figure 1, the central location of “IS research” is essential between “Environment” and “Knowledge base” that are context based concepts. Furthermore, Hevner et al. (2004) note that design-science should be aligned with real-world production experience. Therefore we present the empirical case (Ironmade) where we interpret the IS development with the help of the framework introduced by Hevner et al.

In Ironmade, the existing knowledge base was searched using resources both in and outside the enterprise. Then, the environment was explored with the help of the knowledge base. In so doing, knowledge base influenced the IS development already in the beginning. The project manager was an experienced employee in the target organisation.

Respectively, eMove was not planned with the help of any theoretical framework; rather, the development work was started “on the move”. In other words, it was carried out with a process that carried the project as driftwood. However, the development project was observed all the time as the project manager started to collect research material from the very beginning. The IS project eMove was active for four years while the IS project in Ironmade was completed in a few months. While the project manager in Ironmade was familiar with the knowledge base, the project manager in eMove had to start from nothing because the knowledge base was not researched.

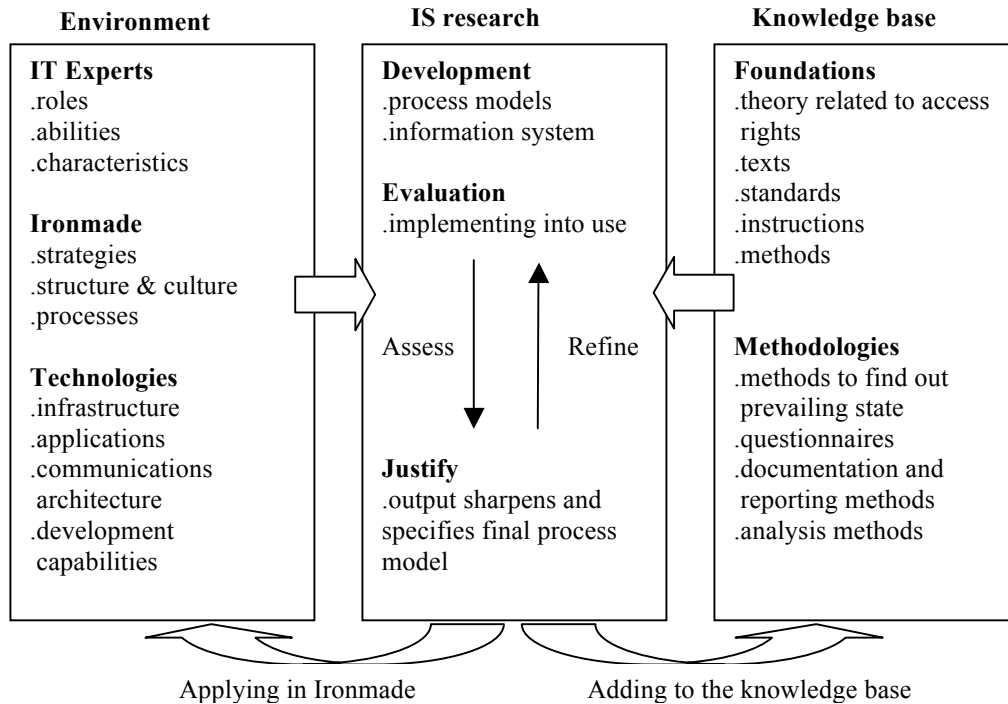


Figure 2. The output of Ironmade in the framework.

In the long run, both IS projects were completed and their outputs were evaluated. The output of the IS project in Ironmade was seen gaining both the knowledge base and the environment it self (Fig. 2). The knowledge base was cumulated with knowledge that was collected in the organisation where it had been scattered and with knowledge that was found in prior research. The environment gained because it was studied systematically. The information system was developed and evaluated.

The eMove project was evaluated, too. The evaluation was done by feedback asked from its users and it was mainly positive such as “Well done and a handy service!” and “It’s very easy to use but would be nice to add some explanation to the terms since sometimes some of them might be quite confuse.” As there was no framework to lean on, there was no knowledge base to be cumulated or environment to be developed.

Conclusion

This paper accentuated the gains of pragmatic and action-oriented approach in doing IS research. In addition, we emphasised the benefits of using a recognised framework in the IS projects that are to serve both practice and research. To achieve the goal, we introduced two IS development projects where action-related research approach was used in a way that Mathiassen (2002) calls collaborative practice research. The first IS project took place in a private enterprise where user rights were not managed properly. Prior to the development, a literature review was carried out and a suitable framework was found to be used in the IS development project. The chosen framework acted as a backbone in the development project that was run rigorously, keeping in mind the goal of the project but acting in the real environment and reflecting according to the current findings. Because the IS developer was present, the empirical material was sufficient in order to achieve the desired output.

The second case appeared to be more challenging compared to the first one. As there was no prior literature review or framework to guide the project, the project was proceeded spontaneously, according to the encounters and situations in the project. In the second case the role of human action in the social context (Elkjaer & Simpson, 2006) was emphasised. Because the researcher was present, the changes were possible to be made and the researcher was able to reflect according to the encounters. Like Onwuegbuzie and Leech (2005) conclude that pragmatic researchers may utilise several methodologies within an inquiry, several research methods were used in the second case.

These two different cases speak for doing research pragmatically, in close contact with practice. Without the constant attendance the reflection would have been significantly less or even impossible. We also believe that with active participation and action the amount of gaps between encounters (Smith, 2006) is vanished. As the cases differed in many respects (private vs. public, long vs. short timetable, inter-organisational vs. intra-organisational) their outputs were impossible to compare. According to the feedback, both cases produced a positive output. However, it is notable to understand that the first case increased the knowledge base of the organisation at least in two valuable domains: firstly, the research elucidated the knowledge of the organisation because it investigated the environmental issues such as the IT experts' abilities and characteristics, the strategies and processes in the organisation and the technology related issues, and secondly, it disentangled foundations and methodologies that were needed or desired in the current IS development project.

All in all, it would be interesting to find out if IS projects such as the second case would unfold any research material without pragmatic approach.

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CO-DESIGN AS SOCIAL CONSTRUCTIVE PRAGMATISM

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Abstract

Pragmatism as theoretical foundation and research approach has been applied in different practical settings by a number of different scholars. One approach, addressing the need for considering different stakeholder's views associated with actions being performed, has been coined as co-design by Olov Forsgren. In this short paper we revisit some of the philosophical roots of co-design in an knowledge endeavour of regarding co-design as social constructive pragmatism. By doing that we try to strengthen the theoretical base for co-design as well as getting inspiration for new development of the co-design movement. Social constructive pragmatism is conceived as a social constructive process in which observations by inquirers are essential. The basic categories in co-design are the viewer often described as the actor, the viewing often described as the action and the target of the viewing, often described as the object. The meta-viewer is also an important part of co-design in viewing the whole scene of actors, actions and objects. In this paper a framework that relates co-design to an action cycle constituted by three steps (conditions, action, and result) as well as the notion of inquiry is presented.

Keywords: Co-design, Inquiry, Pragmatism, Systems thinking, Action Cycle

Introduction

Pragmatism as theoretical foundation and research approach has been applied in practical settings by followers like Checkland (1981), Ackoff (1981), Mitroff, Mason (Mitroff & Mason, 1981), Schöön (1983), Forsgren (1988), and Goldkuhl (2005). The Forsgrenian (Forsgren, 1988) approach to this has been coined as *co-design*. Co-design has also been a generative source for deriving innovative IS/IT-solutions (Albinsson et al, 2007). The latest trends in the IS-field, such as Web 2.0 and coming successors, open source communities, participative approaches to systems development etc., could be related to the co-design foundation and approach (c.f. Lind & Forsgren, 2008). The basic fundament of co-design can be described as *social constructive pragmatism*. Social constructive pragmatism is in this setting to be regarded as a development of pragmatic theory in the line of James (1907), Pierce (1905), Dewey (1922), Singer (1959), Cowan (1986), and Churchman (1971) later also used as a main inspiration for soft systems theory (Checkland, 1981) and communication research (Perry 2001). To be noted is that soft systems theory as well as other pragmatic theories has been used in guiding human action in diverse setting. One such setting is within the practice of information systems design. The idea with this short paper is to revisit some of the philosophical roots of co-design and some related frameworks also pointing to the same philosophical fundament. By doing that we hope to be able to strengthen the theoretical base for co-design as well as getting inspiration for new development of the co-design movement.

Pragmatism is a pluralistic concept. According to one version it is a philosophical worldview in which the notion of change is an important category, and according to another it is a method to handle philosophical disputes by examine consequences of different stances (Perry 2001) In American pragmatism a special interest is paid towards actions performed by people (Goldkuhl, 2004). Many actions are social, existing in intersubjective worlds (c.f. Goldkuhl, 2002), where different approaches for conceptualising actions has been put forward (c.f. e.g. socio-instrumental pragmatism by Goldkuhl (2005) and activity-based communication analysis by Allwood (2000)). Communicative as well as material acts become of interest for a developer when pragmatism directs his actions. He or she becomes an inquirer. The inquirer in the pragmatic tradition is a realist, but not an objectivist (Dewey 1922).

Observations, that the inquirer does when he studies actions, enter into a social constructive process, which we believe is the core of social constructive pragmatism. The inquirer with a pragmatist stance creates facts during his study. However the facts are neither wholly objective, untouched by human minds, nor entirely a matter of linguistic creation outside our connections to the material world (Cronen & Chetro-Szivos 2001).

Following this section the historical roots of co-design is revisited. Then we will look into the notion of inquiry as a social constructive view on action. Given a focus on action, the involvement of several stakeholder views in the process of inquiry will then be elaborated on. The purpose of this short paper is to point to essential constituents of co-design processes and their products in relation to core concepts of pragmatism such as the actors, the inquiry, the actions, its preconditions, its results, and its effects.

Revisiting the history of co-design

From the view of Churchman (1979), Co-design behavior has its origins in the philosophy of Kant (1987). To solve the philosophical dispute between the idealists focusing on ideas as the essence of the world, and the realists focusing on reality as the essence of the world, Kant proposed that we need a priori ideas to interpret the real world. This idea, that today we refer to as perspective, was much more elaborated by another philosopher, Singer (1959). With reference to Aristototele's teleological thinking and Platon's thinking on ideals he expressed the same idea in a different language. He claimed a need to design *measurement scales* to be able to measure, or in other terms, we need to create good questions to get good answers. Subsequently Churchman (1971), as part of the pragmatist tradition clarified the direct connection between a measurement scale, an ideal and a hope for the future. He also introduces the dynamic quality aspect that ideals and scales of measurement have to be in a mood of change. He also describes the arena for the dynamic change as a system. The way of reasoning is influenced by the works of James (1907), Dewey (1922) and Mead (1934).

Influenced by this, Forsgren (1988) developed, a first co-design framework. This framework is a multi-stakeholder model in which all stakeholders concerns, related to a certain co-design situation, are taken into consideration by either inviting, or considering perspectives of, diverse stakeholders. Measurement scales and ideals are co-constructed by engaged stakeholders and perspectives driven by the hope for the future. In some examples Forsgren has described how these ideas can be used as guiding principles for developing artefacts where one type of artefact is computer based information systems.

As an example, we can "measure" day care centers for children so that parents can choose between them. But more important Churchman also proposed that we have to design the measurement scale taking into account that different people have different hopes for the future and that their hopes change over time. For example, when council staff measure, or describe, a day care centre s/he has to think about whom s/he is talking to: is it a family with several children, with disabled children, a family with strong environmental concerns, a family where the parents work long hours, etc. The design of the measurement scale becomes a co-designed system between different interests. This co-designed measurement scale/view directly influences e.g. the design of e-services for parents to evaluate and choose between different day care centers. Views not only influence the design of information and services, but also often influence the design of the service or business itself.

One important consequence is though that it is not easy to know whether or not a useful perspective is successful. It comes back to the point where we already have accepted the existence of different perspectives. Our conclusion of this reasoning is that all, or as many as possible of the stakeholders that are influenced by useful perspectives should be involved in a discussion and decision arena where it is decided if the developed influencing perspective should continue to be used or not. This conclusion has very direct impact on the ideal research process where useful perspectives are created. The ideal process can be compared to a circling spiral. In the inner circles small embryo ideas are expressed and visualised as a blueprint. They are implemented mainly as a thought experiment by the researcher, and as such also evaluated by the researcher. In a wide circle the implementation can be done as a demonstrator with more people involved. Usually students and close friends are used as trial stakeholders. In still a wider circle we can find different pilot implementations and finally in the outer circles we have different full scale examples with a lot of stakeholders involved in judging whether or not it is a successful influencing perspective that has been developed and implemented.

The core idea of co-design has been described in many ways. According to Churchman (1979) it can be expressed through the lenses of Singer (1959) as: "A man need another mind reflection upon him" Or as Churchman himself express this: when you for the first time can see the world from another persons view then you have entered the

worldview of co-design, or the systemic worldview as he calls it. Continuing on that line there is a need for meta-models describing how views are developing and implemented in social and technical contexts. Expressed in Singers terms “A man reflecting upon a man needs another man reflecting upon both of them”. Or in Churchmans terms when you for the first time can view another person’s view you are in the co-design mood.

The basic categories in the framework put forward by Forsgren (1991) are the viewer often described as the **actor**, the viewing often described as the **action** and the target of the viewing, often described as the **object**. And finally the most important is the **meta-viewer** viewing the whole scene of actors, actions and objects. In different pragmatic frameworks (e.g. Goldkuhl, 2005; Checkland, 1981; Ackoff, 1981; Allwood, 2000) these basic categories (actor, action, object, meta-viewer) are elaborated on and related to each other in different ways. Different instances of actors related to the actions are also put forward which has resulted in an acknowledgement of actors influencing as well as influenced by the actions performed. In the same line of reasoning Churchman claims that the subject and the object are inseparable. An object depends on the view of the actor. Instead he talks about **clients**, i.e. people that are directly influenced by the used view.

One essential consequence in this way of reasoning is that one should not bother to design any more detailed solution before you have made the basic view to your own view. That basic view is the *view of views* that matter for different stakeholders, i.e. the stakeholders of a solution need to have a say of how that solution should influence them. With that view you can not any longer talk about better understanding you can only talk about understanding from my point of view or from someone else’s point of view. In a pragmatic conception of the world the focus is on action. A human being intervenes in the world, by performing actions, in order to create some differences in their environment – to achieve ends (c.f. Dewey 1931; von Wright, 1971). Views and viewers are in a dynamic change during time or during a project by the performance of actions. Such meta-views need to be co-designed for the situation, but given an acknowledgement to that knowledge developed in society is cumulative, i.e. we continuously learn from acting, earlier experiences could successively be used as basis for the co-design of the meta-view. Important to note however is that applied meta-view is just a view that can be implemented as a view in action. This meta-view give no better understanding, it gives another understanding making a difference for people. The only way to try this out is to try to implement it and to involve the stakeholders in a conversation about pros and cons also inviting them to invent new views as actions better serving their ideals.

Co-design as an inquiry

As we have described in the last section above the involvement of stakeholders in the design conversation is one main core in our view of co-design. Pragmatism also views conversation as important. It places communication in the center of human concerns (Cronen & Chetro-Szivos 2001). John Dewey argued that the social world not only continues to exist through communication, *it exists in communication* (Dewey 1944). During his lifetime, Dewey worked in several different areas, such as Psychology, Philosophy and Education. He based his view on pragmatism on the previous work by James and Pierce, shifting from an inductive perspective to a more social constructive view on learning and development (Garrison 2006).

The notion of inquiry is one of the ideas that Dewey worked on. The inquiry gives structure to the dynamic, progressive and world improving process which characterizes learning and development. Inquiry is a communication process, and Dewey identified in his book *Logic: The Theory of inquire*, a pattern of inquiry in order to facilitate the transformation of a problematic situation into a determined and improved one (Dewey, 1938). This ambition is similar to our view of co-design. By involving different stakeholders the aim of the co-design process is to determine pros and cons, as well as determine new ideas and views in relation to the design. Hence when co-design is viewed from a pragmatic view one way of doing this is to consider co-design as an inquiry. What then constitute Dewey’s process of inquiry?

Dewey distinguished three phases in an inquiry. He argues that we inquire into situations. A situation for Dewey is an event that is connected to a contextual whole. When a situation becomes problematic it involves some type of communication breakdown or that a need has occurred in the ongoing action which must be met. This ongoing action could be a co-design activity. During this activity situations will occur that needs to be inquired in order to improve the co-design. For example could this be the making of determinations or propositions in the design with the intention of improving the design. To undo a doubt that hampers the design amongst different stakeholders. The first phase is about *identifying* a problematic situation. Qualification of a situation as problematic does not however carry inquiry far (Dewey, 1938).

The second phase of the process involves first the isolation of the data or subject matter which defines a frame around the situation within which the reconstruction of the problematic situation should be done. In the co-design this could include the definition of the different views that different stakeholders has and the consequences these views have on the design as a result or/and a process. The relevant conditions for the situation are then *reconstructed* and the situation is through that determined. In the third, *reflective phase*, the constructive action of the inquiry takes place. Ideas, propositions, theories are then constructed and is regarded as hypothetical solutions to the originating problem in the problematic situation. What the inquirer now attempts is to make a judgment of the hypothetical solutions in relation to the situation at hand. That judgment will include different concrete lines of action, which has defined and observable consequences, which should improve the problematic situation (Cronen & Chetro-Szivos 2001). The final test of the adequacy of these solutions comes with their employment in action. If the solutions are helpful and improve the activity, then the solution no longer retains the character of hypothetical, rather it becomes a part of the existential circumstances of human life; in our example the co-design.

We argue that this pattern is one possible way to structure the dynamics of co-design. However in order to do that we must further investigate which consequences the idea of several stakeholders as inquirers has on the process of inquiry. In order to do that we have developed a framework for social constructive pragmatism in the next section and based on this we have also developed a conceptual model of co-design as an inquiry.

Towards a notion of co-design as social constructive pragmatism

As claimed by several scholars the core is to investigate the action character of the empirical field in social studies. Blumer (1969 p 71) claims that “the essence of society lies in an ongoing process of action - not in a posited structure of relations. Without action, any structure of relations between people is meaningless. To be understood, a society must, during inquiry, be conceived in terms of the action that comprises it”. As identified by e.g. Goldkuhl (2005) an action cycle, as a basic unit of analysis, could be formulated as follows. Actions performed by an actor are based on a pre-assessment of grounds (earlier actions performed by actor(s)). During the performance of an action the actor uses instruments, knowledge and experiences as support. An action produces a result that is directed towards another actor (the addressee). The result is then interpreted by the recipient (the addressee) and the effect will be new actions performed by the addressee according to Figure 1 below.

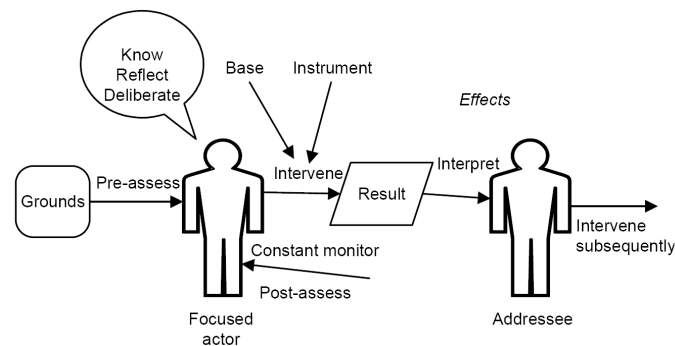


Figure 1: Socio-instrumental action – a basic model (Goldkuhl, 2005)

Important to note is that this model principally conceive *one* actor acting towards another actor (the addressee). Going back to activity theory (c.f. e.g. Engeström, 1987) a division is made between the object, i.e. what is referred to, and the subject, i.e. the actor(s) performing the act. From a social constructive point of view we do however regard objects as artefacts. In co-design we do this in the sense of that an artefact is something that is created by human beings which don't exist naturally in the world while an ecofact is something that exist naturally in the world. We regard an artefact as something that can be instantiated as something with physical- and/or social properties. Examples of artefacts are; computers, software, methods, models, norms, attitudes, values. One important dimension of co-design as social constructive pragmatism is however that there are several artefacts and several subjects *co-existing* in different action phases during inquires. An unresolved quest is thus to bring forward an action-theoretical framework that can manage the co-existence of several **artefacts** and **subjects** in a specific situation. To conceptualise the actions of co-design we therefore build on an action cycle of *one* actor performing one single act against *another* actor. This means that the single-action framework is used as a basis for looking upon co-design as action(s) on a higher level of granularity. Let us therefore conceive co-design as social constructive

pragmatism by relating to such an action cycle in which there is a distinction made between artefact and subject. In the table below **for-action** relates to the conditions of performing the action. Based on Dewey's (1944) view on inquiry the for-action then include the two phases *Identifying the problematic situation* and *Determining the situation*. For-action could concern conditions like instrument, basis, and grounds needed to be in place for the actor. The **in-action** dimension relates to artefacts and subjects that are used when the action is being performed which also relate to Dewey's third phase, *the reflective phase*. The purpose of the **of-action** dimension is to put forward that performed actions will affect both the artefacts in focus as well as the subject(s) and what they are addressing, i.e. the parties that are involved in the co-design situation. Of-action is in a way the connection for a new for-action since it creates new situations. During the actual action (in-action) there will also be artefacts and subjects that will shift between being in the foreground and in the background. Artefacts and subjects in the foreground means to be active and in focus while being in the background means to be involved but not explicit intervening in the actual performed actions.

	<i>Actions</i>	<i>Artefact</i>		<i>Subject</i>	
For-action	1) The establishment of necessary conditions (basis, instruments, norms) by subjects, 2) Actions between subjects resulting in relationships between them 3) The establishment of the measurement scale 4) Identifying and determining the situation	Grounds, Basis, Instruments, Norms		Subjects involved for establishing conditions and measurement scale	
In-action	The performance of the constructive action itself (on different levels of granularity)	F-ground	B-ground	F-ground	B-ground
		Instruments, basis, norms and produced results	Instruments, basis, norms and some produced results	Engaged subjects in the action	Observing subjects in the action
Of-action	Consequential actions by the recipient(s) and the actors performing the action	Results intended to create effects in the areas that is focused in the co-design Consequential effects in terms of revised or new conditions		Recipient(s)	

The framework is also recursive to its character (see figure 2) in terms of that the whole framework can be applied for a certain action phase (for-, in-, and of-action) in itself. In figure 2 below the different action phases and the role of the inquiry in these are depicted in relation to the action cycle. As brought up in the section 2 an important task is to set the measurement scale by the involvement of several actors. This does however address two tricky tasks;

- 1) To establish what is to be seen as necessary artefacts
- 2) To select necessary subjects, i.e. stakeholders to be associated with for-, in-, and of- the co-design action

A core task in co-design processes is therefore to let several actors (subjects) (successively) agree upon the conception of artefacts and subjects related to the action of co-design. As a final remark we would also like to put forward that these kinds of actions could be regarded on different levels of granularity. This means that we through this kind of meta-design could manage to pinpoint a single co-design act as such, but also a group of activities of an enterprise (or even a business network) as a compound co-design act.

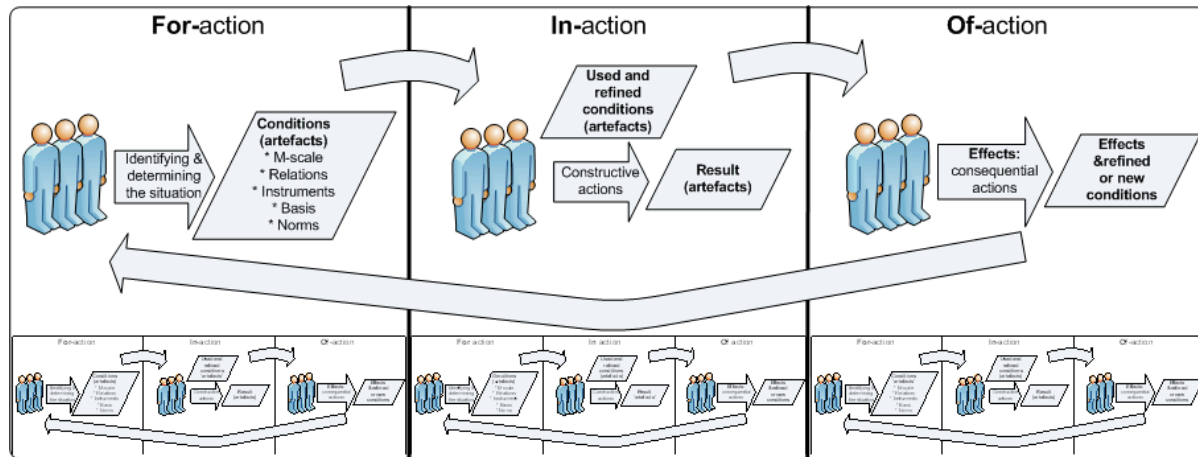


Figure 2: Co-design as social constructive pragmatism

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PRAGMATISM AND INFORMATION SYSTEMS (IS): NEUROPHILOSOPHICAL APPROACH

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“We are reaching the point in the history of science where a discussion of methods that is not grounded upon both a Neuroepistemology and a Neurophenomenology will not be worth considering. Why? Because we now know enough about the relations between consciousness and the brain to know that the structure of consciousness is a functional reflection of the internal organization of the brain. Thus questions having to do with how we know, what we can know, what we cannot know, sex-related styles of knowing, the symbolic nature of knowing, how consciousness constructs its world of experience, etc., are really questions about how the brain is organized and develops, and what limiting factors are imposed upon knowing by the organization of the brain. Hence, Neuroepistemology.” (C. Laughlin)

Abstract

In recent papers, scholars are asking for more development in the philosophy of science for IS. Information Systems is a young discipline, and it has difficulties to find a stable philosophical basis. There is the double need of developing it and combining with the strong results practitioners are obtaining. Pragmatism has some remarkable qualities as a philosophical view that makes it suitable to accomplish this task. Our work proposes how recent advances on Neurophilosophical Methodology are a valid approach for IS Research theory development. Neurophilosophy tries to explain philosophical questions applying models derived from neurosciences (Cognitive Neurophilosophy and Empirical Neurophilosophy) and at the same time, it is the philosophy of science of the Neurosciences (Theoretical Neurophilosophy). Our work contributes with a methodology taken from the Neurophilosophical methodology that proposes a way to give ground and improve the assumptions in the pragmatic theory.

Keywords: Information Systems, Pragmatism, Neurophilosophy, Methodology

Introduction

Academics in IS ask for more theory development for IS (Benbasat, Zmud 2003) (Mingers 2004). This paper tries to support this requirement not by developing a new philosophical theory for IS Research, but by giving support to an existing one (Pragmatic theory and action oriented perspectives). In order to accomplish the task, we will focus on Neurophilosophical Methodology.

Neurophilosophy is not new, with that name or others. Thinking that many philosophical problems will be solved when we reach to understand the brain is a common thought among philosophers, some of them even used to think that philosophy would disappear as a subfield in psychology (Quine 1977): *“I see philosophy not as an a priori propaedeutic or groundwork for science, but as continuous with science. I see philosophy and science as in the same boat – a boat which, to revert to Neurath’s figure as I so often do, we can rebuild only at sea while staying afloat in*

it. All scientific findings, all scientific conjectures that are at present plausible, are therefore in my view as welcome for use in philosophy as elsewhere". Of course, there are opposite views as for example the functionalists and their multiple realizability: a given mental state or event can be realized in a wide variety of physical types. These philosophical views are losing ground against developments in neurosciences (Bickle 2006).

In order to improve the quality of IS research, it is common in philosophy of science to include classical philosophical ideas into IS Research (Mingers, Willcocks 2004)(Goldkuhl 2004). The basic assumption in this paper is that the philosophy grounded in neurosciences can have a sounder basis than the one which is not, i.e. the philosophy of science that grounds on Neurophilosophy provides a better approach than the philosophy of science based on speculative philosophical assumptions. It does not necessarily mean that all philosophy of science has to be based on neurosciences, but it does mean that at least it should be checked if Neurophilosophy could contribute or not.

Pragmatism is seen as a feasible alternative in IS Research, and in this paper we characterize it via the action manifesto presented by Goldkuhl in his paper "Meanings of Pragmatism: Ways to conduct information system research" (Goldkuhl 2004). We aim to provide a procedure to show that pragmatism can serve as a foundation for better IS Research, and thus prepare the basis for a extended second paper where we will try to prove that effectively it is that way.

In this short research-in-progress paper, we will introduce the Neurophilosophical Methodology, and afterwards we will try to show how would it give ground to the Pragmatist Theory. We will finish detailing future work and other possibilities of this methodological approach.

Neurophilosophy

Neurophilosophy is the interdisciplinary study of neuroscience and philosophy. According to (Northoff 2004), we differentiate:

1. "Phenomenal or Cognitive Neurophilosophy" and "Empirical Neurophilosophy" as "Neuroscience of Philosophy". It matches with the definition found in (Bickle, Mandik & Landreth 2006) for Neurophilosophy, where it is said that *"concerns application of neuroscientific concepts to traditional philosophical questions"*.
2. "Theoretical Neurophilosophy" as the "Philosophy of Neurosciences" and "Philosophy of Neurophilosophy".

As the base of this paper, we will focus on the later. Northoff (2004) defines Philosophy of Neurophilosophy: *"focuses predominantly on the development of a definition and methodological principles and strategies for linkage between philosophical theory and neuroscientific hypothesis"*.

One of the most important issues to take into account is the asymmetry between logical conditions from philosophy and natural conditions from neurosciences, and how the Neurophilosophical Methodology copes with it:

A. - Transdisciplinary Methodology: transdisciplinary implies the systematic linkage between philosophical theories and neuroscientific hypothesis. The important thing is to be able to link both worlds. Northoff (2004) defines three principles: principle of asymmetry, principle of bidirectionality and principle of transdisciplinary circularity.

The last principle explains the first two ones:

The principle of transdisciplinary circularity describes systematic processes of oscillation and circulation between philosophical theory and neuroscientific hypothesis, with the consecutive development of Neurophilosophical hypothesis. The need for the development of the "principle of transdisciplinary circularity" stems from the failure of both elimination and reduction of logical conditions i.e. philosophical theories in favour of natural conditions i.e. neuroscientific hypotheses. Since neither elimination nor reduction remains possible, both have to be considered. [...] Since these processes follow certain systematic and predefined methodological steps, one may speak of a "disciplined circularity" (Varela 1998, 342).

B. - Relation between ontology and epistemology in Neurophilosophy: in philosophy, the methodological strategy used is "ontological primacy", which means making first ontological presuppositions about reality and existence, which provides foundational framework to epistemology. However, to be able to make ontological presuppositions we need language and knowledge, i.e. epistemic capacities. Epistemic capacities would be different with a different

brain, and so the ontological assumptions about reality and existence that would be generated. This leads to the epistemic primacy as the methodological strategy for Neurophilosophy.

C. - Characterization of the Neurophilosophical Hypothesis: "*defined as an assumption about the linkage between philosophical theory and neuroscientific hypothesis*" (Northoff 2004). Obviously, this linkage has to follow the methodological principles of transdisciplinary methodology, described above. This gives a systematic relation, rather than an intuitive one.

Since a Neurophilosophical Hypothesis can be defined by systematic linkage between philosophical theory and neuroscientific hypothesis, it remains open for three distinct types of falsifications: logical falsification (gives 'logical consistency' as means for 'internal validation'), empirical falsification (gives 'empirical consistency' as a means for 'external validation') and transdisciplinary falsification (gives 'link consistency' as a means for 'cross-disciplinary validation'). The last one focuses on how the neuroscientific hypotheses and philosophical theories are linked with each other. As we have seen it, there is link consistency if the linkage is in full accordance with the principles in transdisciplinary methodology.

Interaction between ontological/epistemological assumptions and empirical hypotheses should be investigated within philosophical theory and neuroscientific hypotheses. We should add ontological/epistemological assumptions to empirical hypotheses in order to be able to include logical falsification to check for logical consistency. The opposite way around occurs with philosophical theories: there is the need to add empirical hypotheses, in order to be able to apply empirical falsification. It is important to note that Neurophilosophical hypotheses do not predetermine and predefine the terms as in philosophical theories: the definition itself could be changed depending on empirical grounds ("*definitorial shifting*").

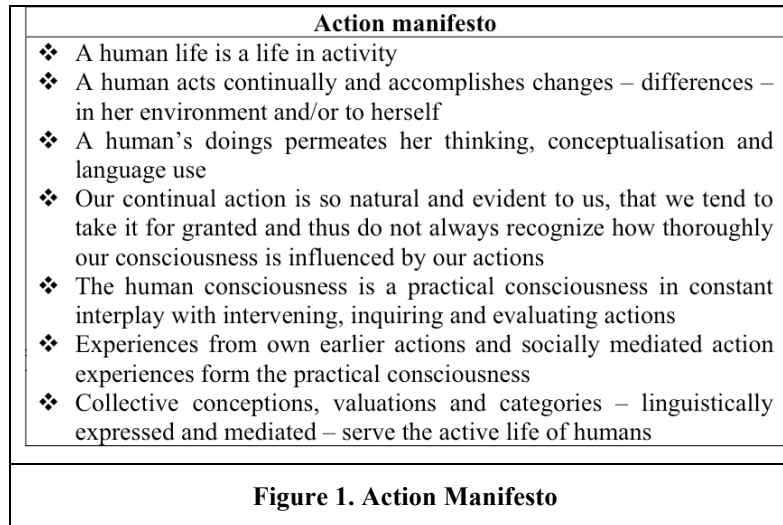
At last, we will define both "conceptual clarification" and "conceptual re-clarification": "Conceptual clarification" focuses on explication of implicit presuppositions and definitions in terms and theories, which are then subjected to logical and/or linguistic analysis. In contrast, Neurophilosophical Hypotheses focus on implicit empirical hypotheses in philosophical theories. The adjustment between philosophical theory and empirical hypothesis requires conceptual clarification, logical analysis and linguistic analysis. Therefore, "conceptual re-clarification" stands for the modification of both definitions and concepts consecutively. At the same time, conceptual re-clarification is used to evaluate link consistency, as a test for systematic interaction between philosophical theory and empirical hypothesis. Thus, Neurophilosophical Hypotheses have the possibility of transdisciplinary falsification, through conceptual re-clarification and with consecutive investigation of link consistency.

Via the Neurophilosophical Hypothesis, it is possible to link philosophical theories and empirical hypothesis in systematic and consistent ways. We will use this idea in the next section of the paper.

Action Manifesto

We will base our work in the paper "Meanings of Pragmatism: Ways to conduct information system research" (Goldkuhl 2004): his paper "*explores the meanings of pragmatism in terms of implications for how to conduct research on information systems*".

Goldkuhl (2004) finishes his work concluding that there is in life a relation between knowledge and action (i.e. proper action should be knowledgeable action and proper knowledge should be actable knowledge), and that researchers should consider it in their tasks. More interestingly to our purposes, he concludes with an action manifesto, which "*in very condensed form espouses the fundamental views of action significance*".

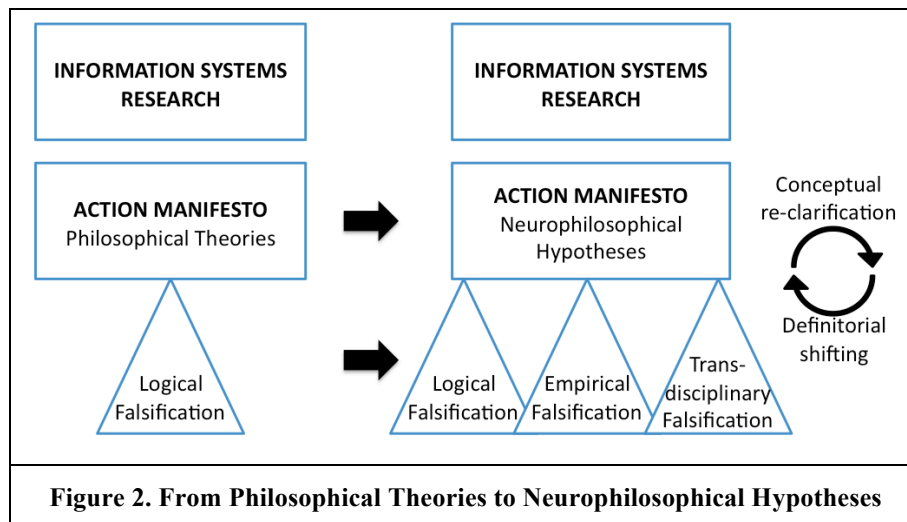


As they are stated, the fundamental views of action significance are philosophical theories in terms of ontological/epistemological assumptions, based on how humans know and act (both individually and socially). Therefore, if we understand Neurophilosophy as the application of neuroscientific concepts to philosophical questions, we can treat these fundamental views as Neurophilosophical Hypotheses.

Information Systems and Pragmatism under a Neurophilosophical Perspective

Considering that the difference between philosophical theory and Neurophilosophical Hypotheses is the possibility of "*definitorial shifting*" and "empirical falsification", and that Neurophilosophical Hypotheses are falsifiable three times, we have two main advantages as there can be seen in figure 2:

1. We can apply three falsification processes to every fundamental view, thus making them more reliable than before.
2. We can take approach of the "*definitorial shifting*" and "conceptual re-clarification" circles, in order to improve the statements of the action manifesto.



Therefore, our paper suggests that philosophical assumptions converted to Neurophilosophical Hypotheses and showed to be consistent, are better grounded than the ones that are not. Due to the required length of this paper, we will not go through the whole process. That work will be part of the next paper.

Conclusions and future work

In this paper we are proposing a new approach to ground pragmatism. A Neurophilosophical Hypothesis Methodology has been shown as a sounder basis for this purpose. A procedure based on the systematic testing of all points of the action manifesto has been explained as the method to justify our proposal.

Our approach is expected to add more elements in order to use pragmatism as a philosophical approach in the IS field. Furthermore, using definition shifting and conceptual re-clarification, those fundamental views can be improved. At last, we can work in a different set of ideas and applications after the inclusion of neurosciences in IS. For example, following the ideas in (Goldkuhl, Agerfalk 2002) if IS are (prosthetic) tools for organizational action and communication, and those abilities are generated by the brain, we could assume that every knowledge we grasp about the brain from neurosciences will help to better understand or develop these IS tools.

As of future work, what follows logically, is to continue the work going through the seven fundamental views of the action manifesto with the Neurophilosophical Methodology. During this process, we will have to check whether we can offer improvements to the assumptions as they are stated, based on the last advances in neurosciences (obviously, this approach can be applied to Pragmatism or any other human related sciences). Finally, there is the need to study if this new approach gives ground to the development of new ideas in IS, both for IS Researcher and for IS Practitioners.

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SUSTAINABILITY COMMUNICATION: A ROLE FOR IT AND IS IN RELATING BUSINESS AND SOCIETY

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Abstract

The challenges presented by a focus on sustainability in relating business and society suggest opportunities for theorizing IT artifacts in their organizational and societal context from a pragmatic, action oriented perspective. This paper outlines just such an opportunity by reframing the concept of stakeholder relationships in terms of the communication pragmatics of accounting. By reconsidering how accounting is achieved through communication, not only can a communicative view of stakeholders be developed, it will also be possible to further theorize the role IT may have in supporting the interaction and reasoning involved in sustainability. Three aspects of this opportunity for theorizing IT in its organizational and social context are outlined here: Accountability Gaps, Communication and Information Services, and The Sustainability Communication Design Space.

Keywords: Sustainability, CSR, Accountability, Stakeholder, Communication, Design, New Media

The Sustainability Context and IT

During the last decades of the 20th century the expectation that business should be conducted in a manner that is sustainable rapidly evolved. This evolution was punctuated by events such as the 1987 Brundtland Report on sustainable development and the introduction of the 'triple-bottom-line' by Elkington to emphasize that corporate performance should be judged not only against economic performance but on social and environmental performance. While not universally accepted, the shift to sustainability has fostered further attention to how business organizations are accountable to stakeholders not just to stockholders. It has led to the development of practices such as environmental-social-governance standards (ESG) and corporate social responsibility (CSR).

Whether expectations about sustainability are enshrined in law or embedded in evolving customs, the simultaneous changes to who a business organization is accountable to and what it is accountable for raises numerous communication challenges. Why, for example, should a firm communicate anything about its performance if it is not required to report? Even when a firm chooses to disclose its social and environmental practices and consequences, the standards for doing so are relatively undeveloped compared to financial reporting. Thus, companies enter into a game for which few rules exist. From a societal perspective, why should anyone trust voluntary disclosures as a basis for judgment? What is the veracity of any system designed to foster accountability when there are incentives to game the system? Can accountability lead to innovation or is it primarily punitive? Despite these challenges, business firms and other organizations have increasingly engaged in communicating their social responsibility and sustainability.

The challenges presented by a focus on sustainability in relating business and society suggest opportunities for theorizing IT artifacts in their organizational and societal context from a pragmatic, action oriented perspective. This paper outlines just such an opportunity by reframing the concept of stakeholder relationships in terms of the communication pragmatics of accounting. By reconsidering how accounting is achieved through communication, not only can a communicative view of stakeholders be developed, it will also be possible further theorize the role IT

may have in supporting the interaction and reasoning involved in sustainability. Three important aspects of this opportunity for theorizing IT in its organizational and social context are outlined here.

Accountability Gaps in Stakeholder Relations

A first aspect is to recognize how instruments for communication among stakeholders contribute to accountability gaps in stakeholder relations requiring new approaches that design systems for accountability.

One common way to understand the relationship between business and society is through stakeholder theory, which recognizes that there are actors beyond investors/owners who have a stake in the firm. A stakeholder is any group or individual that “can affect or is affected by the achievement of an organization’s objectives” (Freeman, 1984, p. 46). A stakeholder would include actors such as investors, consumers, suppliers, and employees. Not all stakeholders are the same in terms of their ability to impact the organization or to be affected by the organization and, furthermore, organizations have differing legal and moral obligations to various stakeholders (Donaldson & Preston, 1995). Ten years after developing the idea, for instance, Freeman (1994) explains that stakeholder theory can be unpacked into a number of stakeholder theories.

A primary theoretical issue for stakeholder theory lies in defining stakeholders and the relative influence organizations and stakeholders have on each other. Some stakeholders have a direct stake in the firm, such as investors, customers, and suppliers, while others have a less direct stake but do hold some influence, such as news media, advocacy groups, and other NGOs. Many argue that an improved stakeholder theory will more adequately identify stakeholders and non-stakeholders and thus provide better guidance on how a business firm should relate to other actors in society (Mitchel, Agle, & Wood, 1997).

The preoccupation in stakeholder theory with defining stakeholders contributes to an overtly managerial view of the role of communication in the business-society relationship that carries over to the development and use of instruments for communication with stakeholders. Firms use various instruments of communication to engage their stakeholders, such as reports, codes of conduct, handbooks, ethics committees, and stakeholder engagement meetings. These instruments are sometimes direct forms of engagement with stakeholders, as in reports and stakeholder meetings, and at other times serve more as signals about the firm’s commitments, as in codes of conduct. The nature of the particular instruments developed and the ensemble of instruments deployed reflects preferred practices for relating to particular stakeholders, strategic orientations toward sustainability, and institutional demands on the organization from its field of activity (Pirsch, Gupta & Grau, 2006; Graafland, van de Ven, & Stoffele, 2003; Perrini, 2005). The instruments most used, developed, and diffused are primarily means for firms to convey stories about the firm and to distribute preferred information about the firm. Communication is taken to be a tool from managing stakeholder relations where choices about how to communicate depend on the organization’s dependence on particular stakeholders for resources (e.g., Rodgers & Gago, 2004), rather than recognizing how communication is constitutive of stakeholder relations.

The context in which these instruments emerge reflects some deeper norms and expectations about communication that emphasize communication as a tool for promotion or a tool for information exchange. The common communication instruments for stakeholder communication are biased toward managerial and ownership interests (for two differing views on this see Kuhn & Deetz, 2008; Reich, 2007). We suggest that the standard view of stakeholder relations coupled with the conventional instruments for stakeholder communication contributes to *accountability gaps* in stakeholder relations.

Accountability gaps arise when the instruments of communication provide little means for generating productive counter-arguments and engagement that enhances the capacity of parties to a relationship to hold each other accountable for behavior and actions. This is evident when, for instance, sustainability or CSR reports by companies do not align with the very problems their business activities contribute to society and the environment. This happens when organizational actions are covered up by accounts about good behavior or by ignoring. This problem of greenwashing is sometimes met by calls to pressure companies not to greenwash. A better solution might be to find ways to bring a firm’s accounts about firm behavior into direct contact with other credible analysis of firm behavior. Friedman and Stagliano’s (2008) study points out some possibilities. They found an interesting mismatch between the Toxics Release Inventory (TRI), which is an annual report on hazardous chemical emissions of American industrial facilities, published by the U.S. Environmental Protection Agency, and the sustainability reports of the 200 highest toxics emitters on the TRI. They found no correlation between the level of releases reported on TRI and the extensiveness in the companies reporting (except for the mandatory reporting for the TRI).

Given that firms may find little incentive to report potentially negative information, it is important to have other sources of information that enable accounts about responsibility meet accountability. Accountability gaps can be remedied through systems for disclosure of information that promotes transparency but, as Graham (2002) points out, building such systems is a non-trivial information system design problem.

Communication and Information Services in Sustainability Communication

A second aspect is to recognize possible roles for IT and IS in supporting accountability in the business-society relationship. There is a need to rethink stakeholder communication and the instruments for stakeholder communication in a globalized, networked world. This starts with the relationship between accountability and communication in stakeholder communication.

While there is considerable ferment over the stakeholder concept, the problematic concept of the stakeholder does open up thinking about organizations in society as existing in a web of relations that have differential consequences for the behavior of the firm. Thus, rather than starting with issues over defining particular types of stakeholders, it is worth considering how communication constructs and sustains the web of relations in which firms are embedded and the networks of activity in which they are bound up. The ties among stakeholders in these networks are both material and communicative and constructed through social and normative practices of accountability. In such a context, it is no longer worth treating accountability as something that is communicated by information and stories about responsibility. Accountability must instead be understood as an achievement of communication among a network of actors (i.e., stakeholders).

This shift is in place as the communicative space around business and its relationship to society becomes increasingly complex. Business organizations increasingly operate in enterprises that transcend the traditional boundaries of nations, whether operating as a multinational corporation or as participants in a global production networks (e.g., Levy, 2007). But business firms are not the only organizations that have gone transnational. The emergence of transnational actors including international advocacy groups and transnational non-governmental organizations as well as multinational corporations suggests that there is an emerging new “global public domain” which is an “institutionalized arena of discourse, contestation, and action organized around the production of global public goods” (Ruggie, 2004). Business, government, and civil society are interacting in new and unprecedented ways that call for new means of accountability.

Clearly, a lack of transparency is a problem for achieving accountability. The example of the mismatch between toxins reports and sustainability reports above is one illustration of the limits of reporting, especially when the act of reporting operates on the logic of promoting as informing. Yet, even if firms engaged in more and better transparency practices supported by better systems for disclosure there would still be a problem for achieving accountability. As Keohane (2006) points out, there is more to accountability, as transparency itself can become problematic, especially in the global context:

Institutions should be judged not merely by their transparency, but by the epistemic quality of our understanding of them. Too much information, without coherent interpretation, is merely confusing noise. We also need the capacity to interpret information intelligently, which entails the ability to ask pointed questions of power-holders and to demand answers. For that capacity, we need a vibrant global civil society, with many groups, from different perspectives, investigating and criticizing the actions of states, multilateral institutions and other powerful entities. A pluralistic accountability system will depend on many kinds of accountability: supervisory, fiscal, legal, market, peer and reputational. In world politics, such forms of accountability will not come from a centralized hierarchy, but from a pluralistic, often discordant system of NGOs and networks among them. (Keohane, p. 84)

Keohane’s point about pluralistic accountability recognizes how accountability is an achievement of communication among actors. He emphasizes how accountability is inherently conflictual. What matters is how that conflict is expressed, pursued and managed and over what kinds of accountability issues. There is less emphasis on defining stakeholder roles and more on outlining multiple dimensions of accountability because any material or communicative action could raise any number of issues that in turn attract different actors in the plausible network of stakeholders to press an issue. Many issues could be pressed simultaneously by multiple actors in dynamically

developing and disintegrating alliances and coalitions. Actors are not construed as one-issue stakeholders with only one stake in one enterprise. Moreover, Keohane's view strongly implies that argumentation – that is, the raising of doubts and disagreements responded to through claims and reasons – among several kinds of actors can lead networks of stakeholders to correct, learn, or discover courses of action if that argumentation enhances the capacity of the network to make sense of the situation and its complexities. Thus, the center of a network of stakeholder relations is not a particular firm but its pursuit of accountability and innovation on evolving standards and expectations about how the network of actors can relate and prosper.

We can now see that accountability gaps arise due to a lack of symbolic, interactional, and material resources for pursuing and resolving doubt or disagreement over the material and communicative actions of an organization. This can arise from an inability to monitor, from lack of fora or means to raise disagreement and from the lack of a developed normative framework from which to formulate a disagreement. The conventional focus on instruments for stakeholder communication emphasize the flow of information and persuasion but has not yet effectively considered how instruments for stakeholder communication might be construed as means that support interaction and reasoning – argumentation – that enables networks of actors to mutually achieve accountability.

In recognizing accountability as a joint communicative achievement, IT and IS in the context of sustainability might be better understood as communication and information services for intervening on accountability gaps. These services would facilitate argumentation over the business-society relationship in a way that enables stakeholders to pursue and redress differences by enhancing the epistemic quality of the interaction and reasoning about relating business and society. Such *sustainability communication* orients conceptions of IT and IS that draw upon aspirations of early visionaries such as Bush, Licklider, and Englehardt who saw the possibility of IT and IS not only for their computational impact but for their capacity to support interaction and reasoning among a variety of actors in complex social environments.

We can already see examples of communication and information services emerging at accountability gaps that point to the possibilities for supporting sustainability communication. These examples stand in contrast to the conventional instruments for communicating CSR in standard views of stakeholder relations discussed above. We have identified, in a preliminary manner, three kinds of communication and information services that illustrate a role for IT and IS in supporting sustainability communication:

Argument Builders: Services that aggregate and interpret evidence that is otherwise hard to collect or organize. The communication work of these intermediaries provides arguments or the grounds for building arguments or for raising doubts and disagreements. Examples include: scorecard.org is a pollution information site providing detailed information about who produces what toxins with what effect in a geographic area the U.S.; www.opensecrets.org is the Center for Responsive Politics site that enables citizens to track the influence of money on elections and public policy in the U.S.; and sunlightlabs.com by the Sunlight Foundation provides tools for visualizing earmarks on U.S. congressional legislation so that citizens can track how the U.S. federal budget is spent.

Argument Articulators: Services that provide tools that enable people to represent complex evidence that brings to light patterns that are otherwise hard to communicate. Examples include: most peer based social data analysis tools such as www.data360.org, www.swivel.com/, and www.many-eyes.com/ all of which provide people ways to make data sets available and ways to visualize the data. Another compelling example is www.gapminder.com which is a visualization tool for displaying trends in statistical data through animations.

Argumentation SenseMakers: Services that enable collective, participative exploration of issues and disagreements or that visualize the positions, reasons, and evidence relative to an unfolding issue. Examples include: Compendium, by the www.compendiuminstitute.org, is a methodology and software application, that enables users to, among other things, map the issue structure of complex deliberations; www.truthmapping.com/, and www.debategraph.org/ support large-scale argumentation through tools that enable participants to contribute to an issue and visualize the argumentation in an evolving distributed discussion; and www.politifact.com/truth-o-meter/ is service of the St. Petersburg Times newspaper Congressional Quarterly that examines claims made in the U.S. presidential campaign.

The three kinds of communication and information services outlined here illustrate services that play a more neutral role in supporting argumentation. It is easy enough to imagine, however, a role like an *Argument Generator* that might play more of an advocacy role, such as the websites by think tanks and other kinds of policy organizations.

The communication and information services described above then are instruments for communication that go beyond disclosure and transparency by supporting argumentation that enables networks of actors to achieve accountability. These services suggest how IT and IS could contribute to epistemic quality of the interaction among stakeholders.

The Sustainability Communication Design Space

A third aspect is to recognize that the prospects for designing sustainability communication lie in understanding how pluralistic accountability is achieved. Design in IT and IS is typically concerned with creating the IT/IS artifact but design for sustainability communication is concerned with constructing forms of communication that have otherwise been difficult, impossible or unimagined in overcoming accountability gaps (e.g., Aakhus, 2007). IT and IS are understood here as tools for the collaborative design of sustainability communication among networks of stakeholders.

Conflict is inherent to accountability. If there is too little conflict or too much conflict, then no accountability is achieved and only accountability gaps remain. Interventions on these gaps require some way of seeing patterns and common features of interaction that can in principle be reconfigured to have some consequence for communication quality (e.g., Aakhus & Jackson, 2004). Given the complexity of stakeholder relations in global production networks and in the global public domain, is it possible to recognize and understand the organization of conflict in stakeholder communication?

Accounts are produced in everyday interpersonal interaction and function to justify or excuse some behavior or action to others (Scott & Lyman, 1968). It is through accounts that an actor situates his or her behavior in the stream of ongoing behavior. Accounts are not static but emerge in the flow of interaction to comment on some aspect of it. Even though accounts are not always made, the fact that actors can signal that something is accountable and others can anticipate that something is accountable is due to the fact that actors orient to the accountability of their actions. Indeed, accountability is a basic feature of human interaction that gives rise to and sustains social order even while being a source of contest and struggle (Garfinkel, 1967).

While much of what is known about accounting is from research on interpersonal interaction, there is much to be learned from this as a means for understanding accounting at the scale of organizations acting in a global network of business transactions and a global public domain. At the scale of organizations and inter-organizational communication, accountability seems to be no less potent as a principle of action. One does not have to look far to see the immense interest organizations have in public relations, branding, and reputation management to get a good indicator of the role of accountability for organizational action. The everyday practice of accounting can be used to reframe stakeholder relations by drawing attention to how communication pulls stakeholders into accountability relations.

We suggest, following the language action perspective (Winograd & Flores, 1987), that stakeholder relations and the communicative achievement of pluralistic accountability can be modeled using the metaphor of conversations. Conversations are networks of communicative acts that enable at least two parties accomplish a joint undertaking while networks of conversations are the building blocks of all forms of organization. Stakeholder relations could be understood, from a LAP perspective, in terms of how stakeholders take up a role relative to a particular kind of conversation, such as a conversation for action where a request is made and promise to full the request is undertaken. While LAP conversations highlight two parties interacting there is no reason to think that other parties have no stake or do not attend to these conversations. This basic insight provides a way to begin seeing how multiple parties may take up different stances toward participating in an unfolding conversation.

The LAP conversation metaphor offers an additional way to understand the organization of pluralistic accountability. Recent developments in LAP, following van Reijswoud, add layers to the basic conversation model (e.g., Lind & Goldkuhl, 2003; Weigand & deMoor, 2004). While there are variations, the improvements to the basic model incorporates an argumentation layer to describe repairs to breakdowns in completing a conversation (e.g., closing the loop between initiating and completing communicative acts) and a discourse layer to describe the presumed common ground parties draw upon to resolve disagreements that arise when repairing a breakdown in the conversation. While not expressed in LAP theory, the concept of layers, outlines how content, norms and values extrinsic to the originating conversation may come to play a role in disrupting or repairing the conversation. Parties can become stakeholders, for instance, by entering into a disrupted conversation and drawing on a dimension of the

discourse layer (e.g., supervisory, fiscal, legal, market, peer or reputational aspect of accountability) to repair or escalate the disagreement.

The relationship between the argumentation and the discourse layer is important for articulating how pluralistic accountability is achieved among stakeholders. But, to further understand that relationship, we here we turn to the concept of a “disagreement space” first articulated by Jackson (1992) as “a structured set of opportunities for argument” (p. 261). In performing an action one can be held accountable for anything that action presupposes or implicates independent of whether one is committed to that presupposition or implication. The possible range of matters for which one could be held accountable in undertaking an action defines the disagreement space. The disagreement space thus provides affordances for pursuing the expression of doubt and disagreement about some action. The type of act one is assumed to perform, such as a promise or a request, provides stock issues around which doubt or disagreement can be relevantly expressed and for which a response is expected. Argument then may be over the truth value of something said but it can also be over the felicity of the act one is understood to have performed.

When considering how any particular material or communicative action of an organization, it should be seen as potentially pursuing multiple functions and to potentially be directed toward or responsive to multiple other actors. Thus, even the simplest exchange among stakeholders has potential economic, legal, resource, reputation, and future-interaction implications. Any of these aspects could become problematic and a basis for conflict. The norms against which actions are judged are drawn from available understandings of how an act ought to be performed as well as other norms and substantive knowledge. The actions of organizations may be thus called out in a variety of ways. Whoever the stakeholders might be they are attracted to or caught up in particular conversations around particular disagreements spaces. The conflict can quickly take on a life of its own in the global public domain as others are attracted to participate in the pursuit. See for example case histories of Brent Spar and Shell or sweatshops and Nike (Vogel, 2004).

The concepts of conversation and disagreement space provide ways to articulate and understand the organization of conflict among networks of stakeholders. For instance, instruments for stakeholder communication, such as conventional forms of CSR/Stakeholder communication (e.g., csr reports and sustainability reports) should be understood in light of conversations and disagreement spaces. The format of a report may invite particular others to participate as though a certain act has been performed. A report might be written, for instance, in a style that suggests it is an assertion of facts but it may be treated by other stakeholders as an implicit promise. Such a move would disrupt the initiating act and open up a disagreement spaced organized around criteria for resolving the difference that were not projected by the initiating act. The responding stakeholder thus reshapes the disagreement and the grounds for pursuing its resolution.

The role of IT/IS in facilitating sustainability communication must be understood in terms of how it shapes the disagreement spaces among networks of stakeholders. The content, direction, and outcomes of stakeholder communication is contingent on the symbolic, interactional, and material resources parties have for calling out and responding to being called out. A challenge for IT lies not only in providing information or contact but in shaping how the space for disagreement is opened and managed. It is in this that support for the achievement of pluralistic accountability can be developed.

Conclusion

We discussed an opportunity for theorizing IT artifacts in their organizational and societal context by considering possibilities that lie at the business-society interface. At a minimum, this requires reconsidering the communication pragmatics of accounting and the demands for communication and information services that arise in the large-scale argumentation that animates the global public domain. The opportunity lies in recognizing that sustainability communication evolves with emerging concepts about who a firm is accountable to and for what. But this evolution has primarily developed the capacity of business firms to tell their story or account. The opportunity in supporting sustainability communication for IS and IT is in developing instruments for communicating that generate productive disagreement spaces that shape the network of stakeholder relations around epistemic quality.

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MANAGING AMBIGUITY WHILE REDUCING UNCERTAINTY

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Abstract

This paper is originating from an attempt to chronicle and evaluate the struggle to innovate, to understand and to produce a sustainable response to the pressing problems of the care and protection of an aging population. In that struggle, quite distinct world views of the lived experience of the older person and their families and careers, the pressures and challenges of practitioners, on managers and planners and on the politicians who strive to improve the experience of life of their constituents and the desire of technicians to design and build something useful and interesting come together not in a rational orchestration of interests but in the agonistics of real life.

The reality of the distinction between what we have called North-South, hierarchical. and East-West, peer and partnership behaviours and attitudes, between Gregory Bateson's distinctions of first order and second order processes and deuterio versus acquisitive learning together with the need to support and nurture sense making and co-production are very apparent in the experience of the project. The challenges of maintaining an appropriate balance have been significant and are ongoing.

Keywords: social care, user participation, co-production, sense-making, second step back.

INTRODUCTION

A structural problem

The paradigm which places the design process between “needs” and “solutions” fails to address the issues of innovation and transformation. But these are the very characteristics that are demanded by policymakers in many eGovernment initiatives which are not (or are no longer) about delivering the old services through new channels but about the transformation of roles and relationships among service providers and between them and their clients, the formation of new partnerships and the redistribution of decision making and of control. In these processes the concept of need itself is open for reconstruction and renegotiation. The challenge of addressing the resulting ambiguities becomes at least as significant as managing uncertainties within established frames and practice.

When transformation of delivery, in multi-agency and multi-disciplinary contexts such as coordinated health and social care, is considered while, at same time, complex technical systems to support delivery and governance are being constructed, traditional linear, first order development models are no longer adequate. The demand for use cases and attempts to map business processes exacerbate the problem rather than provide the first steps to a solution. Engagement and participation of all stakeholders in design processes would seem to be essential, but traditional PD approaches quite often implicitly assume that participants already have a shared language

adequate for the situation, together with common values, vision and understanding. These assumptions may be, and often are, ill founded. This paper explores the issues of how interventions can be designed to address these challenges, and to provide a more appropriate balance between managing uncertainty and resolving ambiguity

Watzlawick, in studies of the pragmatics of human communication (Watzlawick et al. 1967), identifies content and relation as equally relevant. Bion (1961) in studies of the psychology of groups distinguishes between the task to be executed, and the equally important establishing of relation and trust in the group. These observations raise a question: Is there too much of a dichotomy in our interventions, between attempts to establish functional rationality in technical systems and organisational processes on the one hand (reducing uncertainty), and attempts to establish culture change through facilitation and learning on the other (managing ambiguity)?

Posing a question of this sort corresponds in the words of Bourdieu (1992) to be taking a second step back on our part in looking at our intervention activity, for not only investigating whether we are performing what we were asked to, what we have designed to do, and whether it really works (first step back), but also to question whether we are doing what we can and should, to assist our ‘clients’ in making their journey: whether we are constructing with them a shared sense making of the whole project, of the context and of its main concepts, objectives, choices, and motivations, and whether we have been successful in making trust relationships amongst all possible.

Carl Rogers (1951, 1969, 1980), in his person centred approach studies of therapy, advocates the application of three criteria (non-judgemental unconditional acceptance, empathy, congruence) on the part of the counsellor, for establishing working communication and trust relationship with the client. – Note that Rogers intentionally avoids using the term patient, in his descriptions of his personal therapy activities. We see the relationship between facilitators and clients in ISD deployment, such as the one described here, as even more symmetrical than this conception of the counsellor – client. (Cattani and Jacucci 2007).

An infrastructural solution proposal

Addressing ambiguity and building shared understanding entails working on, as well as in, language and for this to happen, participants must be engaged with a shared problem and with each other. A core issue in the approach presented here is the identification and selection of material which has the potential to engender this engagement of participants in a constructive exchange. Tools in these approaches include exhibits, representations, illustrations and stories, embedded in free and accessible discussion of different perspectives on the joint activity and context. One way of characterising this use of material is in terms of ‘mirrors and windows’ to help participants recognise their own perspective (mirror), and to be able to observe and compare it to that of others (windows). Non-judgemental respect, empathy, congruence, are also needed here, to create the pre-conditions for the exploration of other points of view and perceptions and the development of trust and understanding. In terms of the design of an intervention, story telling, humour and performance all play a part in offering material as a provocation or exhibit to be engaged with rather than as a product to be sold by a salesperson or a lesson to be learned from a teacher.

We have observed the following characteristics of multi-agency care and of the contexts in which shared technical infrastructure and new working practices are being constructed:

While there may be someone “in the chair” but there is no one in control of the space in which the parties come together to plan and execute these development programmes.

The participants not only belong to different agencies but also have the different value sets, priorities and perspectives of practitioners, managers, technicians and clients or patients.

The policy drivers and legal or management imperatives that bring the parties together often imply or demand second order rather than incremental change. As Bateson observes (1973), this is schizogenic.

The nature of the health and social care relationships make issues of governance of practice and of information paramount and these are matters of responsibility which cannot be reduced to, and expressed in terms of, mere function.

All of these characteristics mean that any approach to rationality in design or communication has to be preceded by, and a consequence of, shared sense making just as the products of these processes (technical and organisational systems) must themselves be “made sense of” through use and governance. In the face of the complexity, ambiguity and contention of the caring and developmental services, rationality cannot be a cargo to be brought to the process by certain actors but must be the outcome of the co-productive relationships of all of

them. On this basis, a connection may be drawn between the rationalities of function and of communication and this can be related to the complexities and incoherences of the wider context.

While the introduction of a co-productive approach involves the fundamental reappraisal of relationships and boundaries in the development process, it does not, and cannot deny the differences that exist between domains of expertise and practice. It is inevitably the case that at some points, concrete technical work has to be undertaken. Such work has, perforce, to have inputs and will produce outputs; some division of labour is inevitable. Because of this division, the processes by which systems are produced must still be understood in terms of spaces and the work that takes place within and between them. The supply model of current methodology literature and systems practice is based on the assumption that such divisions are between the “technical” and the “non-technical” with the latter as a source of requirements and as the recipient of the design and development outputs of the former. Participation is usually conceived as the fostering of overlap and the interpenetration of the spaces but the observations made above indicate that, on occasion, this can be insufficient. Going further to a commitment to co-production, however, cannot be assumed to involve removal of the boundary all together. It is also worth re-enforcing the observation that that “technical” is a relative term here, simply denoting an asymmetry of access to and capability in respect of some area of practice. There are many occurrences of such boundaries in a care community and in the infrastructure and environment in which it operates. The instance of the ICT system is only one subset of this more general web of relationships of service supply and use.

In our familiar, first order, rational development process, we traverse phases of vision, plan, execution, and evaluation:

Purposeful behaviour starts with the conception of a vision of the desired state of affairs.

Next we must construct a plan based on what we believe is possible and effective, this is strategy.

This leads to the execution of the plan which involves deploying and consuming resources that are available and appropriate.

The evaluation of our progress in relation to the plan and the continued relevance of the plan to our vision involves comparing observations, measurements and the use of appropriate criteria.

And this results in learning and the conception of new visions where learning involved the deepening and broadening of our knowledge. It is cumulative.

The purpose of this process is to manage uncertainty which represents risk and it is the basis for all of our standard project management approaches. However, every so often something different happens and, when we look back, what we see is that we have started doing things that we previously thought impossible and have stopped doing things that we thought were essential. What we once thought of as our resources have become impediments and what we thought were barriers are now opportunities. We have re-evaluated what we mean by evaluation and our learning has involved forgetting.

We cannot account for these changes within our first order loop; somehow we must have broken out of it. What seems to have happened is that contractions, inconsistencies and paradoxes, as well as discoveries, have built to a point where we have been forced into a different mode of sense making. This is equivalent to entering the inter-subjective mode of conversation we mentioned earlier where we open ourselves up to the co-construction of new meanings and values. One of the signs that this is taking place is that we start adopting new terms and usages, this is languaging. For the outsider this often appears strange and threatening and is dismissed as jargon but for the participants it leads to new commitments and new shared vision. The purpose of this second order loop is the management of ambiguity rather than uncertainty.

Systems development projects always start with the definition of a first order loop even though the political vision may contain within it contradictions and paradoxes if we try to analyse it within the paradigm of current practice – which, of course, is what we do. The application of these processes in contexts of multiple organisational and professional cultures often leads to further tensions which generate the need for a shift into second order mode. All of the odds are stacked against this event, this identification of the need to address ambiguity, contradiction and paradox, leading to transformation and, when it does happen, this tends to be in spite of management and is interpreted from that quarter as scope creep or unco-operative and disruptive behaviour. So, the challenge of information systems development in the multi-agency, multi-professional contexts of caring services, is to find ways of facilitating and orchestrating events and occasions where the co-production of new meanings and values can be nurtured and enabled. This does not mean that the conventional

planning and management structures are suppressed but that they come under a new concept of governance which is open to what Kenny refers to as “live conversations”. [<http://www.oikos.org/vincen.htm>]

As we have explained above, we take this approach to represent an additional step, and commitment, compared with conventional participative design, one that, as we have observed, is open to a accusation of being disruptive because it might question and undermine the very assumptions and stated objectives of a project which has been cast as a technical development. The success of these ventures are conceived in terms of the completion and delivery of an implementation programme rather than the achievement of the outcomes of care and wellbeing that the technical components are assumed to be able to deliver. It requires a radical reflexivity on the part of facilitators who must continuously monitor and control a non-imposing attitude, intellectual honesty, empathy and congruence towards all of the clients and the interests they represent and express. The method endorsed is that of reducing ambiguity and suspicion by manifestation and sharing of group-perspectives in open conversations among different stakeholder groups, and of establishing relation and trust by genuine participation, joint-commitment, and co-production.

DISCUSSION

Contextualising the discourse

Two types of underlying concern are being expressed in a user-oriented discourse (Jacucci and Martin 2008). The first is an essentially conservative one about how the proposed innovation can be accommodated within existing structures and the second is about issues of protecting and developing social capital. These are interrelated because current structures of networks and institutions are seen by some of the participants as the conduits of existing social capital and the underlying concern is that the innovation will reinforce rather than undermine this. There is an interesting relationship between the concern with social capital we see here in an East-West discourse and the concept of political capital and service costs which is evident in the North-South discourses of planning and delivery. This expresses concerns about dangers of “proliferation of requirements” and the potential “loss of focus on concrete delivery”. This heterogeneity and divergence of interests, values and concerns is common in public sector developments and particularly in the deployment of ICT in the contexts of public care and development services. In the context of this particular work about the care of the elderly, there is also a third domain of discourse which has appeared only from a patient oriented perspective, in this account. This is the clinical perspective associated with the telemedicine development of the project. Again we see both threat and opportunity for existing structures and practice but in a context of clear asymmetries of control and agency between practitioners and patients and between the clinical and the social care domains. This discourse is concerned with human capital in the sense of fitness and health of the individual and of the population. This complexity is not something that conventional systems design methodologies has evolved to address. They are grounded in the concept of the enterprise solution which draws a clear boundary between the inside and the outside of a problem, assumes rationality, a single locus of control and ownership of resources on the inside and aims to cope with and exploit the external environment. In these circumstances the systems architect takes a simple (i.e. un-reflexive) stance either in the service of management, as client, or as emancipator of the users. The intervention reported here cannot be analysed in these simple terms. The outcomes that are sought for the aging population, their families and communities and for the network of providers and commissioners of service can only be developed and delivered through trust and inclusive partnership across a wide care community. The “architecture” used in a development project to support and innovate in this situation needs to operate at the infrastructural rather than the structural level. Its designs and products do not deliver the envisaged care and the outcomes directly, they enable their users to co-construct these outcomes in a living system and network of care.

CONCLUSIONS

The core theses of this paper is that, faced with the inevitable combination of both ambiguity and uncertainty, the response has to be about balance, that is to say, about facilitating and nurturing appropriate transitions between sense-making on the one hand and rationalist planning and delivery on the other.

Different people and groups develop different perspectives and sense making over mutual interaction scenarios, including those related to the introduction of novel technology. Mutual trust and open attitudes towards change may arise only from awareness and shared understanding of the perspectives of self and others. Communication and mutual learning are therefore essential facilitators to establish governance, opening the way to positive project-outcomes.

Open conversations supported by 'Windows and Mirrors' (IS-based) techniques can facilitate the emergence of sense making and trust. New, scenario-appropriate social practices can then be co-constructed jointly by all concerned, paralleling the design of new, appropriate technologies. People intentions can be correctly included in this way into the pragmatics facet of the theory and practice of IS design, by taking up explicitly the (socially constructed) new social practices, and inscribing them directly onto the new technology.

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A PRAGMATIC CONCEPTION OF SERVICE ENCOUNTERS

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Abstract

A service encounter is conceived as an interactive process between a service provider and a service receiver. It has however largely been analyzed as a non-interactive phenomenon which lead to a superficial and incomplete understanding of the dynamics of service encounters as an interactive process. The purpose of this paper is to explore whether pragmatic concepts could form a foundation for the conception of service encounters as an interactive phenomenon. The results show that in order to capture the essence of interaction in service encounters from a pragmatic view researchers should turn to the concept of action. In order to avoid a one-side view (the customer or the company/company representative) of the service encounter the inter-related actions need to be taken into consideration.

Keywords: Service encounters, pragmatics, interaction, action

Introduction

Rayport *et al.* (2005) report that companies are reconfiguring the way they interact with customers. This has been called the “front-office revolution”. Such development gives a call for research within the field of service encounters. A service encounter can be defined as the time-frame during which a customer directly interacts with a service provider (Surprenant & Solomon, 1987). The interaction is a critical determinant of customer’s satisfaction with the service (Czepiel *et al.*, 1985) and the contact employees can be the source of differentiation and competitive advantage for companies (Pfeffer, 1994). Customers’ interaction with companies through technology is another form of service encounters. Contemporary discourse related to the service encounter pinpoint the necessity to find a balance (Salomonson & Lind, 2006b) between technology-based encounters and inter-personal encounters. As Rayport *et al.* (2005, p. 68) mention: “The strategic question facing companies is how to effectively distribute relationship building roles between humans and machines in a way that capitalizes on the strengths of each.”

There are diverse ways to conceive service encounters, and there are several research approaches provided for finding answers to the challenges of understanding, evaluating, and giving advices to organizations of how to interact with customers. Research about how customers perceive the interaction, the service and the organization (c.f. Brown *et al.*, 1994; Svensson, 2006) or how the interaction can be managed in order to create satisfied customers is quite common. Most research also focus on encounters between humans. However as the number of encounters between customers and organizations through electronic media increase the need for understanding these interactions as such, as well as in relation to encounters between humans, also increase. It is thus a need for a comprehensive conception of the service encounter that incorporates both the human interaction as well as technology-mediated interaction. We also believe that there is a strong connection of how a phenomenon is conceived and the research approach used for derive knowledge about the phenomenon.

In this short paper we argue that the field of pragmatics has a strong potential to contribute to research about service encounters and the understanding of human and technology-mediated interaction. Pragmatism is conceived as, (1) an interest for actions, (2) an interest for actions in their practice context, (3) an acknowledgement of action permeation on knowledge, (4) an interest for practical consequences of knowledge, (5) an interest in what works and what does not work (c.f. Goldkuhl, 2004). Pragmatism has also influenced the practice of pragmatics. In pragmatics the study of the relation between the structure of language and its usage in context (c.f. Levinson, 1983) is of concern. The meaning of what is said and done by humans and/or mediated by technology is thus dependent on the context. A concern of the context means an interest for actions as well as preconditions and effects of actions. The area of service encounters pays special interest to the interaction between buyer and seller. These interactions are

constituted by actions, related to each other, in a certain context. The purpose of this short paper is to explore whether pragmatic concepts could form a foundation for the conception of service encounters from an interactive perspective.

The concept of action as a pragmatic foundation

As claimed by several scholars the core in pragmatics is to investigate the action character of the empirical field in social studies. Blumer (1969 p 71) claims that “the essence of society lies in an ongoing process of action - not in a posited structure of relations. Without action, any structure of relations between people is meaningless. To be understood, a society must be seen and grasped in terms of the action that comprises it”. The core category in pragmatism is action. As claimed by Goldkuhl (2005) there is however no single theory that gives a complete account of action aspects. Different action theories emphasize different aspects of action. It could however be noted that there are some theories that build upon several action theories for certain purposes, such as information systems research as well as communication research. Two examples of those are socio-instrumental-pragmatism (c.f. Goldkuhl, 2005; Goldkuhl & Röstlinger, 2003) and activity-based communication analysis (c.f. Allwood, 2000). In these knowledge endeavors different properties of actions are put forward, such as that actions are purposeful, social, accountable, interactive, relational, and multi-functional.

Most actions are social (c.f. e.g. Mead, 1934; Blumer, 1969; Strauss, 1993). As claimed by Mead (1934, p 6) “the behaviour of an individual can be understood only in terms of the whole social group of which he is member, since his individual acts are involved in larger social acts, which go beyond himself and which implicate the other members of the group”. A human being intervenes in the world, by performing actions, in order to create some differences in their environment – to achieve ends (c.f. Dewey 1931; von Wright, 1971). An important distinction is made between the result and the effects of the action (von Wright, 1971).

The action result lies within the range of the actor and the action effects may arise as consequences outside the control of the actor. An action is performed in the present based on a history and aims for the future (Goldkuhl & Röstlinger, 2003). A social action is an action oriented towards other persons (Weber, 1978), and such action can be a communicative act, e.g. someone saying something to another person, or material (Goldkuhl, 2001; Goldkuhl & Röstlinger, 2003). As claimed by Goldkuhl (2005) a social action (performed by an actor) has social grounds (“takes account of the behaviour of others”) and social purposes (“thereby oriented in its course”). It is thus essential to look both for social grounds and social purposes when studying actions. Social grounds are the past of the action. Social actions are thus interactive (Blumer, 1969; Strauss, 1993) where several inter-related actions constitute patterns of actions related to each other by initiatives and responses (Linell, 1998). One action can be both an initiative and a response (Linell, 1998).

Actor relationships between the intervening actor and the recipient are thus established through social actions (Habermas, 1984). An initiative made by the intervening actor needs to be taken into account by the recipient. Social actions imply commitments and expectations or other kinds of relational constructs (Goldkuhl, 2005). Actor relationships should therefore both be seen as grounds and effects of action, where the latter constitute the grounds for subsequent actions.

In organizational settings humans (often supported by artifacts) perform action in the name of the organization (Ahrne, 1994; Taylor, 1993). The concern of theorizing actions has also been acknowledged by actor-network theory (ANT) (c.f. Latour, 1991), where technology and people are both seen as actants. As claimed in ANT, our perception and borders of social constructions, such as organizations, are continuously redefined by the interplay between the actants.

A generic model of social action, including both communicative (Austin, 1962; Searle, 1969) and material acts, is presented by Goldkuhl (2001) and Goldkuhl and Röstlinger (2003). E.g. an order from a customer to a supplier is a communicative act. The delivery of goods from the supplier to the customer is a material act. Since these are actions directed from one actor towards another actor they must both be considered as social actions. In this perspective we are mainly interested in communicative dimensions (as the illocutionary force with appurtenant propositional content according to Searle (1969)) of social actions, related to each other, in order to determine action patterns. This means that we delimit ourselves from instrumental and strategic actions according to Habermas (1984).

In this section we have described the concept of action from a pragmatic view. We now turn to the concept of service encounters and map out research in this area in order to determine the need for a pragmatic approach.

The area of service encounters

A service encounter is conceived as an interactive process between a service provider and a service receiver (Grönroos, 2001). It has been defined as a period of time during which a consumer interacts with a service (Bitner, 1990). Service encounters take place between humans (Surprenant et al., 1983) but can also involve interaction between individuals and self-service technology (c.f. Bitner et al., 2000; Svensson, 2006). Based on the interactive dimension researchers argue that it is important to consider the perspective of both parties involved (c.f. Czepiel, 1990). Studies also show that the interaction is the core for customers evaluating services (c.f. Chandon et al., 1997; Burgers et al., 2000). Research about how customers perceive the interaction, the service and the organization is quite common (c.f. Brown et al., 1994; Svensson, 2006). Studies about the perception have often been related to quality dimensions in the service and concepts like customer satisfaction. It is often displayed that there is a difference, a gap, between a customer's expectation of a service and what the customer then actually experience. Customers' perceptions of contact employees' behaviors during service encounters have also been studied (c.f. Bitner, 1990; Bitner et al., 1990). A study based on critical incident technique by Bitner et al (1990) showed that personnel behavior could be divided into three categories: (1) employee response to service delivery failures; (2) employee response to customer needs and requests; and (3) unprompted and unsolicited employee actions. A common feature in studies about customers' perceptions and evaluation is that they focus on the experience of the interaction instead of the actual interaction. The same goes for studies about service employees' experiences from encounters with customers and effects for the employees.

There is also research about what happens or should happen before the encounters with customers. The main focus in these studies is how the interaction can be managed in order to create satisfied customers (Brown et al., 1994). Studies related to the management of service encounters has for example dealt with matters like staffing and the skills and characteristics that employees need in order to perform effectively in the service encounters (c.f. Bowen & Schneider, 1985; Lewis & Entwistle, 1990). Service encounters have also been studied based on customers' satisfaction related to physical surroundings (e.g. Bitner, 1990). Another area is how the service can be adapted to customers' needs; how a customer orientation can be reached. The employees' ability to adapt to customers' needs are seen as especially important since it is a potential source of competitive advantage for the firm and can lead to favorable service quality evaluations by customers (Lewis & Entwistle, 1990). The adaptations in the interaction create opportunities to customize the service (e.g. Gwinner et al., 2005). The normative perspective of how the encounters should be managed however sometimes leads to that parts of the individual actions of customers and employees are left out. The criteria created, often based on customers' evaluations and service quality, in order to manage the service is seen as general for all customers. This leads to that customers are treated according to the criteria instead of their individual actions in interactions.

The interaction in service encounters has been studied based on a dramaturgical perspective with the use of role theory. A main focus has been the role of customers and employees (c.f. Solomon et al., 1985; Grove & Fisk, 1992; Bitner et al., 1997). Solomon et al (1985) argue that the role metaphor is useful since it presents the participants as social actors. As a social actor you learn the appropriate behaviors expected (scripts) in relation to the specific role and other actors expect you to act accordingly. The service encounter is thereby largely determined by the role expectations. A limitation of this approach is that the actors can be seen as merely roles instead of human beings. In this perspective actions are seen as a result of standardized set of behaviors (Mattsson & den Haring, 1997). There is thus a risk that an analysis based on role theory disregards the dynamics in human interaction.

In summary most research about service encounters has focused the service receiver's (the customer's) perspective which lead to that it largely has been analyzed as a non-interactive phenomenon (Svensson, 2006). Svensson (2006) even states that *the empirical and theoretical analysis and understanding of the dynamics of service encounters as an interactive process has been superficial and incomplete.*

Towards a pragmatic conception of service encounters

The call for research about service encounters that takes interaction seriously can also be seen as a call for a more pragmatic research approach concerning service encounters that focus more on the actions performed by the participants in an interactive manner. As Goldkuhl (2004) mentions, pragmatism means an interest for actions. Through human action the social world becomes meaningful. In order to capture the essence of interaction in service encounters from a pragmatic view we therefore argue that researchers should turn to the concept of action. It is the individual actions and re-actions of the participants that form the interaction in the service encounter. As stated

humans also use technology to interact with other humans or non-humans like companies and organizations in order to achieve something. A social action is interactive since it is directed to others (Blumer, 1969; Strauss, 1993) and the inter-related actions constitute patterns of actions related to each other by initiatives and responses (Linell, 1998). In order to avoid a one-side view (the customer or the company/company representative) of the service encounter the inter-related actions therefore need to be taken into consideration.

Imagine now a service encounter between a waiter and guest in a hotel restaurant. The guest has never visited the hotel before and is therefore unknown to the personnel. The booking of the room was made through the hotels web site and the table in the restaurant table was reserved upon arrival. The guest is now seated at the table and the waiter has approached him to take the order. If one relates to previous research about service encounters this could be studied from the guest's point of view, for example by looking at how he perceived the service and the waiter's behavior in comparison to his expectations. Was he satisfied with the service received? Another approach would be to look at the organization of the service encounter, for example physical surroundings or staffing and the skills of waiters needed in order to perform effectively in the service encounters. Both these approaches however focus on one view of the encounter. The interactive dimension is thereby overlooked. A pragmatic approach, taken the interactive dimension of the service encounter into consideration, seems to be appropriate.

The guest and the waiter use both verbal and non-verbal communication as means for interaction. The inter-related actions constitute patterns of actions related to each other by initiatives and responses (Linell, 1998). The guest says something and the waiter responds to that. Talk is according to the analytical approach of conversation analysis built up by individual turns; the participants take turns in talking. The sequencing of conversation can be understood and analyzed with the concept of adjacency pair. An adjacency pair is two communicative actions, a first and a second, that together represent an exchange of words produced by two speakers, for example question-answer, offer-acceptance/rejection, invitation-acceptance/rejection and complaint-response (e.g. Schegloff & Sacks, 1973). After an utterance, for example a question, an answer is expected. The second part of the adjacency pair does however not necessary have to follow the first part. Other communicative actions can come in between. For example a question can be followed by a clarification by the person who stated the question. If the waiter indicates that he does not understand the guest's question about food the guest can make a clarification. With this perspective the context is shaped by the individual utterances. An utterance is both shaped by prior utterances and context-renewing since it creates conditions for the next possible utterance. As Allwood (2000) mentions conversational analysis points "...to the fact that certain conversational phenomena only arise through interaction and can never be found if attention is limited to individual contributions" (p. 4).

There are also non-verbal cues exchanged. If the waiter raises his eyebrows or if the guest frowns, this sends out signals that are interpreted by the participants in the encounter. These signals or give-offs (Goffman, 1959) can be intentional or non-intentional. For example a nod with the head can be interpreted as the person is agreeing with what is said and/or that he is actively listening. The social interaction also influences the relation between the guest and waiter. A relationship is built up by the outcome of previous interactions between two parties. If a guest experiences that the hotel personnel in the restaurant has fulfilled previous commitments towards him and lived up to his expectations the relationship will be strengthened. If the waiter says something that the guest seemingly interprets as insulting this could alter a previously good relationship to something bad. By studying the actual interaction a researcher can grasp and analyze particular sections of the interaction where something potentially is troublesome.

In order to further explore a pragmatic conception of service encounters future research could aim to explore interaction in service encounters from an approach called "Activity based Communication Analysis" (Allwood, 2000). This approach points to some conceptual problems with both speech act theory and conversation analysis. Features of an activity based approach include psychological and social levels, i.e., properties of communication "which can be related to the fact that communicators are perceiving, understanding and emotional beings who also can be seen as rational motivated agents occupying various activity roles" (Allwood, 2000, p. 23).

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REPRESENTATION AND CORRESPONDENCE: ON THE VALIDITY OF THE REPRESENTATION ASSUMPTION IN INFORMATION SYSTEM DESIGN

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Abstract

With its point of departure in speech act theory this paper discusses the assumption that information systems consist of representations of reality. The notion of institutional object is introduced and it is shown how such objects are used to represent brute and institutional facts in information systems. Implications for design are described.

Keywords: Institutional objects, conceptual modeling, ontology, identity

Introduction

The predominant view of the information system (IS) in the information systems field is that such a system store information that represents facts about reality as it exists outside the system. Wand and Wang (1996, p. 88) capture this view quite concisely in their “representation assumption”, which states that “an information system is a representation of a real-world system as perceived by users.” Date (2004, p. 291) reinforces this idea when acknowledging that “It was Codd’s very great insight, when he invented the relational model back in 1969, that a database is not really just a collection of data (despite the name) rather it is a collection of facts, or what logicians call true propositions.”

Several scholars working within the so-called language/action perspective (Weigand, 2006) have criticized this view for being too restricted. Hirschheim et al. (1995), for example, refer to this as a “reality mapping view”, Goldkuhl (1995) as a “contents view” and Holm (1996) speaks of “the technological version of the descriptive fallacy”. The term “descriptive fallacy” was coined by Austin (1962) and refers to the misconception that language is used only to describe the state of the world. Searle (1969) refers to such descriptive speech acts as “assertives”, which can be evaluated as either true or false depending on their correspondence to known facts about the world. Austin’s (1962) concept of “performatives”, however, highlights the fact that many speech acts are indeed used not to describe the world but to bring about change to the world. A speech act F(p) consists of a propositional content p associated with an illocutionary force F (Searle, 1969). Notably, the same propositional content can be used with a number of different illocutionary forces. For example, the propositional content <car, red> can be used to state a fact (“the car is red”), or to invoke future action (“do paint the car red”). The propositional content is the same because in both speech acts the object referred to is a car, and the attribute (predicate) ascribed to the car is red. However the meanings of the two speech acts are quite different because they have different illocutionary forces; the first is an assertion and the second is a request (a performative speech act). The truth of a speech act is only asserted in assertions, while performatives bring things about or describe things that ought to be brought about. Searle (1979, pp. 3–4) terms this the direction-of-fit between word and world. The direction-of-fit is word-to-world when the propositional content describes what is, and world-to-word when the propositional content describes what ought to be¹. In the proposition “the car is red” the direction-of-fit is word-to-world because here the proposition must correspond to facts in the world. In the case of “do paint the car red” the direction-of-fit is world-to-word because measures are required in order to make the world correspond to the proposition. A special class of performatives are the declaratives which function is to create a new fact corresponding to the propositional content only by stating it

¹ Word-to-world should be understood as ‘word *corresponds* to world’ and not as a causal relationship ‘from word to world’. (World-to-word analogous.)

(Searle 1989). Declaratives, for example, “I pronounce you husband and wife”, are special because the propositional content of these speech acts have a double-direction-of-fit; it is both word-to-world and world-to-word at the same time.

In order to understand the implications of this for IS design, the distinction between what Searle (1995, p. 27) terms “brute facts” and “institutional facts” is fundamental. Brute facts concern physical (brute) things and their properties and exist independently of human institutions. They only require the institution of language in order that the facts can be asserted; for example, the assertion “it is snow on Mount Everest”. Institutional facts, on the other hand require special human institutions (of which language is one) for their very existence. In this context “institution” refers to structures of rules governing cooperative human behaviour.

The reality mapping view assumes that information systems are used for representing brute facts in such a way that the direction-of-fit is always word-to-world. The aim with an assertion is to get its propositional content to match an independent existing reality. However, while this is true in the case of assertions, where a statement recorded in the IS should correspond to an existing brute fact, it is not true in the case of performatives. In the latter case the aim is to change reality so as to match the propositional content of the speech act.

It is also important to emphasise that the existence of a speech act in the system is in itself an institutional fact. This goes for all types of speech acts, both assertives and performatives, which means that they correspond to themselves. We may refer to such stored speech acts as “institutional objects”, which may then refer to other institutional objects that in turn correspond to existing (word-to-world) or possible (world-to-word) institutional or brute facts. A meaningful and valid institutional object:

- consists of an identifier and at least one attribute;
- is created via a language act (speech act) at a certain point in time;
- is an instantiation of a concept;
- is something that is referred to in a social context of use;
- is by itself an institutional fact;
- represents brute and/or institutional facts;
- has a semantic and deontic/pragmatic meaning;
- is created according to general rules which means that it is defined on a type level.

Hence, just as language systems in general, information systems are self-representing and as such must be able to represent both physical things in the world and institutional objects created, stored and maintained within the systems themselves.

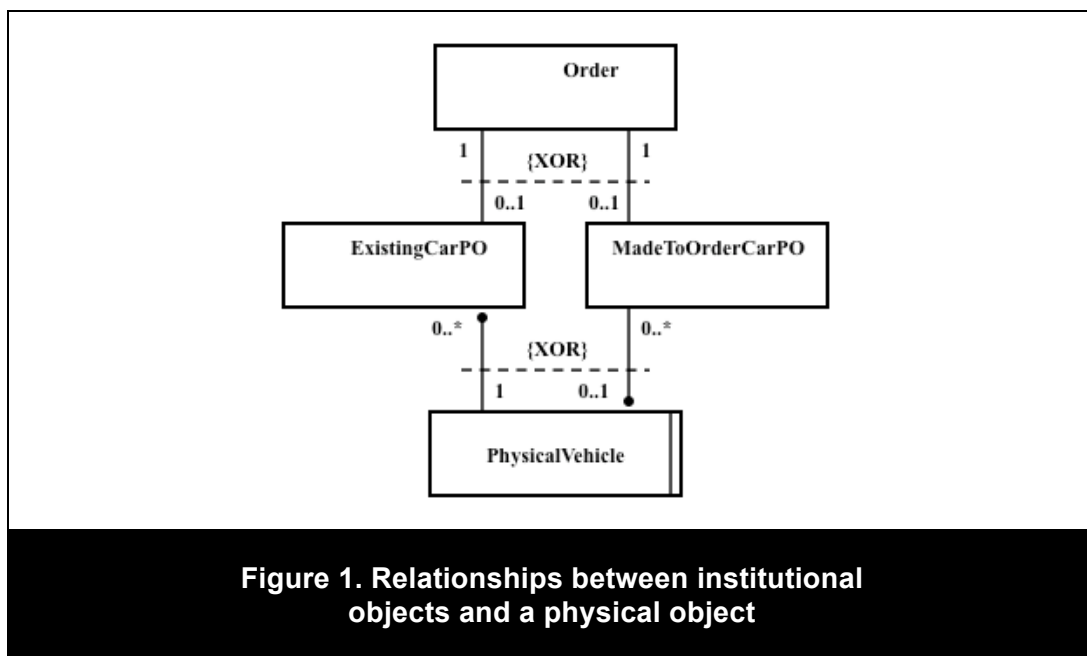
Among these institutional objects there is an important distinction between assertives and performatives. The purpose of the propositional content of assertives is to describe what is and the purpose of the propositional content of performatives is to change the world. There is also an important distinction between those performatives that only create a purely linguistic institutional object with their propositional content—such as those created by saying “I hereby promise to paint the car red”, “I order you to paint the car red,” etc.— and those speech acts that create an extra-linguistic fact with the help of the propositional content—such as, “I pronounce you husband and wife”, etc. (Searle, 1989, pp. 554–555). While the propositions of declarations create extra-linguistic facts by themselves, promises and orders require subsequent action in order to create the extra-linguistic facts described by their propositional content.

Illustration

As an illustration, Figure 1 draws on the car sales example of Ågerfalk & Eriksson (2004). The purchase order, which is the result of a performative speech act, and its propositional content, a purchase object, are two different but related institutional objects. The purchase object describes the physical vehicle (a brute fact) that should be delivered (an institutional fact). The purchase object is either of the type ExistingCarPO or MadeToOrderCarPO, which are two different types of institutional object. The ExistingCarPO must correspond to an existing physical vehicle in order to be valid and “true”. A MadeToOrderCarPO, on the other hand, does not correspond to an existing

physical object. Rather, it will be used as a “blueprint” for a new vehicle that is yet to be built so that it can be delivered.

The conceptual model reveals a number of things of importance to the design of a supporting IS. There are two purchase object classes, ExistingCarPO and MadeToOrderCarPO, which are mutually exclusive. The ExistingCarPO has a word-to-world correspondence relationship to the physical vehicle. This relationship is 1 in the direction from the ExistingCarPO to the PhysicalVehicle because there must exist a physical vehicle that is referred to. The relationship is 0..* in the direction from the PhysicalVehicle to the ExistingCarPO because there can be physical cars in stock that are not yet included in a purchase order. The MadeToOrderCarPO has a world-to-word correspondence relationship to the physical vehicle. This relationship is 0..1 from MadeToOrderPO to PhysicalVehicle because at the time the MadeToOrderCarPO is created there is no existing car. However, there has to be a physical vehicle that corresponds to the MadeToOrderCarPO at the time the vehicle is delivered. In the direction from PhysicalCar to MadeToOrderCarPO the relationship is 0..* because there are physical cars that have not been built based on purchase orders, and one physical car that has been built can correspond to many MadeToOrderCarPO.



Discussion

A conceptual model based on these ideas can shed a new light on many of the problems discussed in conceptual modelling. First, it can help us to decide what type of identifier to use given a specific entity. We refer to this as the *identifier problem*. Second, it provides a rationale as to why social obligations (commitments) sometimes ought to be modelled as objects (classes, entities). We refer to this as the *ontological problem*, which has to do with whether institutional objects created by speech acts, such as offers and purchase orders and their propositional contents should be treated as ‘objects’ in their own right. Third it can be used to discuss the *counting problem*; the problem of deciding which objects should be counted in a specific situation. Fourth, it can help us to sort out the relationship between properties, attributes and objects; i.e. the difference between properties and attributes and what a specific property or attribute is a property or attribute of? We refer to this as the *predicate problem*, as it has to do with how we predicate properties to ‘objects’ by use of language.

The identifier problem, which emphasizes the importance of designing appropriate identifiers (primary keys), has traditionally been regarded as a database problem (Codd, 1970; Chen, 1976; Date 2004). Contrary to this misconception, it has been argued that the identifier problem actually has to do with meaning and language use

(Eriksson, 2003). The problem should therefore be understood as an institutional one, related to the function that identifiers have in human communication and society, rather than as a technical database problem. The conceptual model in Figure 1 shows that the ExistingCarPO and the PhysicalVehicle objects are not really the same object. In this action context, the car company can sell cars that physically exist at the time when the car is purchased but can also sell cars that will be built after the customer has purchased the car (i.e. on customer order). It is also obvious that the ExistingCarPO and PhysicalCar objects are not the same since we must allow for physical cars that have not yet been purchased. It is also important to notice that neither the licence number nor the ISO-VIN (serial number) can be used as the identifier to refer to the MadeToOrderCarPO because these are identifiers used for cars that physically exist. This means that we have to have a special identifier that can be used for identifying MadeToOrderCarPO objects. The selection and design of identifiers is an important design issue in information modelling (Eriksson, 2003; Date, 2004), and this example shows that taking both institutional and physical objects and their direction-of-fit into consideration can help solve this problem.

The ontological problem concerns the issue of existence and what kind of entities there are in the world. This is an important issue because the idea of what entities there are is the basis for identifying objects and classes, which is the central to conceptual modelling. A problem is that the conceptual modelling literature provides little guidance as to what an entity really is. In the database literature, Date (2004, p. 411) actually tells us upfront that “we cannot state with any precision exactly what an entity is.” In object orientation (e.g. Jacobson et al., 1994; Mathiassen et al., 2000), objects are understood as primarily belonging to the “real world” outside the IS, while the IS provides information about such objects; for example, information about people or inventory (Mathiassen et al. 2000, p. 5). It is also noticed that while it is usually not a problem to distinguish an object as a physically tangible thing, when objects become less tangible, describing them becomes increasingly problematic. In contemporary work on using the Bunge-Wand-Weber (BWW) ontology as a foundation for information modelling (Evermann and Wand, 2006), Rule 1 of the seven foundational rules for conceptual modelling (Wand et al., 1999) suggests that only physical things should be modelled as objects. This premise obviously overlooks important aspects of language use, such as the idea that an important part of social reality is constructed by use of language (Searle, 1995), and that, by implication, we must be able to model also that socially constructed world. The conceptual model in Figure 1 shows the necessity of recognizing the existence of institutional objects created by the use of language and how these symbolic objects are related to physical things.

The counting problem (Parsons & Li, 2007) is closely related to the ontological problem because it has to do with which types of object that should be counted. The counting problem refers to situations in which instances counted in their roles yield a greater number than the same instances counted by the objects playing these roles. For example the number of purchased cars over a year can be more than the number of physical cars because there are cars that are made to order. Furthermore, one physical car can also be purchased a number of times. If we want to know the number of cars purchased over a year we will make a sum of all ExistingCarPO and MadeToOrderCarPO which means that it is the institutional objects that are counted, not the physical objects. This also conforms to how objects are counted in general in administrative work-practices. Many times, there must also be a physical object in order to create the institutional object to be counted, but this is not always the case (which the conceptual model shows).

The predicate problem concerns what properties belong to what objects. This has been approached from a semantic point of view in, for example, normalization theory (Codd, 1970) and the infological approach (Langefors, 1995). A key question seems to be to understand what can be considered as an object (i.e. the ontological problem) and how language is used and related to the world when talking about those objects. Another important issue is to distinguish between properties and attributes. Properties are brute facts that physical objects possess, and attributes are language constructs that are used for describing institutional and physical objects. For example, the colour of the physical car is a property of the car and in order to change the colour you have to repaint it, and change the attribute that describe the colour of the car. This is different compared to the price of the purchase object because this is an institutional fact, it is possible to change the price of purchase object without changing the properties of the physical object, although it is dependent on the physical properties of the car, you only change the attribute. In conceptual modelling based on the BWW ontology the price should be seen as a mutual property dependent on the customer, sales person and the physical car. However, the same customer concerning the same physical car to the same salesperson can appear in a subsequent sales contract (which is another speech act) where the price does not have to be the same as in the purchase order. The price in the sales contract depends on if the salesperson accepted the price that the customer designated in the purchase order. The price depends on different speech acts performed and the commitments made based on speech acts. This means that the price it is an attribute of the speech act and the purchase object (i.e. the institutional object) referred to in that speech act.

The concepts introduced above can be used to approach these four problems, and to provide a framework that directs modellers' attention towards important aspects of information modelling not traditionally stressed. This concerns pragmatic aspects, such as actors, responsibilities, actions and commitments, which are not paid sufficient attention to in traditional conceptual modelling. The predominant view is that conceptual modelling is a reality mapping process. With such a perspective the main modelling problem is to analyse how the external world and physical things (the universe of discourse, or business domain) should be mapped onto, and be represented in, the system (system domain) in a 'true' way. Evermann and Wand (2006) express this in their semantic mapping Rule 1, stating that "only substantial physical objects in the world are modelled as objects". Accordingly, they suggest that, for example, orders and order lines should not be modelled as classes since their instances have no counterpart in the real world. With the ontological position adopted in this paper, orders and order lines clearly belong to the real world. Indeed, since information systems are primarily about information and communication, it seems rather odd to restrict the analysis of their domain to physical phenomena only. Instead we suggest that phenomena such as orders and order lines are institutional objects and should be modelled as such.

It is important, however, to understand that the representation assumption as such is in no way invalid. On the contrary, as pointed out by Weber (1997): "Whether fact-based data models [such as E/R models] can represent these types of phenomena [intensions and beliefs] is simply an ontological issue." Consequently, an ontological outlook that equally emphasizes both directions-of-fit (word-to-world and world-to-word) would provide a complementary view. Designing an information system from such a perspective would emphasize that we need to store information also about important institutional facts established through the system (Ågerfalk and Eriksson 2004). The main modelling problem should be to analyse the language acts performed by use of the system within the business, and how these acts and resulting institutional objects are related to the world. We do not only use language to describe what exists, language is also used to construct reality, i.e. to create institutional facts (such as orders and purchase objects) and these facts are also used to govern our physical acts and the production of physical things. The problem with the 'traditional' point-of-view is not the representational assumption as such, but rather the often associated restricted understanding of representation: the direction of fit is assumed always to be word-to-world, never the other way round, and that is not how the world works.

This means that we also suggest that the demarcation between information systems on the one hand and the business domain (the real world) on the other should be abandoned. Instead, the main issue should be to analyse the language acts performed by the use of IT systems within the world, and how these acts may affect the world. This ontological position implies that we are not restricted to what exists in the physical world, such as physical cars. In addition to such physical things, it is important to take into account also institutional objects (such as purchase objects) and the relationships between physical and institutional objects.

The ideas presented in the paper provide an alternative view that leads to an exiting new research agenda—in line with, yet challenging Wand and Weber's (2002) suggestions for research opportunities on conceptual modelling. Interestingly, views similar to the ones introduced in this paper were suggested already in the 1980's by such scholars as Goldkuhl and Lyytinen (1982) and Winograd and Flores (1986) and even suggested as "a new foundation for design" (cf. Weigand, 2006). However, when speech act theory has been used in IS research it has focused so heavily on the illocutionary aspect of language that the propositional aspect has been almost completely neglected (Ågerfalk and Eriksson, 2004). This unfortunate state of affairs is, not surprisingly, reflected also by Wand and Weber's (2002, p. 369) account of the possible role of speech act theory in conceptual modelling, which only suggests it can be used "as a means of identifying interactions". In this paper we have shown that language philosophy in general and speech act theory specifically has much more to offer by focusing on the propositional content and how speech-acts are used to create institutional objects. By doing this the real value of using speech act theory in information modelling can be achieved. Future research could generalize these insights in order to focus on how ontology and different language systems can help us solve important theoretical and practical problems—a contemporary "linguistic turn" for the evolving information society.

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HABERMAS' THEORY IN ACTION

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Abstract

In order to investigate the legitimacy of claims by two daughter companies, in different countries, within the same holding, about not being able to match the standard SAP solution that was imposed upon them, the ontological models, according to the DEMO methodology, of both companies were produced. The analysis of these models yielded a difference that could only be explained as social/cultural differences in the valuation of validity claims, as stated by Habermas' theory of communicative action. Two major conclusions can be drawn from this. One is that the matching of a business process to a standard SAP solution can only be determined definitely on the basis of the enterprise ontology of a company. The other conclusion is that the notion of business process in SAP is inappropriate; it is the mechanistic notion as represented in event process chains (EPC's)

Keywords: enterprise ontology, social value system, DEMO, SAP

Introduction

This paper reports on a study concerning the differences between two gas-provisioning companies in Europe, called SESA and SGD. The companies are located in different European countries, but they belong to the same holding company, called GasPro. The study was conducted in order to investigate the legitimacy of claims by the companies that they were unable to match the standard SAP solution that was imposed on them by GasPro. The study was conducted using the DEMO methodology [Dietz 2006a], such that the investigation of differences could be started at the essential, ontological level of an enterprise. One of the theoretical foundations of DEMO is Habermas' theory of communicative action [Habermas 1981]. Space limitations prohibit us to introduce DEMO, so we have to refer the reader to material that has been published, in particular to [Dietz 2006a; Dietz 2006b]. As a very brief summary of (the theoretical basis of) DEMO, we mention that every organization consists of a layered structure of three aspect organizations: the B-organization (B of business), the I-organization (I of information) and the D-organization (D of data and documents). The complete DEMO model of each of the aspect organizations consists of four models: the Construction Model (CM), the Process Model (PM), the State Model (SM) and the Action Model (AM). The only model we will discuss is the CM. It represents an organization as a network of transactions and actor roles [Dietz 2006a].

The ontological models of two organizations of the same kind, like SESA and SGD, are usually similar. If there are differences, these can easily be explained as services that one of them provides and the other one does not. During the analysis of the CMs of SESA and SGD, however, a difference was discovered that could not be explained in this way. On closer investigation it turned out that they have to be understood as social/cultural differences between the two countries, and that they can only be explained satisfactorily by means of Habermas' theory of communicative action.

In section 2 we present and clarify the Construction Models (CM) of SESA and SGD. In section 3, the difference as mentioned above is analyzed and some conclusions are drawn.

The ontological models

This section presents the Construction Model (CM) of the B-organization of the companies SESA and SGD. Where deemed convenient for the sake of understanding, infological and datalogical transactions are added, which show parts of the I-organization and the D-organization respectively.

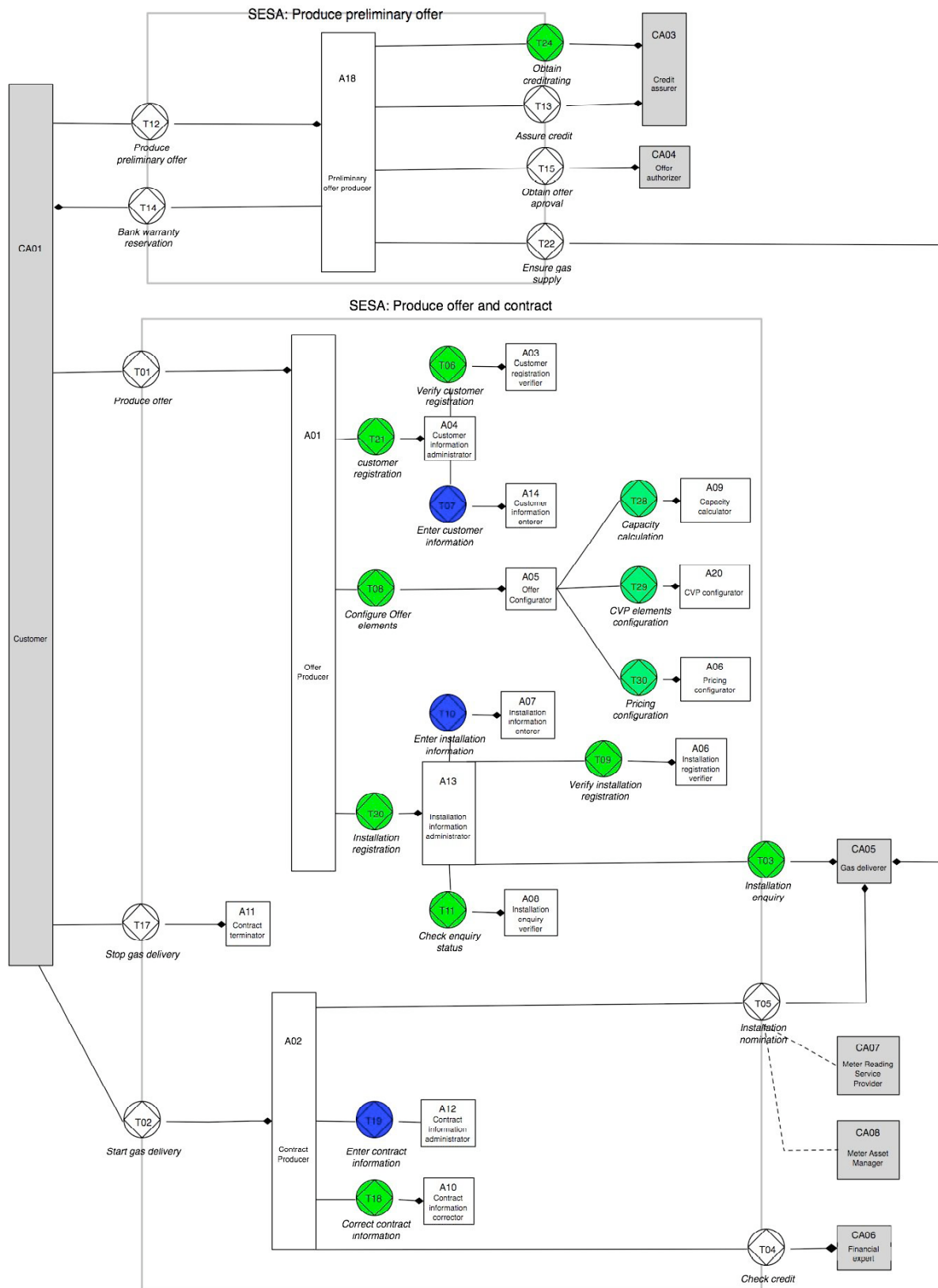


Figure 1. Construction Model of SESA

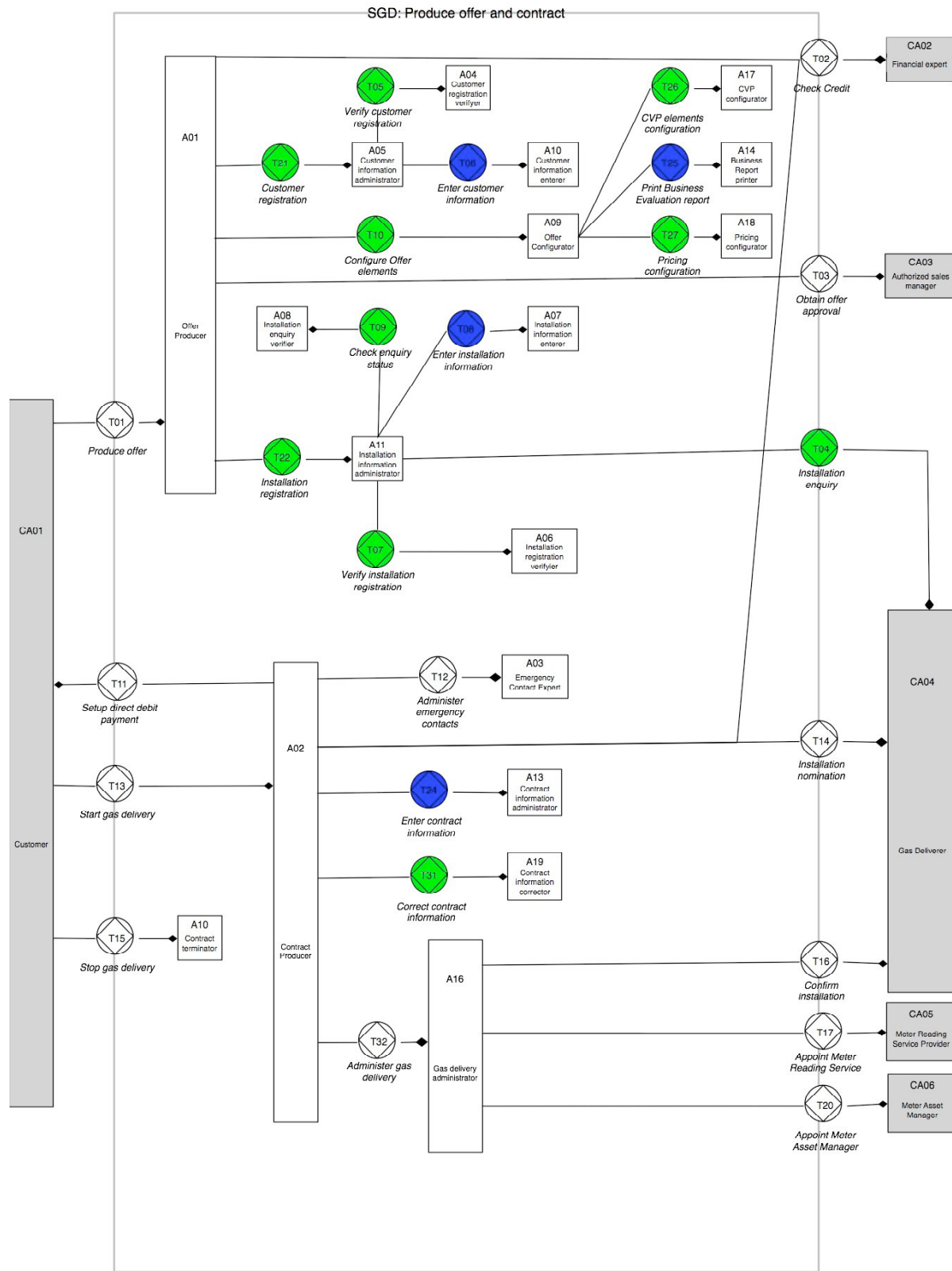


Figure 2. Construction Model of SGD

Figure 1 shows the CM of SESA. For the sake of brevity, we skip the preliminary offer process (of which T12 is the root transaction). The offer to cash scenario starts with the request by the customer (CA01) to produce an offer (T01). Effectively the production of an offer means producing a draft contract that has to be sent and signed by the customer. Once SESA has promised to produce an offer the customer registration process (T21) will be executed. When it has been verified that the customer has not been previously registered (T06) the customer information will be entered (T07). Once the customer information has been entered the installation information will be entered (T20). The installation information administrator (A13) requests to enter the initial installation information (T10) when it has been verified that the installation has not been previously registered (T09). When this transaction is completed the installation information administrator enquires the Gas Deliverer for installation details. The installation enquiry (T03) is carried out in order to ensure that the requested amount of gas can be delivered to the customer and is reasonable. When the status check of the enquiry (T09) shows that the enquiry has successfully been performed and the installation registration (T09) has been executed as well, the installation registration is completed. The last transaction that needs to be performed in order to complete the production of the offer is the configuration of the elements in the offer (T08). The offer is composed by configuring various parameters within the system. This set of parameters can be separated into three parts: capacity calculation (T28), CVP configuration (T29), and pricing configuration (T30). This capacity calculation concerns the load of gas in the gas grid. The configuration of these parameters is necessary since SESA needs to balance the consumption of the customer with the gas quantity that can be provided by the Gas Deliverer in order to obtain the optimal gas quantity contracted from the Gas Deliverer. The 'Customer Value Proposition' (CVP) configuration considers the terms and agreements in an offer.

The customer may request the start of the gas delivery (T02) once he has accepted the offer (T01). Effectively this means converting the offer to a definite contract. Upon the request of T02 the contract producer requests the transaction to correct (certain elements of) contract information (T18) in case the customer indicates this or in case any mistakes have been made. When this transaction is completed A02 requests the installation nomination (T05). The nomination of an installation is carried out to inform the gas deliverer that the customer has signed an offer and to start the gas delivery to this installation for a specific date. The gas deliverer will accept the nomination when it is possible to deliver the requested amount of gas to this installation.

Because in the country where SESA is located, the party that fulfills the role of a Gas Deliverer also fulfills the role of the Meter Reading Service Provider (CA07; the actor responsible for providing the meter reads) and the role of the Meter Asset Manager (CA08; the actor responsible for maintaining the installation assets) information links are drafted as well. Although information links are formally part of the CM diagram notation they are drafted here in order to facilitate the comparison with the ontological model of SGD where the external actors CA07 and CA08 do execute specific transactions. Parallel with the nomination of the installation the financial terms and agreements of the contract will be entered (T19) that are taken into account in the financial relation with the customer.

Figure 2 shows the CM of SGD. The offer production process, of which T01 is the root transaction, is largely similar to the one in SESA (Figure 1). Therefore we skip this part of the explanation and concentrate on an important difference. Upon the receipt of the signed contract (i.e. when T01 is stated and accepted), the administration of the gas delivery (T32) will be requested. This transaction ensures that the proper information will be disclosed to the right third party. It must be completed successfully in order to enable accurate billing of the customer based on precise meter reads. SGD engages with 3 third parties: the Gas Deliverer (CA04; responsible for the transportation of the gas), the Meter Reading Service Provider (CA05; responsible for providing the meter reads) and the Meter Asset Manager (CA06; responsible for maintaining the meter assets and providing the specific installation information necessary to enable accurate meter readings). This stage of the contract production business process is also referred to as the D-14 timeline since the included transactions must be completed within 14 days. The 14-day countdown will start once the installation confirmation (T16) has been accepted. This transaction will confirm to the Gas Deliverer that SGD intends to take this supply point over from a different supplier on a specific date. The appointment of a meter reading service (T17) will be automatically requested once the Gas Deliverer has promised to confirm the installation of the gas delivery. The appointment of the Meter Asset Manager (T20) will be requested instantly when the installation has been confirmed.

Analysis of the models

As we have seen, the transaction T32 (administer gas delivery) is only present in SGD (not in SESA). SGD has to perform several (ontological) transactions enclosed in the 'administer gas delivery' transaction. Transaction T32 will be requested upon acceptance of the production fact (a contract) of the 'produce offer' transaction (T01). However if one of the enclosed transactions of the T32 transactions will not be accepted (in the case one of the parties dissents

or cancels a coordination act) the production fact of the T01 transaction will be declared invalid and its production act (composing the contract) has to be performed again. The fact that an enclosed transaction will be requested upon the acceptance of a transaction is quite remarkable. It is even more remarkable that a production fact of a transaction will be declared invalid if one of its enclosed transactions will not be accepted. Four important conclusions can be drawn from these observations.

First, apparently the social value of a contract (i.e. the result of a transaction T01) is different in the two home countries. In the home country of SESA it is a formal agreement between the customer and GasPro, as a result of a successfully completed business transaction (i.e. a transaction in the B-organization). In the home country of SGD it is apparently only considered as a formal "promise" of the T01, although the transaction has been completed.

Second, this practical example gives an early indication that the DEMO methodology is capable of detecting different social value systems. Social values (norms) are the customary rules of behavior that govern business transactions. Norms impose uniformity of behavior within a given social group, but often vary substantially among groups, just as in our example. The capability of detecting differences in value systems stems from one of the core elements in the methodology, the transaction pattern, which is fully based on Habermas's Theory of Communicative Action [Habermas 1981]. A transaction consists of coordination acts and a production act. Coordination acts are brought about by primarily communicative acts that can be justified only by being based on social values (Dietz 2006a). Put differently, in order to successfully complete a transaction the actor that initiates the transaction and the actor that is responsible for the execution of the transaction have to strive towards consensus. This depends on how an actor *values* each coordination fact as well as the production fact. The differences in value systems are revealed on an ontological level because the ontological transactions of an organization deliver services to the environment of the organization. The environment of an organization consists of the concrete and explicit specification of the *social* context in which an organization operates (Dietz 2006a).

Third, the way the business process of producing a contract is performed in the operating units can be challenged to reach further convergence of the business of GasPro across Europe. This can only be achieved if the difference in the value systems is caused by the organization itself (the GasPro company). In other words the environment (the actor responsible for initiating the transaction) in the home country of SGD and in the home country of SESA must value the production fact of T01 in the same manner.

Fourth, since the SAP system is a standard information system that supports a general business model based on best practices known in the industry it incorporates universal values in the business processes it supports. For example a social value or norm could be that a contract should never be broken, i.e. when a production fact "contract has been produced" is a fact in the production world it cannot be undone by an enclosed transaction of the specific business process. When one implements a standard information system across multiple countries that may have different value systems, it can limit the convergence one is trying to achieve. Since this incorporation of social values is implicit, they actually are not part of the SAP meta model of business processes. Put differently, this meta model is a mechanistic one. This explains why it is sufficient to use EPC's (event process chains) to model them.

In conclusion, a higher degree of convergence of the business processes could have been reached and can be reached if one challenges the differences that occur out of market and business reasons. One should focus on the differences on the ontological level. The differences on the infological and datalogical level have a lower impact on the essential aspects of an organization; they can be challenged later on.

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CHALLENGES TO INFORMATION SYSTEMS DEVELOPMENT

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Abstract

This paper discusses the term information system artifact. It shows that there is no one-size-fits-all way of understanding that term as collection of appropriately interpreted software and hardware components. The paper therefore suggests understanding the term information system artifact as such an information system model that enables rationally reconstructing selected information system quality characteristics. The paper discusses then challenges to creating such models, i.e., to information systems development and considers the role pragmatism and action research might be able to play with regard to these challenges.

Keywords: information system, artifact, model, pragmatism, action research, research paradigm

Introduction

A call for theorizing “the” IT artifact has been issued in (Orlikowski & Iacano, 2001). It has, among others, been acted upon by (Bensabat & Zmud, 2003; Weber, 2003; Whinston & Geng, 2004) and (Sidorova et al., 2008). The term IT artifact has been defined in (Orlikowski & Iacano, 2001, p. 121) as “those bundles of material and culture packaged in some socially recognizable form such as hardware and software”, see also (Whinston & Geng, 2004, p. 150). I discuss the more specific term information system artifact and show that the above definition is too narrow. I argue then that at best the term information system artifact should be conceptualized as information system model. I briefly introduce into a theory of model and briefly discuss challenges to information systems development and the role pragmatism and action research might be able to play with regard to these challenges.

Information system artifacts

By information system (IS) I mean, in succession of Langefors, an artificial medium that is used (1) for recording, storing and disseminating language expressions; and (2) for drawing inferences from such expressions (Hirschheim et al., 1995, p. 11). The core function of applied computing in business is to provide IS customized for human information processing. Nowadays human information processing is a key business activity in virtually any branch of economy and any task within such branch. IS still may require major investments and obviously may have deep impact on how humans work. Following Bacon and Comte I hold that to “... see in order to foresee ... is the permanent distinguishing feature of true science” (Habermas, 1971, p. 77). Therefore I would consider a term IS artifact as suitably chosen if it would simplify planning, assessing, and carrying out any IS related investments as well as understanding that IS’ quality characteristics.

I do not count IT systems, such as car racing games or similar as IS and discuss in this paper the IS subclass of IT systems only. Initially I understand IS artifact as that which implements a given IS. Implementation abstraction is one of the key conceptual tools of applied computing and is used for introducing the distinction of a system outside

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view from a system inside view. This methodological distinction is made such that the important quality characteristics of the outside view can be rationally reconstructed from the inside view and its quality characteristics. I thus aim at using IS artifacts for the rational reconstruction of important IS quality characteristics. Viewing IS artifact as that which implements the IS requires explicitly mentioning an implementation platform. A number of such platforms could be chosen. Any such choice needs, for a given case, to fit the IS quality characteristics of interest and the methodologically inspired presuppositions.

The limited expressivity of information system architecture

In computing one commonly distinguishes the architecture layers: **application system**, i.e., the software components providing application specific functionality; **software platform**, i.e., the software components providing application independent functionality; and **hardware platform**, i.e., the physical devices providing basic pattern processing as well as signal transmission. I am going to show that in some cases the reconstruction of quality characteristics of information systems needs to use quality characteristics from all these layers. Additionally I am going to show that these layers are not always sufficient for reconstructing the relevant quality characteristics of an information system. With **society-ware platform** I mean the circumstances entailing that computing technology, i.e., hardware and software, will be deployed and installed properly and, moreover, will be operated and serviced advisably.

For showing that one not necessarily can ignore software and hardware platform when it comes to reconstructing information system quality characteristics of application systems I consider the RSA algorithm, see (Rivest et al, 1978). Its capability to increase the cost for deciphering a given cipher text crucially depends on the size of the primes p and q that are the base of its operating schema. Now, on a computer C there may be an arithmetic available for calculations with integers of a prescribed number of digits. On a computer C' such arithmetic might not be available. Even if the algorithm executed literally would be the same on these computers the security provided could be quite different. The number of digits of an integer of type T on computer C could be quite different from the number of digits of integers of type T on computer C' . In this example the reach of the application system would include software and hardware platform. If the complexity of the RSA encryption algorithm is under consideration then detailed specification of the data types used to implement the algorithm on a computer won't be necessary. However, if one wants to assess the cost implied to someone who wants to break the code as produced by a given implementation then information is required about the available types of integers and maybe even hardware used such as the processor employed for encryption or the memory available for storing any intermediate results.

To show that society-ware cannot always be neglected consider a large internationally operating bank. Presuppose it considers achieving an availability of 99.99% of its backbone banking systems. Now, a year has about $365 \cdot 24 \cdot 60 = 525600$ minutes. 0.1% of that is 52.56 minutes, i.e. less than an hour. Considering a year as reporting period means thus that availability of 99.99% means a down-time of less than 1 hour per year. Consider now the location planning of such a bank. They obviously have to be concerned about the infrastructure. At least parameters such as availability of power, network services, the frequency of floodings, earthquakes, terrorist attacks, and the likelihood of major banking law changes needs to be considered for assessing whether or not implementing such a project is going to pay off. This example shows that it might not be sufficient to just look at the top three levels when it comes to assessing the quality of an information system. I consider society-ware as a layer like the other layers above and not as context of the information system since for the reconstruction of information system characteristics there are more things to consider and several of these are really close to the actual hard and software. For example humidity and temperature of the place where the hardware is operating needs to be kept within specified boundaries. Similarly line voltage and frequency need to be controlled. Also, operating and transport altitude over sea level need to be observed (see for example <http://www.apple.com/macbookpro/specs.html>). Of course connected to transport and operation altitude is a maximum radiation level that needs to be guaranteed. Furthermore any advisable hardware or software services should be carried out professionally such as cleaning screens and keyboards or reorganizing indexes, reallocating table spaces, clearing garbage areas, performing backups, and installing software updates.

Challenges to information systems development

The rational reconstruction of any IS quality characteristics may require consideration of society-ware, which is not covered by the definition in (Orlikowski & Iacano, 2001). That calls for looking at alternative ways of conceptualizing the term IS artifact. A common conceptual framework for conceptualizing any IS artifact one might want to choose seems to require outmost flexibility. I thus suggest to consider IS artifacts as models of information systems. I draw from Stachowiak's model theory (Stachowiak, 1973, 1983), see also (Kaschek, 2005). Accordingly models and hence, for this paper, IS artifacts at best are chosen with respect to a given goal of investigation, a given group of investigators using specified tools within an anticipated period of time. In Stachowiak's theory the concept model is not characterized ontologically. Rather, a relational characterization is used: a model is a model of an original. Both of these are semiotic entities that are represented as predicate sets. That relation between these two that tells which predicates in the original are ignored in the model; which surplus predicates the model has over the original; and which original predicates are mapped onto which model predicates is called model relationship. Stachowiak requires no two original predicates to be mapped on a single given model predicate as that corresponds to an abstraction that he requires to be performed entirely by ignoring original predicates in the model.

Among the issues to consider with regard to IS artifacts are any of their creation obstacles. I want to address two respective points. Stachowiak has, in line with the 20th century Philosophy of Science, focused on thought and knowledge. He believed that all knowledge is contained in and achieved via models. It seems that emotion was underrated and thus needs to be rated higher nowadays. My first point thus is question how emotion and subjectivity of system users can be turned into a driver of system development processes. It seems to me that a modelism of Stachowiak's kind that uses semiotic entities only cannot adequately deal with the specific quality of emotion. It can, however, deal with subjectivity, as the mentioned predicates can be understood as judgments (Pfänder, 1921) and these in turn can be presupposed to capture any individual's subjectivity.

Followers of a classical view of cognition are likely to critique any attempt to focus on emotion with regard to research processes (such as requirements engineering). However, there is reason to not adopt that classical view as contained for example in (Popper, 1934) and (Carnap, 1961). For example, Fleck has shown that even the supposedly best and most rational kind of human knowledge, i.e., scientific knowledge, has a history throughout which scientific concepts emerge and significantly can change their content or meaning (Fleck, 1935). Fleck has illustrated this with an analysis of the genesis of the modern concept of syphilis. His contribution in that regard is to consider concepts similar to tools that a Denkkollektiv (maybe best translated as school of thought, or within scientific pursuit as scientific community) uses and by and in consequence of that use also changes. Any such Denkkollektiv of course is autonomous in its related decisions not all of which may be conscious or rational ones. Austin has shown that human communication not necessarily or mostly aims at disseminating facts or fabricating consent about facts (Austin, 1979). Consequently one cannot necessarily expect human discourse to be entirely grounded in fact and discursive rationality. One way of rationally understanding the evolution of the supposedly entirely rational, i.e., the scientific, knowledge is to postulate non-rational impact factors involved in human cognition. Attempting a solely rationality based choice of reasoning system obviously faces the challenge of choosing the rationality type preferred, which obviously transcends rationality and at least inclusion of chance.

Model driven approaches to systems development seem to become popular. Some of these include automatic design or code generation. Related examples are the Olivanova programming machine (<http://www.care-t.com/index.asp>) and Microsoft's Oslo project (<http://msdn.microsoft.com/en-us/oslo/default.aspx>). A tendency seems to emerge in which modeling is considered as synonym to programming. The respective hypothesis, however, is not true since modeling languages do not need to have a formal definition or a definition at all, while programming languages rely on such a definition. Natural languages are modeling languages and at least initially do not have definitions at all. My second point therefore is that only a proper part of that which can be modeled also can be programmed and thus the question arises: which is an advisable relation between modeling and programming? That question gains

additional relevance by the observation that even in computing modeling is not necessarily the pre-stage of programming. Modeling notation thus does not have to be chosen according to whether or not it can be mapped onto a design notation with formal semantics. Also, undefined terms in utterances, if considered in terms of what they evolve into, may play a very important role in interlocution. Restricting someone's means of expression might entail a limitation of their capability of expression.

Impact of pragmatism and action research

In my view computing is evolving into a social activity [Ka09]. Space limitations prevent from discussing that thesis here. It, however, implies that the importance is increasing of the more social activities in systems development such as requirements engineering, testing, and system evolution is increasing, which here is assumed to include maintenance.

In requirements engineering a branding takes place, i.e., a system under development (SUD) conceptually is shaped. That branding includes the emergence of a conceptual usage model (CUM), a concept I draw from (Norman, 2002). It is a model of how anticipated users are going to use the SUD and includes the user interface widgets' design and their labels. According to (NZZ Online, 2008) that draws from a recently published study humans respond to well-known brands, among others, emotionally. It is thus likely that information systems stakeholders also respond emotionally to the systems that affect them. In fact that emotional response should be exploited rather than ignored since it very likely is a major overall performance impact factor. Usually, after some time of being operated, an information system is considered as requiring change. That may be caused by a change of the user group or its tasks, the usage environment, the legal, or economical usage circumstances. Usage environment changes often result from information systems either becoming operational or inoperational. It is well-known that users of an information system may differ significantly in how and what for they use that system. Quality driven information systems development thus requires figuring out the various types of future users and for each of them the likely CUM.

Particular philosophical systems may impact outcome and questions asked through a research project considerably. For systems development this has been studied in (Hirschheim et al., 1995). Inevitably anticipated users of an SUD consider their CUM and any of its details differently than users do of a different user type or non-user stakeholders. Action research therefore likely substantially impacts figuring out CUMs and system evolution. There is at least anecdotal evidence for error removal cost depending on the time the error is in the system. Spending on action research for requirements engineering and system evolution potentially is going to reduce software cost.

In web design, interaction design, and interface design there is growing awareness of the importance of system quality. Pragmatism has impacted this greatly by providing a suitable concept of quality, i.e., fitness for use. That makes quality applicable wherever one reasonably can talk about someone using an artifact. Pragmatism thus opens an important perspective for information systems. In a sort of micro local view it considers the individuals using technology and then focuses on the question how fit that technology is for that kind of use. In the light of the ancient Greek philosophical tradition pragmatism and action research belong to analysis. It will have to be worked out how synthesis can be provided for the outcomes of analysis as inspired by the two mentioned philosophical approaches.

Pragmatism and action research might favor that synthesis by boosting the anticipated system stakeholders' role in systems development. Action research and pragmatism complement each other well as paradigms for information systems development. Action research potentially turns the anticipated stakeholder from the research subject into the investigator. Pragmatism suggests their subject of research (the fitness for use), the research question (how to use technology and how fit is it for that use?), and the research purpose, i.e., improve the fitness for use of anticipated systems. There is an interesting challenge though: Many information systems have a quite diverse group of stakeholders. There are, for example, those who run the system, those who use its services, and those who are affected by it. It is much more difficult to determine those who will belong to the latter groups than it is to identify

the members of the former group. Consequently the CUM preferred by the latter categories of stakeholders is more difficult to come by. It would be interesting to see what action research and pragmatism have on offer in that regard.

According to Chomsky engineering or manufacturing consent has a long history in the US. It dates back at least to Woodrow Wilson's Committee on Public Information (Kang, 2008) and consent engineering has some negative connotations originating to Edward Bernays' and Paul Lipman's work. However, its basic idea, i.e., to interact with people prior to them making any important decisions is applicable in systems development too. In fact it seems that employing it is inevitable. Since, if circumstances have emerged in which the various stakeholders consider things in too different or even antagonistic ways then no way might be left for synthesis to come up with a coherent integrating view of things. The well-known methods of reaching consent are: more or less hidden persuasion and evidence; bribery and deception; and force. Of course there are transition zones between them. The method of choice for avoiding too divergent stakeholders' views might be a combination of consent engineering and persuasive discourse. It would be interesting to see how well pragmatism and action research do in contributing to effectively providing high quality systems (or at least system specifications) for a competitive price.

It seems that software vendor driven systems development processes are getting fashionable. A too strong focus on technology use in systems development might be the consequence. Pragmatism and action research might do better than classical or other emerging system development process models at empowering anticipated users in driving development processes. Pragmatism and action research might lead to focusing less on development technology since their process drivers might not be keen on and qualified for handling that technology. These approaches therefore might attribute to modeling a larger independence from programming than seems to be emerging in competing approaches. The impact of that on systems development would be very interesting to study.

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MAKING THE WEB MORE PRAGMATIC: EXPLORING THE POTENTIAL OF SOME PRAGMATIC CONCEPTS FOR IS RESEARCH AND DEVELOPMENT

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Abstract

In this paper we examine some pragmatic concepts that we believe have a potential in relation to three core activities of the IS-field; 1) description and understanding, 2) evaluation, and 3) design. The concepts that we will examine are “social activity”, “communicative act”, “sequences of communicative acts” or “exchange types”, “communicative feedback” and “turn management”. We describe the concepts and then exemplify how they can be used to analyze web services by examining e-mail and Wikipedia as two activities currently on the web. Our analysis leads to a partly new description of both phenomena. It also leads to a number of open questions concerning the functionalities of both phenomena.

Keywords: Social Activity, purpose, role, artifacts/instruments, environment, communicative act, commitments, obligations, subactivity, exchange unit, feedback, turn management

Introduction

In this paper we will examine some pragmatic concepts that we believe have a potential in relation to three core activities of the IS-field; 1) description and understanding, 2) evaluation, and 3) design. The concepts that we will examine are “social activity”, “communicative act”, “sequences of communicative acts” or “exchange types”, “communicative feedback” and “turn management”. Firstly, inspired by the Wittgensteinian notion of “language games”, we introduce the concept of “social activity” as a convenient mid-range concept of social organization to capture variation in communicative practice on a level that we believe is significant for the description and understanding, evaluation, and design of information systems. We then introduce the concept of “communicative act” as a generalization of the concept of “speech act” that historically (relying on Austin (1962), Searle (1969) and Habermas (1981)) has influenced the IS-field. In doing this, we go back to the pragmatic foundations of the communicative act, where we take communication to include not only speech, but also other modes of production, such as gestures, pictures, writing, and electronically mediated versions of these. We adopt an analysis of communicative acts that has been developed as a criticism of the Austinean analysis of speech acts (which is also the analysis adopted by Searle and Habermas) in terms of locutionary, illocutionary, and perlocutionary acts (c.f. e.g. Allwood, 1977; 1978). This analysis enables us in a new way to describe and understand why there are sequential patterns of communicative acts. Another goal is to focus on the interactive aspect of communication more strongly than has been done in traditional pragmatics, and as a part of this give a better analysis of the recipient’s active role in communication. This role can be clarified by examining the phenomenon of communicative feedback. Besides communicative feedback, we also consider turn management (i.e. ways in which the right to communicate is distributed among participants, e.g. who can communicate about what and how long?) that is a prominent feature of any communicative interaction.

Using the concepts included above, we will examine two examples of Web related use. The examples are *user-driven content generation in Wikipedia* and *written communication via e-mail*. Our examination reveals that the use of the mentioned pragmatic concepts to a greater extent, than previously, allows us to describe and understand these

and probably other web-related phenomena. The concepts not only allow us to describe and understand, but also allow us to evaluate web related (and other) information systems so that we can discuss if the present Web-support for an activity and a related IS-system allows the activity to be optimally realized, and if specific aspects of the activity, such as sequential patterns, feedback, and turn management are designed in a good way. By “good” we will roughly mean “a manner which allows an efficient and ethical way of achieving the purpose of the activity.”

This paper, thus, explores a number of pragmatic concepts lying outside of the presently established “LAP” framework. Below, we first give a short description of these concepts and then, in the second part of the paper, discuss how they could be applied to phenomena that are to be found on the pragmatic web. The concepts all have a pragmatic motivation in the sense that they are rooted in ideas concerning action and interaction.

Some core concepts in Activity based Communication Analysis

Social Activities

Taking the notion of “social activity” as our point of departure, we will now briefly describe the concepts introduced above.

Social activities provide a natural grounding for the idea of “language games” introduced by Wittgenstein (c.f. Wittgenstein, 1953; Allwood, 2000). They are a natural mid range unit of social life. Social activities together constitute the dynamic aspect of an organization. Thus, an organization like a university is the host of several social activities like lectures, seminars, tests, gossip, and job interviews, which together constitute its dynamic side.

A social activity can be defined as a collective interaction with a purpose and often has socially regulated means and roles. Communication is seen the basic force of social cohesion and joint social action and is the primary means through which social activities are pursued. The fact that communication is the primary instrument for social activities provides an explanation for why features of communication vary with social activity. Compare the differences and similarities between communication in activities like informal conversation, enquiries in a travel agency, love making, police interrogation and teaching. Social activities can be described by the following factors (and possibly others), (i) the **purpose** of the activity (e.g. buying and selling), (ii) the typical **roles** of the activity (e.g. shop clerk and customer). Roles can often be further analyzed by describing the rights, obligations and competence requirements that are connected with the role, (iii) the typical **artifacts** (instruments) of the activity (e.g. money, counter, cash register) and (iv) the **environment** (e.g. a shop). These 4 factors have turned out to be very useful as a background for description, explanation and evaluation of the communication in the activity. Analyzing the relation between activity and communication thus, allows not only for description and explanation but also for improvement of the communication in the activity.

Social activities often have internal structure, e.g. they may have characteristic openings and closings. Getting a meal at a restaurant might have the following phases or **subactivities** (i) Greeting, (ii) receiving a menu, (iii) making a selection, (iv) placing an order, (v) waiting for the meal, (vi) receiving the meal, (vii) eating, (viii) asking for the bill, (ix) paying, (x) thanking and farewell. Typically each subactivity will also exhibit a specific structure of communication.

This structure will to some extent consist of typical “**sequences of communicative contributions/communicative acts**” or “**exchange types**”, This structure is predicated on the fact that both activities and subactivities, require a specific order in which communication proceeds, e.g. a greeting is normally followed by a greeting, a question by an answer, a statement by an acknowledgement or an agreement etc.

Contributions, Communicative Acts, Turn management and Feedback

Dialog proceeds by speaker and listener, through their utterances and gestures, making **contributions** to a successively shared content. Each contribution can consist of one or more communicative acts. **Communicative acts** are the smallest action units of communication. However, the relation between behavior and action is complex and is in general characterized by **multifunctionality**, Cf. Allwood (1978, 2000), i.e. instances of communicative behavior (the contributions) can often express more than one communicative act and thus have more than one meaning or function. For example, if A in a worried voice says to B *It's slippery outside*, this utterance at the same

time expresses A's worry, A's belief about weather and could be an attempt by A to warn B. The multifunctionality of communicative contributions is related to the fact that we, in communicating, have many contextual relations and usually communicate multimodally, so that our behavior can express several types of information at the same time.

Both speaker and listener in dialog, through their contributions, make commitments and contract obligations. The sender contracts commitments concerning his/her grounding and sincerity and the listener is put under the obligation to evaluate and respond to what the speaker contributes.

In order to ensure that communication is going to be successful, i.e. lead to shared understanding, there is a system of **communicative feedback**. This system has evolved in order to allow dialog partners to check whether they are able and/or willing to continue communicating, perceive, understand and accept the information being communicated. The feedback system also allows the mainly sending party to get information about what emotions the recipient is experiencing (c.f. Allwood et al, 1992).

Most dialogs involve speakers taking turns holding the floor. There are therefore a number of mechanisms and processes to aid this process. We will refer to these mechanisms and processes as **turn management** (cf. Sacks et al, 1974). These routines are essential when we have two-way interactive communication. They are somewhat less important when we have one-way (or broadcasting) communication.

Two examples of Internet practices

In this section two examples of how the concepts introduced above can be used to describe internet practices is put forward. These are Wikipedia and e-mail. Each of the two phenomena are described as a social activity, using the concepts mentioned above, i.e. social activity (characterized by purpose, roles, artifacts/instruments, environment) and exchange type, turn taking and feedback.

1. User-driven content generation – the case of Wikipedia

Purpose: volunteers collaboratively create encyclopedic content at a web site. The idea behind Wikipedia is that someone wants to say something about a certain topic to others that care. The content in Wikipedia is continuously being built by contributors in patterns of proposals and counter-proposals

Roles: There are users taking two roles as well as bots (Internet robots): First of all, volunteers take the role of being *contributors* who bring up new subjects (articles) as well as adding/refining existing content by editing. These contributors are called *editors*. Contributors need to identify themselves. Secondly, there are *readers* of the content put forward on Wikipedia. There are also *bots* (Internet-robots) that help make sure that the content is appropriate. These act as regulators of the content. In the task of doing this articles might become subject to deletion by having them tagged. Contributors have the right to contribute with content, but it might be disregarded, changed or deleted.

A contribution is not connected to commitments and obligations since contributions might be disregarded, changed or deleted. The whole idea relies on whether a topic (described as an article) becomes interesting enough. The procedure raises many questions like: What mechanisms are there for getting enough attention to a new article? Which criteria need to be met for the creation of sustainable articles? What possibilities does an editor have to refine the content of an article? Are there articles that are “locked” for further contributions and what criteria determine when this happens? How is cumulative content-building assured if there are no contributors, editors, or readers obliged to read what has been said? Why does it work without having receivers with an obligation to read and comment? Are there blind spots in the content that are overlooked and how can the trustworthiness be assured for the readers of the content?

Artifacts/instruments: The major instruments enabling and restricting the interaction is electronic communication and the internet. There are also bots continuously scanning the content and thereby overlooking the interaction going on between different contributors. There are possibilities to track revisions as well as having watch lists. Users can design and implement their own bots. Another important instrument is storage capacity in the form of a distributed database to be accessed by Wikipedia as well as the functionality provided in Wikipedia as a web-application.

Environment: The articles in Wikipedia provide an environment for each other. The content of one article is related to other articles through key words. In order to achieve this, key words can be added to both new and old articles. In this way, article dependencies are created in a networked structure. This means that the already existing articles are

part of an environment where people are acting (and reacting) based on both new and old articles. From a wider perspective, Wikipedia is based on the idea of an open society, i.e. open collaboration, open access etc., in which it is possible for everyone to contribute. There are however norms and rules regulating who can contribute and what contributions that can count.

Exchange types, turn taking and feedback: Wikipedia provides a structured environment for communication regarding article content. Sequences of contributions are logged in historical records describing the evolution of the content. When it comes to turn management, Wikipedia is asynchronous, so interaction can be slow. Quick responses are, however, possible, e.g. a BOT finding out that the content is not appropriate to exist in Wikipedia. There are also facilities for managing several contributors acting on, i.e. editing, the same article simultaneously. Again our examination raises many questions like: When does content-building decline? What determines when responses are no longer necessary? How does the turn management system of Wikipedia handle this? How does the system keep track of which articles that are read and acted upon? What feedback is given at the different stages of development of an article?

2. Enabling written communication via e-Mail

Purpose: to enable written electronic communication.

Roles: There are two roles: A. The sender, the person/agent who sends the message and B. the recipient or the reader(s), the person(s)/agent(s) who read the message. If we analyze the two roles in terms of rights and obligation, often sender's rights correspond to reader's obligations. However, given the facts of spam and information overload, a general observation is that there are not many rights and obligations that can be generally associated with e-mail. However, some open issues are the following:

1) When does a sender have the right to have his/her message read and when is a recipient of e-mail obliged to read a received mail? This normative question corresponds to the more descriptive question of which of all sent messages are actually read. How do senders' priorities correspond to readers' priorities? Here are some factors that probably have an influence on what happens (i) interest of recipient (ii) kind of relationship between sender and recipient (family, friends, lovers, boss-employee, business, topic etc.). Some of these factors help create rights and obligations, others create expectations, but are perhaps not so easily relatable to norms.

2) What messages require a response and how long can the time be before the response is sent? Again, there seems to be no clear rules, but only tendencies based on the same factors as those mentioned in the comment to question 1.

3) What is the influence of information on the identity of the sender and recipient? E-mail normally requires overt identity of the sender and recipient. This places restrictions on what information can be put in the messages. Under special circumstances, identity can be hidden, e.g. spam. Hidden identity allows for greater freedom both in relation to what is expressed and in relation to how this information is received. Revealing or not revealing who else will get the same message will in some cases enable positive collective action but often simultaneously put restrictions on what responses become possible from the primary recipient(s). Because of the influence of information about the sender and recipients identity, most e-mail programs allow the sender a strategic use of disclosure of the recipient's identity. There is also the possibility of not revealing who the recipients are by using bcc or just simply forwarding a sent mail in retrospect. Thus, in e-mail, distinctions between primary (bona fide) recipients, other recipients, secret recipients and possibly also eaves droppers (persons/agents who read the mail without the sender being aware of this) have taken on a new importance.

In general, we might therefore conclude that e-mail is an activity that on the generic level is very open, but that specific topics, activities and relationships create expectations about readership and interactivity. In certain relationships and activities, these expectations will be related to rights and obligations connected to the roles of the sender and the recipient.

Artifacts/instruments: A third factor influencing an activity is the artifacts and instruments used in the activity. In this case, electronic communication and the internet are the major instruments enabling and restricting the interaction. In fact, one might say that it is these factors that have constituted e-mail as a specific type of activity. It is an essential condition for the existence of e-mail. This is shown in the continuous dependence of electronic written communication on new features made available in the programs that enable communication. Compare, for example, the use of smileys pictures and voice. The more easily combinable with written message, such features will be, the more they will probably be used.

Environment: The influence of the environment of e-mail overlaps to a great deal with the influence of the instruments mentioned above,(i.e. it is the internet which makes possible asynchronous or very rapid exchange between persons separated spatially all over Earth). Two of the features of this environment have been the rapid increase in messages information overflow and the speed of responses. Both of these have created a pressure toward informality, brevity and perhaps superficiality. It has also created a situation where many persons are forced to find principles for prioritizing or slowing down of communication. There is just too much mail all the time. The amount of mail and interchange is also having an effect on commitments and obligations, making them harder to determine and keep track of.

Many of the other concepts introduced above can also be used as a kind of checklist to understand the nature of e-mail exchange. Such concepts are “subactivities” and “exchange types”, which can be used to do a sequential analysis of an e-mail exchange. Other concepts, like “communicative act” with “orientations”, can also be used to make a closer content analysis of the messages in e-mail and how this content is dependent on being responsive to previous mail or evocative in relation to expected responses. Mail can also be analyzed from the point of view of its cognitive and emotive expressivity and what phenomena are referred to.

Exchange types, turn taking and feedback: Finally, e-mail can be looked at from the point of view of turn management and feedback. When it comes to turn management, e-mail is asynchronous, so interaction can be slow. It can also vary from consisting of very long messages to very short messages. Overlap can exist in the sense that a contribution can arrive while another contribution is being written, but because of the restrictions on the medium, two incoming messages never overlap for the recipient. In two party exchange, the situation is fairly uncomplicated, but when a topic concerns several persons, keeping track of what is a response to which contribution becomes more complicated, especially since mail from other interchanges, unrelated to the given one can be interspersed in the interaction.

When it comes to “feedback”, the needs of the sender are to find out whether the intended recipient has received the message, whether he/she has read/understood and how he/she reacts to the main evocative function of the message. Since, among other things, spam has made the various recipient related reactions very uncertain, some mail programs today have started to support the need for feedback by requiring that the sender be notified if the recipient has received the mail. However, much more thought could be given to how feedback processes could be integrated in e-mail systems.

Differences and similarities between the two cases

Below, we will use the same features as above to highlight some differences between the Wikipedia and e-mail. We start by first looking at the activity factors.

Purpose: Beyond enablement of asynchronous, electronic, written, interactive communication, e-mail has few restrictions. Wikipedia, on the other hand, is set up with a very specific purpose, i.e. the cooperative collective authorship of an encyclopedia. Interaction is possible but not primarily supported.

Roles: In e-mail, the two primary roles are sender and recipient. In the Wikipedia case, roles are more complicated, i.e. contributor to encyclopedia, regulator of contributions etc. The rights and obligations of these roles are more closely regulated than in e-mail. But again the factor of anonymity of the contribution probably creates more freedom of expression than would have been the case if the contributors had not been anonymous.

Artifacts/instruments: E-mail is enabled by the general features of electronic communication. Wikipedia is enabled by a much more specific communicative environment, including a well functioning and easily accessible database.

Environment: Both activities exist in the environment of the world wide web, which increasingly is characterized by such features as open access, open collaboration and open source. However, since Wikipedia is helping to create this environment these features are more closely related to the Wikipedia effort than to e-mail in general.

Exchange types, turn taking and feedback: Since Wikipedia is a much more structured environment for communication than e-mail in general is, exchange types, turn taking, and feedback are more regulated and adapted to the specific purpose of enabling the collective creation of a high quality encyclopedia.

Concluding remarks

In this paper, we have argued that pragmatic theory offers a number of concepts that could enrich web use. We have presented a number of these concepts and illustrated their use by looking more closely at the activities of e-mail and Wikipedia. We hope to have given some evidence that such a broadened view of what could be relevant for the “pragmatic web” will lead to better description and understanding/explanation of how electronic communication works and that this in turn will enable continued development of more pragmatically sensitive forms of communication. Some examples for further study that could be considered here are: What functionalities should a personal agent helping us to overcome information overload have? What forms of feedback connected with readership would be desirable? How can we build in different forms of quality assurance on the web?

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INTRODUCING HUMAN IN COMPLEX SYSTEM: A COGNITIVE PRAGMATICS BASED MODEL

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Abstract

At the present time, and even if not all SoS community agrees on it, System of Systems (SoS afterwards) are generally modeled thanks to classical design methods and tools. SoS models are complicated and their design is time-costly, but at a design time step, they are efficient. The models in Computer Supported Cooperative Work (CSCW later) add complexity to traditional models as they aim at representing human cooperating in working activities. Modeling human is a real complex problem involving run-time and round-trip issues. We then deal with complex system modeling which has no real fundamental principles except using the ones of system design. Putting Human in the SoS loop enables to change our IT and modeling paradigms and then to replace knowledge modeling issues by beliefs modeling issues, to use communication processes to model data flows exchanges among user and finally to replace inferences of a logical type (machine) by inferences of an analogical type (according to pragmatics principles and cognitive system modeling). We assume that pragmatics principles will ease SoS modeling to take into account man in the loop.

Keywords: System of Systems, Cognitive Sciences, Enaction, Cognitive Pragmatics, Human in the loop

Domains and Issues

As a foreword, we would like to highlight that this paper is a position paper, more an attempt to theorize the IT artifact as used for applied concerns in an industrial environment than the IT artifact in general. These applied concerns find their roots in the actual Model Driven Engineering (MDE) and a more theoretical positioning enabling the future of models in engineering (i.e. their re-use, their generalization, the satisfaction (QoS) constraints, or the run-time constraints). In our context, Information Technology artifact is a complex artifact taking into account social and pragmatics phenomenon applied as an interface between human domains and computer / technical domains. Using pragmatics to model the whole domain enables to take into account human and its technical environment and to have these two extremities of the continuum taken into account in a single, seamless modeled artifact. To broaden these aspects, a theoretical pathway is needed. In order to broaden our applied approach of MDE to SoS, a return to complex system theory is needed (Section 2). To widen a satisfaction or a contractual constraint, a return to action-oriented theories is needed (cognitive pragmatics, enaction) (section 3).

Modeling issues and domains

To implement large and long lasting systems, we often use design and runtime models. A model is an abstract, formal and focused representation of a system or a set of system components. The Model Driven Engineering proposes designers as well as developers an engineering artifact usable all along the product life-cycle. Nevertheless, as MDE focuses mainly on model building to generate software code insuring the code properties, the model is mainly used at design time for the implementing and maintaining steps of the product life-cycle. In the field of System of Systems (SoS) which deals with large and dynamic systems, design-time models do not suit perfectly. They lack of maturity and not actual tools support the round-trip i.e. the process of generating codes from models keeping automatically models and code synchronized (compliant) whenever changes are made from the code (bottom-up) or the model (top-down).

SoS definition

The SoS domain is a new field, which bears several definitions. (DeLaurentis and Callaway, 2004) propose a definition based on (Rechlin, 1991)'s definition of system as "a set of different elements so connected or related so as to perform a unique function not performable by the element alone". A SoS (DeLaurentis and Callaway, 2004) is then "the combination of a set of different systems forms a larger "system-of-systems" that performs a function not performable by a single system alone". Some authors explicitly stand on the Complex system side. Thus, (Kotov, 1997) by SoS means a "large-scale concurrent and distributed systems the components of which are complex systems themselves". (Maier, 1998)' definition enables to handle actually the SoS and cover the whole panel of SoS definition: "Systems-of-systems should be distinguished from large but monolithic systems by the independence of their components, their evolutionary nature, emergent behaviors, and a geographic extent that limits the interaction of their components to information exchange. Within these properties are further subdivisions. For example a distinction between systems which are organized and managed to express particular functions, and those in which desired behaviors must emerge through voluntary and collaborative interaction. (...)". Maier also notes five principal characteristics to distinguish a SoS: Operational Independence of the Elements, Managerial Independence of the Elements, Evolutionary Development, Emergent Behavior, and Geographic Distribution. To emphasize Maier's preoccupation about "collaborative interaction", we also cite (Luskasik, 1998) definition who describes SoS engineering as the "the integration of systems into SoS that ultimately contribute to evolution of the social infrastructure." i.e. human one.

Complex System definition

As we can see the difference between SoS and Complex System is not that clear. From the complex system field, a complex system is a system that is not "reducible to a finite model, as complicated, stochastic, sophisticated this model could be, whatever its size, component numbers or intensity of their interactions could be" (p.178 personal translation of (Le Moigne, 1995)). In Complex Systems (CS), the auto-organization and autonomy concepts are central. A CS is a system manifesting autonomy forms of any sort (Le Moigne, 1995). Complexity appears and develops itself with the emergence of an autonomy capacity. These autonomy behaviors are elaborated by the system itself, endogenously, by being opened on its environments which solicit or restrain it. Despite these transactions, the system is not necessarily wholly dependent. It keeps its own projects and is capable of smartness.

Relations between a system and its environment came initially from Francisco Varela's work (Varela, 1988,) on living systems. He suggests that the autonomy of living system is coming from their *organizational closure*. A system is organizationally closed if its organization is characterized by processes depending on each other by their auto-generating property. These processes constitute the system as a recognizable entity in the space where processes exist. The organizational enclosure doesn't mean the confinement of the system; on the contrary, the system interactions with its environment produce simultaneously the system and its environment.

A social system is a complex system involving humans. It is a kind of living and complex system. In a computer supported cooperative work (CSCW) perspective for example, we need to model a complex socio-technical and user-centric system with autonomy, auto-organization and evolvable principles.

CSCW artifact: Multimodal tools and interaction (complex) models

The phrase Computer Supported Cooperative Work, coming from I. Greif and P. Cashman (1988:5), is defined as: "A computer-assisted coordinated activity such as problem solving and communication carried out by a group of collaborating individuals." (Schmidt et Bannon, 1992, p. 3) consider that "CSCW should be conceived as an endeavor to understand the nature and characteristics of cooperative work with the objective of designing adequate computer-based technologies for cooperative work arrangements." In order to design adequate groupware, it is also necessary to adequately design cooperation. But cooperation is one of these activities eluding complete proceeding and coming close to the users' personal contributions to work organization. Then, designing interaction models in CSCW falls into the complex system model design category with a part of unknown due to the evolvability of a living system.

In CSCW, to model user activity, we can use different methods (practice analysis based or theory based) and tools like languages (textual representation, UML or Domain Specific Languages, or self-defined meta-models/MOF). The activity models defined are based on the domain/activity expert specifications. These models are powerful to model user activity, but lack expressiveness when we need to complexify it in order to take into account interactions

or cooperation (even if attempts negotiation models or tasks models for CSCW exist). As for the step from system to SoS, the complexity induced by the representation of human is poorly modeled. Generally, designers simplify the interactions between users and user(s) and system to be able to apply system design principles. This practice results in the lack of interaction between users or user-system. The main problem is then to tackle with individuation (to autonomously consider itself as an individual, a finite element), which is to say a closure problem in a larger environment. Once the system is individuated, it still has relations, interactions with other systems (with its context), and is able to evolve and manage its evolution (Varela, 1988). The evolution rules in enactive theory (Varela, 1997) can be seen as actions the systems has on itself. As it, we are in a pragmatic view of evolution and adaption of meanings to the system goal(s).

Cognitive Pragmatics based System Model

Several issues rise from our positioning on these definitions of System of Systems as Complex System taking into account man in the loop. The main questions are about: how to handle complexity and uncertainty via models? How to model or simulate evolution of autonomous systems in a SoS? To attempt to bring some cues, we will focus only on two topics representative from technical and methodological needs in modeling in CSCW:

- Complexity modeling;
- Multimodal and adaptive tools requirements

Answers can be found in a pragmatic approach of complex system design i.e. a *matter-of-fact* approach to the problem and a Cognitive Pragmatics approach. We assume that pragmatics principles will ease SoS modeling to take into account man in the loop.

Complex System Model

Le Moigne (1995:11) considers that to understand a complex system, it is necessary to model it to build its intelligibility (understandability). But simplifying (=mutilating) a complex system, we a priori destroy its intelligibility. Nevertheless, he also considers that even if our attempt of modeling will not be the solution at our present problem, it will give some cues to smartly tackle it (Le Moigne, 1995:7). As the present solutions given for modeling human in SoS are coming from the Human Factors field, i.e. Human modeled as cognitive parameters (for work load for example) and keep human as a logical system, we consider that our attempt to model human processes at a high level (large and complex communication / interaction system) will give some cues to smartly tackle man in the loop in SoS even if the solution is not the final one. We assume that complex modeling fits to model pragmatics and then enables to handle in a seamless model Human, Interaction and Technical Artifacts.

Man in the loop

The pragmatics field has been recognized to be a crossing domain for System modeling (high level modeling as for natural language description) and Cooperation (Dynamic discourse adaption to context-activity) dealing with the closure problem between cotext (Semantics) and context (Pragmatics). In the CSCW field, pragmatics are used as a methodology (as in discourse analysis) to describe actual communication means and processes for cooperation (descriptive means). The path from description (design time) to run-time obviously represent a gap. Our research work aims at modeling cooperation in order to take it into account in SoS modeling. The cooperation model we aim at defining, should then be goal-oriented taking into account mental representation at run-time or round-trip process. It is more the action we need as meta-model process to represent the SoS evolution. In order to model cooperative activities of human in a SoS, a first step will be to model the processes user is involved in, and then to implement these self-evolving processes to make the SoS evolves.

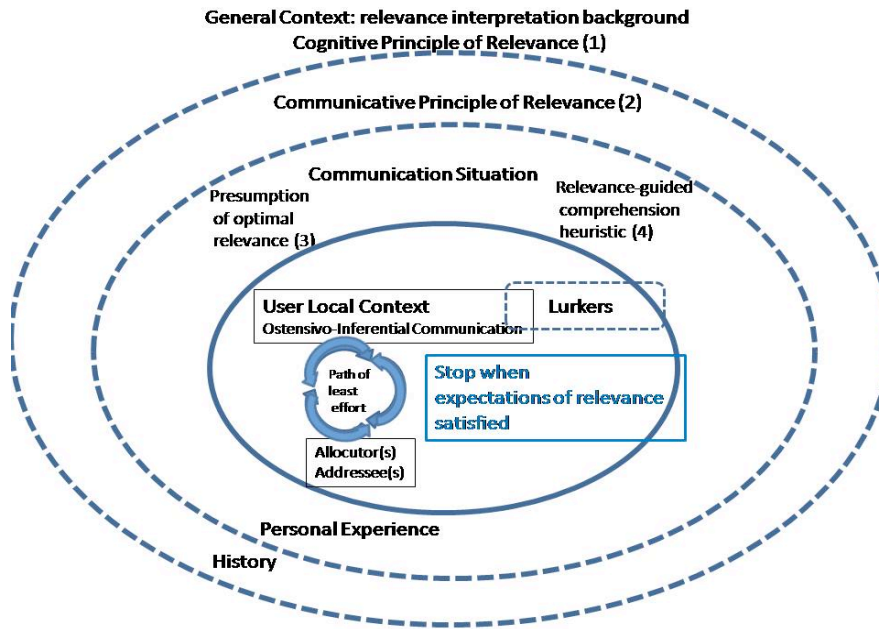


Figure 1. Relevance Theory representation

- (1) Human cognition tends to be geared to the maximization of relevance.
 - (2) Every act of overt communication conveys a presumption of its own optimal relevance
 - (3) (a) The utterance is relevant enough to be worth processing.
(b) It is the most relevant one compatible with the communicator's abilities and preferences.
 - (4) (a) Follow a path of least effort in constructing an interpretation of the utterance (and in particular in resolving ambiguities and referential indeterminacies, in going beyond linguistic meaning, in supplying contextual assumptions, computing implicatures, etc.).
(b) Stop when your expectations of relevance are satisfied.
- (Sperber & Wilson, 2005)

Cognitive Pragmatics

Putting Human in the SoS loop enables to change our IT and modeling paradigms and then to replace knowledge modeling issues by beliefs modeling issues, to use communication processes to model data flows exchanges among user and finally to replace inferences of a logical type (machine) by inferences of an analogical type (according to pragmatics principles and cognitive system modeling). On the two mainstreams of Pragmatics, i.e. philosophy of language and cognitive pragmatics, we are then explicitly placed in the second. We do not consider language in its descriptive or representative function, but more as an action mean (ostensive-inferential communication).

In cognitive pragmatics, the aim of a cognitive system is to build a representation of the world and to enhance it. "Pragmatics" is a capacity of the mind, a kind of information-processing system, a system for interpreting a particular phenomenon in the world, namely human communicative behavior" (Carston, 2002). Cognitive Pragmatics explains utterance interpretation processes by the representation they have of the cognitive processes. For example, they postulate the similarity among the language of thoughts structure (mentalese) and the syntax of a sentence. We assume that this analogical process to interpret utterances among different cognitive level (i.e. mental, linguistics) could be an interesting means to tackle the meta-model/model layers interpretation without fixing the process at design-time and encounter interpretation problems at run-time.

The cognitive pragmatics of (Sperber and Wilson, 1995) is a non-linguistic cognitive pragmatics, contrary to the Integrated pragmatics (Ducrot, 1993). We chose to keep this semiotico-cognitive level for modeling in order to be able to tackle with the problem of multi-modality modeling in Information Technology Systems. The Sperber and Wilson theory will highlight Pragmatics contributions to model interaction complexity in CSCW. (Sperber and Wilson, 1995) in their approach to the study of human communication give cues to model communication action. From (Sperber and Wilson, 2005), we can consider a possible complex model in Fig.1. offering means of closing an interpretation process by measuring relevance interpretation maximum via effort and effect. This model is based on (Mouchet, 2005).

We need then to couple this high level communication model to interaction model and system model in a large complex system model to use at run-time to guide user interaction in a CSCW multimodal groupware.

Conclusion and perspectives

Cognitive aspects enable to theoretically handle modeling issues in a SoS, about autonomy, auto-adaptation as well as evolution through other cognitive sciences theory as pragmatics or enaction. Enaction is useful as it takes into account human environment (social) in an IT system. Cognitive pragmatics is useful as it handle human processes (communication, autonomy facing the system) for technical means (adaptive systems, autonomous systems, HMI...)

Such a pragmatics driven model enables to model seamlessly the human in a socio-technical SoS and provides description model to implement user centered support tools. Of course cognitive pragmatics principles are not yet applied in an actual design method but our works focus on this aim. We are presently working on a collaborative platform underlain by cognitive pragmatics theory and offering multimodality functions (augmented reality, Adaptive IHM).

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DESIGN RESEARCH FROM A COMMUNICATIVE PERSPECTIVE: HOW TO DESIGN THINGS WITH WORDS

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Abstract

Design research is an established research approach in Information Systems, founded on the seminal work of Herbert Simon. However, for Simon design is basically a search problem. In this presentation we review briefly some traditional design approaches and propose an alternative approach in which design is viewed as communicative action

Keywords: Design science, speech act theory, information systems, technology

Introduction

The role of design in IS research has been and still is a subject of debate. Walls et al (1992) expressed the need for Information System Design theories. In their view, these theories should refer to design products or design processes. The design theory does not address the design of a specific artifact, but a class of artifacts, e.g. transaction processing systems, and its core consists of a set of meta-requirements and a meta-design meeting these meta-requirements. Trying to classify the results of design research, Jarvinen (2000) argues that not only totally new artifacts should be counted as such, but also artifacts whose value is equal to the current state-of-the-art while differing in structure, or whose value is higher, as well as reports on cases in which the building project failed.

Hevner et al (2004) in their seminal article argue for a full recognition of design science in IS, while at the same time providing a set of guidelines on how to distinguish the good IS design research from the bad. They point out that the goal of behavioral science research is truth, while the goal of design theory is utility, so, although they are related, one cannot be reduced to the other. Although this position appears to gain legitimacy, an empirical study of Backlund (2005) on the contents of ECIS proceedings shows a decline in the number of studies where artifacts are constructed or tested. Hevner et al (2004) are a bit ambiguous when it comes to the role of theory in Design Science (Venable, 2006): the goal of design is utility, not theory, but they also talk about kernel theories applied and extended through the experience of the researcher. The notion of kernel theories is taken from Walls et al (1992), but in this framework, kernel theories are natural science or social science theories that “govern design requirements”, and they distinguish these kernel theories from design theory as such (the former can be part of the latter, but they are distinct in nature).

There has been quite some discussion on the notion of IT artifact. March and Smith (1995) identified 4 types: constructs, models, methods and instantiations. The IT artifact is proposed by Benbasat & Zmud (2003) to be at the core of the IS discipline. Not that the IS discipline only involves the study of the IT artifact as such; at least as important is how IT artifacts impact the contexts in which they are embedded. However, focusing on the IT artifact can help to delineate IS studies from social science research in general, and to avoid research that is better left to other disciplines, such as cognitive science or computer science. In general, the proposal of Benbasat & Zmud has been received positively, but McKay (2005) criticizes the focus on “creating things”, as IS is a socio-technical discipline. Hevner et al state that “artifacts are rarely full-grown information systems that are used in practice”, which suggests that technical artifacts can be separated from the organizational context. In contrast, McKay posits that the

task of IS researchers is to understand practices with respect to transforming situations by the application of artifacts into more desired states, taking into account the context and use.

The recognition of design science in IS raises the question of how it relates to other research methods or paradigms in the field. Many authors plead for pluralism or a multi-method approach in which design science, positivistic empirical methods as well as interpretative approaches each have their own role but not everybody enjoys pluralism. According to (Klein & Hirschheim, 2003), the effects of conflicting paradigms and commitments to incompatible visions of the nature of IS have fragmented the IS research community along several dimensions to the point that it has reached the so-called “fragmented adhocracy”. The article pleads for a communicative approach and the development of a common Body of Knowledge, which includes technical, ethical, applicative and theoretical knowledge.

An interesting proposal on how to integrate design science and behavioral science paradigms has been put forward by Goldkuhl (2004) under the label “pragmatism”. Pragmatism was originally introduced by Peirce, James, Dewey and others as a philosophical alternative to abstract and rationalistic science. Pragmatism does not contend itself with observing a given reality, as it wants to acknowledge the role of purposeful human action in changing reality. One of the foundational ideas within pragmatism is that the meaning of an idea is the practical consequences of that idea. Therefore, IS research should focus on knowledge that makes a positive difference, i.e. knowledge which contributes to improvement of IS practices. So pragmatism provides a framework in which empirical research and design research can support each other and in fact need each other.

2. Critical reflections

In this section, we consider a few objections against Hevner et al (2002), and related current work on design research in IS. Although we support the basic message that design research should be fully recognized in the IS discipline, we think that this can only work if the nature of design research in general, and in the IS field in particular, is clear.

We first summarize our objections, and then go into the first two in more detail.

- (1) The focus on the “IT artifact” as instantiated system confuses the distinction between IS and Computer Science. The focus of IS should not be an instantiated systems, but on information and communication processes in organizations.
- (2) The idea taken from Simon that “design is essentially a search process” is mistaken in several ways. First, because it underestimates the difficulty of problem representation. Second, because it obscures the creativity in design.
- (3) The uncritical use of the word “utility” without taking into account the different stakeholders is problematic.
- (4) The uncritical use of the word “science” in “design science” or “science of the artificial” is problematic. The relationship between design and science is more complicated than suggested.

(1) The IT artifact

According to guideline 1, “the result of design-science research in IS is by definition, a purposeful IT artifact created to address an important organizational problem”. Apart from constructs, methods and models, on which we have more to say below, the most important IT artifact is, following March and Smith (1995), the “instantiation”, a working system. One problem is that that would make it hard to distinguish IS from Computer Science. By this statement, we do not want to separate the two disciplines completely, as they are evidently closely related. But related is not identical. The IS discipline is socio-technical and its primary object consists of the information and communication processes in organizations. These processes are to a certain extent the result of intentional design efforts. Nowadays,

most processes are supported by IT, and hence the IT support of the processes is an important part of the design. We concur with the critique of McKay that the focus should not be on the working system as such.

Information and communication processes in organizations can be studied from a design perspective (how to improve them?), and from an empirical perspective. We agree with the pragmatist stance that the design perspective should be leading, as we are dealing with objects of intentional human design rather than given natural objects. However, it is generally known that the formal organization (the object of design) never coincides completely with the informal organization (the actual ways of working). Here is a hook for interesting empirical IS research.

In current practice, the information and communication processes in organizations are usually designed or redesigned by IS analysts and designers (either in-company or hired in from a consultancy company). The design process is a communicative practice on its own and involves many parties. According to Hevner et al, design-science research in IT [sic!] often addresses problems related to some aspect of the *design* of an information system. We would like to rephrase that to the effect that design research in IS ultimately aims at improving information and communication processes in organizations, but one road towards this goal is the improvement of information and communication processes in IS design practices. Again, these processes are increasingly supported by IT, and hence there is a legitimate interest in the design of useful IT support (e.g. CASE tools) as well, but what should be central are the processes, not the IT support.

Hevner et al argue strongly that not only instantiations are legitimate design artifacts, but also constructs, methods and models. *Constructs* enable “the construction of models or representations of the problem domain”. As an example of a construct, they mention the famous ER model of Chen. As ER models model a certain aspect of the information and communication processes in organizations, implicitly Hevner et al seem to admit that not the IT system itself (as they say elsewhere), but the latter processes constitute the real object of design research. For the rest, we agree that constructs are indeed artifacts in their own right, but not all constructs are relevant to IS research. Given our definition of IS, only representation languages for information and communication processes (on various levels of abstraction) are relevant; not a programming language, for example. ER models (as workflow modeling languages, for instance) are interesting for the IS practitioner and for the IS researcher as they offer (a language for) white-box models of the IS design artifacts.

Methods are another category. Methods are supposed to define problem-solving processes, “how to search the solution space”. In our view, this characterization is too narrow and too broad. Methods that are used in IS design practice do not only aim at exploring a solution space, but also at collecting requirements, for example. They also serve to reduce risks (e.g. testing procedures). On the other hand, not all methods are interesting from an IS perspective. Most relevant to IS research are methods that support the modeling (the “constructs”), for example, rules on how to check the completeness of an ER diagram, or methods that say how a relational structure can be derived from an ER diagram. Since these modeling constructs have an assumed generality, the supporting methods are general as well, whereas design practices not directly related to modeling are more dependent on the context, culture or consultancy style.

(2) Design as search

Hevner et al follow Simon in viewing design “essentially” as a search process. Simon should be fully acknowledged for his defense of design disciplines against the imperialism of natural and social sciences, and his initial thoughts on how a design science could be taught. However, his conceptualization of design as search has severe drawbacks. In the first place, it underestimates the difficulty of defining the problem in the kind of problems addressed by IS. For instance, he states (1996, p.132) that “solving a problem simply means representing it so as to make the solution transparent”. As the inventor of the term

“bounded rationality”, Simon should have known that there is nothing simple at all on representing a diffuse problem with many stakeholders involved. As argued at length by Visser (1995), Simon's view applies to “simple”, well-defined problems and to their processing, but does not represent the ill-defined problems that professional designers have to solve. Even if a model, by definition, simplifies its object, Simon's representation of design, in all its simplicity, no longer renders the specificities of design. Ironically, it was by reference to Simon's idea of limited capacities leading to bounded rationality that Schön and Wiggins qualified designing as possessing “the conversational structure of seeing-moving-seeing” (1992, p. 143). Although Simon does recognize the intrinsic iterative nature of design, and Hevner et al recognize that IS problems are typically ill-defined, they still stick to the search metaphor.

The metaphor of a solution space being searched through also does not square with the creativity in design. Sometimes, design involves a systematic exploration and comparison of the possible alternatives, but at other times, this does not lead to results and a redefinition of the solution space is necessary. Recognizing the creative aspect of design also explains why it's social character. Creativity is often stimulated in collaboration. New solution spaces are often opened up as a result of cross-fertilization between different communities (Spinosa, Flores, Dreyfus, 1997).

The alternative that Visser offers, on the basis of an extensive survey of design literature is, that of “transforming representations”:

The activity of design thus consists in *transforming representations*. Design indeed starts with a representation and has to come up with another representation (both, generally, composite). The initial representation can be very diverse, i.e. composed of elements of various levels, from different sources, made up of contradictory and/or incomplete constraints, or implying such elements. The final representation has to be very precise and detailed, i.e. composed of elements that are all at the same level of abstraction: it has to be so specific that the implementation of the artifact is completely specified.

3. Communication-based design research

What would we gain if we replace the “design by search” metaphor by a “design by communicative action” metaphor? We offer only a few thoughts for further reflection.

- First of all, it draws attention to the *creative* nature of design. Just like speech acts do things with words, so designing is doing something, changing our world, by means of certain representations. This creativity is something that should be encouraged and appreciated in its own right, and not only because the artifacts thus created can be the subject of “empirical science” evaluation. The creativity should also be stimulated in IS curricula.
- Not only design as a whole is an act, this also applies to most of the steps in it. These steps take the form of *transforming representations*, or to be more precise: a cycle of interpretation and transformation. Design students should be taught ways of transforming representations in other forms that may provide new insight. Sometimes this form is a formal representation in logic; or a simulation; or a graphical composition.
- The representations used in the design (not only IS design) should be seen as more than the passive subject of transformations. What is interesting is that the representation has a *declarative* character, transforming the situation by reframing the problem or disclosing new worlds.
- As *communicative acts*, designs should be relevant, clear, etc (Grice maxims). A great number of guidelines in the Hevner checklist of design research are subsumed by acknowledging design as communication. The validation requirements on the claims in design research are stronger than the requirements on communicative action in daily life, but they are in the same line.

- Design is part of a *social* (communicative) practice, embedded in an evolving life world (community of practice) in two ways. First of all, even if the designer works on his own, at some point his results are submitted to someone: the community of practice, the research community or society as a whole. This gives designers a specific responsibility to listen to the ongoing conversation in the social practice. It should be fully acknowledged that design results often provide parts of the solution. In the end, all these solution components together may provide a lasting innovation, so it is important that these solution components are published and shared. Secondly, the design activity itself often also has a social character, or can benefit from social interaction. The interpretation-transformation cycle can work even better when different interpretations can be put on the table.
- Finally, the speech act metaphor may help to appreciate the *context-dependent* character of design. A speech act is nothing in itself; it is the way it transforms a (largely underspecified) context into a new stage. IT practitioners transform organizational contexts by means of IS systems and other design artifacts. As a consequence, general rationalistic methods have a limited value only.

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THE PRAGMATIC WEB: AN APPLICATION VIEW

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Abstract

The World Wide Web as we use it nowadays is mainly a syntactic web. Keyword-based search is used to locate and access information, documents are stored in data repositories and many data exchange formats exist. The Semantic Web initiative has argued for an enrichment of such data with semantic elements. Search is no longer based on keywords (and thus on terms) but on concepts. Ontologies are used as the underlying frames for documents contents and thus access is enabled in a flexible way. However, the focus of Semantic Web research is still on its formal foundations rather than on the application side. To enable flexible, world-wide information exchange between entities such as human users, software agents, or computers, an additional level of semiotics is required that can represent the intention of communicative acts. This level is called pragmatics in semiotic theory and has led to the concept of a Pragmatic Web.

In this paper, we will provide an application view of the Pragmatic Web, thereby emphasising the requirements of pragmatic elements and, at the same time, showing their actual implementation in already existing systems. We will discuss electronic negotiations as an application scenario and show that:

- *communication theories such as Searle's Speech Act theory and Habermas' Theory of Communicative Action have been implemented*
- *ontologies are used for semantic enrichment of communicative exchanges*
- *intentions are transferred based on user choices*
- *negotiations about business scenarios are enabled*
- *at the same time, negotiations about the semantic and pragmatic contexts are possible*
- *communicative exchanges can occur between human agents, between human agents and software agents, and between software agents*

The discussion will be based on extensive empirical data showing the effectiveness and efficiency of our pragmatic approach. Finally, we will discuss why a purely semantic web approach would not be sufficient for our context.

Keywords: Action-oriented approach, IS implementation, pragmatic theory, recognised framework

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