

On the Idea of Soft Systems Methodology for IS Development: A Perspective Based on Purposeful Action

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ABSTRACT

The paper investigates the context of information systems (IS) development, which aims to underline the importance of soft systems methodology (SSM) in the process of IS design that should meet several essential challenges: First, IS development, usually concerned with ill-structured problem situations in organizations, needs to make sense both to those who work in IS and to those whose concern is organizational imperatives. Second, it needs to encompass changes in practice, which are made possible by technical developments. Third, it must be robust enough to remain valid as the technology itself and ways of using it continue to develop. Our research is driven by a belief that the design issues of IS support must be situated in the context of social processes in which, in a specific organizational scenario, a particular group of people can conceptualize their world and hence the purposeful action they wish to undertake. This provides the basis for ascertaining what information support is needed by those who undertake that action. Only then does it become appropriate to ask how modern information technology can help to provide that support. The paper concludes by reiterating the main context for IS work is the organizations, and meeting the challenge of designing suitable IS's, based on SSM, starts from a re-thinking of what is entailed in providing informational support to purposeful action in the specific organization context. This is often facilitated by the provision of an important enquiry process constantly attended to, and integrated into organizational activities by which IS professionals could learn of the organization's continual adjustments to its changing world.

Keywords: soft systems methodology, meaning attribution, human activity systems, holon, systems thinking

1. INTRODUCTION

The capacity to attribute meaning to what we perceive seems to be a unique characteristic of human beings. We can turn the data, which is the position of the hands on a clock, into the information that we are late for an appointment or that we still have time for another cup of tea. This transformation of data into information by the attribution of meaning makes the study of information a very broad and hybrid field, especially, the particular nature of organized attempts to provide information, namely, the development of information systems (IS). Indeed, in the emerging knowledge economy [23], as the possibilities of the information revolution challenge traditional business logic, many organizations are being compelled to question their entire existing operation and try to redesign it in a way that uses new technology to serve their business better. Consequently, it is important to focus on the organization's development of any IS support truly integral to the context of the specific transformed organizational system. Our discussion, based on meaning

attribution, should serve as an organizing framework by which concepts and goals may be formulated, and synthesized. First, we recognize that organizations are products of their social and historical growth, and we need to identify the context that defines and constrains what is and what is not, possible to design in an organizational IS support. Second, we should develop our baseline assumptions around which the organizational concerns and the IS support requirements must be consistently associated. Thereby, the meaning attribution approach assumes that the problems of designing IS support should never be thought of as something to be defined once and for all, and then implemented. Instead, it is based on the observation that all real-world organizational problem situations have at least one thing in common: they contain people interested in trying to take purposeful action constantly. Pragmatically, the idea of a set of activities linked together so that the whole, as an entity called the human activity system (HAS) [10], could pursue a purpose is, according to Soft Systems Methodology (SSM) [7], never fixed once and for all. Indeed, well-developed ways of naming and building models of such HAS models, [13, 14, 26], assume from very early on in the modeling process, that given a handful of the HAS models, namely, models of concepts of purposeful activity built from a declared point of view, we could create a coherent structure to debate about the problem situation and what might improve it. Subsequently, from the IS architect's point of view, while conceiving the necessary IS support, from the outlook of SSM, to serve the specific organizational requirements, the fundamental ideas could be integrated as follows: Always start from a careful account of the purposeful activity to be served by the system. From that, work out what informational support is required (by people) to carry out the activity. Treat the creation of that support as a collaborative effort between technical experts and those who truly understand the purposeful action served. Meanwhile, ensure that both system creation and system development and use are treated as opportunities for continuous learning. In this way, models of purposeful human activities can be used to initiate and structure sensible discussion about information support for the people undertaking real-world problem situations.

2. SSM AS LEARNING SYSTEM

Undeniably, setting up an organizational information system is a social act in itself, requiring some kind of concerted action by many different people; and the operation of an IS entails such human phenomena as attributing meaning to manipulated data and making judgments about what constitutes a relevant category. In this regard, the use of SSM in the creation of IS support, can be seen as a process which learns its way to the meanings which characterize an organizational scenario. This idea of learning the meanings, by which people sharing a human situation seek to make sense of it, is a significant feature of

SSM. The important point is that we must not lose sight of the fact that the HAS models are not would-be descriptions of parts of the world. Instead, they are abstract logical machines for pursuing a purpose, defined in terms of declared worldviews, which can generate insightful debate when set against actual would-be purposeful action in the real world. The implicit belief behind constructing the HAS models is that social reality – what counts as facts about the social world inside an organization – is the ever changing outcome of a social process in which human beings continually negotiate and re-negotiate, and so construct with others their perceptions and interpretations of the world outside themselves, and the dynamic rules for coping with it. Researching social reality in the context of IS development, then becomes an organized discovery of how human agents make sense of their perceived worlds, and how those perceptions change over time and differ from one person or group to another. In the process, we do not expect to discover unchanging social laws to set alongside the laws of natural sciences. Rather, an organization is perceived as entailing readiness on the part of its members to conceptualize it and its internal and external relationships in a particular way, though it is understood that such readiness changes through time, sometimes incrementally, sometimes in a revolutionary way, as perceptions and membership change. In SSM, our focus is on an organized set of principles, which guide action in trying to manage the real-world problem situations [6]. The basic shape of SSM's learning approach could simply be described as follows: Find out about the problem situation that has provoked concern; Select relevant concepts that may be integrated into different human activity systems; Create HAS models from the relevant accounts of purposeful activity; Use the models to question the real-world situation in a comparison phase. Tellingly, the debate initiated by the comparison normally entails the findings of accommodations between conflicting interests, that is to say, situations that may not satisfy everyone, but could still be lived with, enabling action to be taken. Oftentimes, the purpose of the debate is to collectively learn a way to possible changes (improvements) to the problem situations, by activating in the people involved, a learning cycle, which counts on their ability to articulate problems, to engage in collaboration, to appreciate multiple perspectives, to evaluate and to actively use their knowledge. It is worthwhile to notice that taking the purposeful action would itself change the situation, so that the whole cycle could begin again, and is in principle never ending. Likewise, through SSM, IS architects could provide help in articulating the requirements of specific IS support through operating the learning cycle from meanings to intentions to purposeful action.

3. ACTION RESEARCH AS THE FOUNDATION FOR SSM

From the discussion built up so far, we can understand that what is of concern in SSM is how to create a learning system to bring about improvements in areas of organizational concerns by activating in the people involved in the situation a learning cycle. The nature of this kind of research starts from the position that our knowledge of reality, including the domain of human action, is a social construction by human actors and this applies equally to researchers. In fact, this approach involves the researcher immersing oneself in a human situation and following it along whatever path it takes as it unfolds through time. Such an approach of research through interaction with real problem situations in an action-oriented mode, is called action research [28], which requires a readiness to use the experience itself as a research object about which lessons can be learned by

conscious reflection. In order to make this possible, probably most interpretive action researchers would accept the notion of Argyris et al [2] that the crucial elements in the approach are: a collaborative process between researchers and people in the situation; a process of critical inquiry; a focus on social practice; and a deliberate process of reflective learning. Actually, it is also absolutely essential to declare in advance an intellectual framework, which will be used in attempts to make sense of both the situation and the researcher's involvement in it. It is with reference to the declared framework that lessons can be defined. The action researcher thus has two hopes: that the framework will yield insights concerning the perceived problems which will lead to practical help in the situation; and that experiences of using the framework will enable the situation to be gradually improved. Without such a framework in terms of which what constitutes knowledge about the situation researched will be defined and expressed, it is sometimes difficult to distinguish researching from novel writing. Such a declared framework also allows those interested in the research and its outcomes to recover the process by which the results were obtained. Hence they can see how these arose and decide how believable they are. In the context of our current discussion about IS development, SSM has emerged as this intellectual framework of ideas.

4. SSM IN THE CREATION OF IS SUPPORT

The use of SSM in IS work always assumes that the purpose of creating an organized IS, is to serve real-world action; namely, organized provision of information is always linkable in principle to action [8, 12]: to deciding to do things, doing them, observing and recording the results – and then if necessary, modifying the deciding, doing and recording. Thus, designing an IS will require attention to the purposeful action which the IS serves, and hence to the meanings which make those particular actions meaningful and relevant to particular groups of actors in a particular situation. In other words, if we wish to create an appropriate IS in the exact sense of the phrase, we must first understand how the people in the situation conceptualize their world. We must find out the meanings they attribute to their perceptions of the world and hence understand which action in the world they regard as sensible purposeful action, and why. Having obtained that understanding we shall be in a position to build some of the purposeful models, and use them to stimulate debate aimed at defining some human activity systems (HAS) widely regarded by people within the situation as truly relevant to what they see as the required real-world action. Once an agreed truly relevant system has emerged, SSM requires us to ask of each activity in the model the following questions: What information would have to be available to enable someone to do this activity? From what source would it be obtained, in what form, with what frequency? Besides, we need to ask: What information would be generated by doing this activity? To whom should it go, in what form, with what frequency? In this way, an activity model may be converted into an information-flow model. Given the information-flow model, which is agreed to be a necessary feature of the situation studied, we may then ask: What data structures could embody the information categories that characterize such information flows? It is only then that we could start the design of a suitable information system, which should yield the information categories and information flows required by the structured set of activities regarded as truly relevant to the real-world action that is itself relevant according to the meanings which people in the situation attribute to their world as a result of their worldviews.

5. THE POM MODEL FOR IS DESIGN

According to [7, 9], the main role of an information system is that of a support function in an organizational setting. More specifically, the IS function is to support people taking purposeful action by indicating that the purposeful action can itself be expressed via some activity models, which are called the HAS models from the perspective of SSM [10, 11]. As an account of the context of IS work, we now consider a *process* model in which *organization meanings* are created; hence, the idea of the POM model. Briefly, there are seven elements in this model, worthy of our attention. Element 1 consists of people as individuals and as group members in the organization. Element 2 is the data-rich world people perceive selectively through their various taken-as-given assumptions. Element 3 is the organizational discourse in which meaning is created inter-subjectively. Element 4 denotes the attributions of meanings which yield the necessary information and knowledge through a very complex social process involving perhaps, persuasion and coercion. Element 5 represents the assemblies of related meanings, intentions and accommodations among conflicting interests. Element 6 represents the purposeful action, best thought of and expressed as a managing of relationships. Element 7 covers the formally organized information systems based on various information technologies (IT) which support organization members in conceptualizing their world, finding accommodations, forming intentions, and taking actions (elements 5 and 6). In fact, the POM model is conceived not as a descriptive account of the specific organization process, but a defensible device with a structure to make sense of life in real organizations and their provision of IS [29]. In a particular situation, the initial focus might, for example, be on action (element 6). It might be found to be inadequately supported by the IS in element 7, or it might be found that some boring action previously taken by people could now be automated. In another situation, a new development in IT (element 7) might cause a re-think of possible knowledge (element 4), intentions (element 5), and action (element 6). Meanwhile, from an IS architect's viewpoint, elements 1-5 describe the organizational context in which people create meanings and intentions; this leads to purposeful action being taken (element 6). Element 7 provides what would usually be described as information support. Thus, we have a process (elements 1-5) and a form of support (element 7) for a main outcome of that process, namely, the purposeful action (element 6), which people take as a result of the process. In general, the POM model should have pathways, which link all elements with one another; namely, there is no clear starting point for use of the model. However, the cycle might be dominated, in particular circumstances, by changes in (or changed perceptions of) any of the elements in the model.

6. A CONCEPT OF ORGANIZATION FOR IS

In trying to build a picture of organization capable of better supporting IS work, we start from the simple idea that an organization is an abstraction: it is a social collectivity concerned with some collective action, and there are associated social practices, which relate to this. But, what causes it, as an entity to exist? The answer is often the readiness of some people, usually many people, to talk and act as if there were a collective entity which could behave like a conscious being, with the ability to do things and then make them happen. This way of thinking about an organization is rather abstract, but it is necessary to make sense of what we all know from observation and experience. Indeed, to be a member of an organization is to have a contractual relationship with it, be it a legal contract of employment or a more complex psychological one, or both.

Typically, members of an organization are assumed to share an image of their organization in terms of its context, aims and objectives, its structures, processes and resources, and the measures of performance, which indicate whether or not the aims are being achieved. Within this framework, the members make their contributions of purposeful activities in pursuit of organizational objectives. Oftentimes, there are conceptualizations based on the interests and agendas of individuals, or sub-groups within the organizations as well as the overall declared, public, official account of the organization. The existence of these different interests and agendas mean that the organization as a whole, the collectivity, has constantly to seek accommodations between conflicting interests upon which action can be based. It cannot simply assume consensus. Rather, following Sir Geoffrey Vickers [27], the action should be expressed more richly as managing a changing set of relationships, through which the organization itself can hardly be static but is always responding to changing circumstances, both internal and external.

7. IMPLICATIONS FOR IS DEVELOPMENT

It is understood that the variety of real-world problems concerning IS work in an organizational setting, is enormous; however, it is useful to see them as lying within a spectrum which extends from 'hard' to 'soft'. There are a number of ways in which 'hard' and 'soft' can be defined, but the definition often cited is in terms of the degree of agreement about what the problem is among the particular population of individuals to whom the problem is of concern. For example, in the IS context, the hard approach often assumes that organizations are systems with information needs which IT can supply; the soft approach takes a process view of organizations and explores, using soft systems ideas [10, 13, 14] to structure action research, the way in which people in organizations inter-subjectively attribute meaning to their world and hence form a view on what information is relevant.

● *The Hard Strand of IS Work*

In the hard strand of IS work, an organization is often considered to be a socio-technical system whose managing comprises such activities as planning, organizing, staffing, coordinating, directing and controlling. As a member of such a social unit, the fundamental activity in problem solving is decision making, which is the process of identifying a problem, identifying alternative solutions, and choosing and implementing one of them [31]. Information systems have an important role in this; namely, they are there to support individual decision-making. In the words of Herbert Simon [25], problem solving through decision making proceeds by erecting goals, detecting differences between present situation and goal, finding the tools or processes that are relevant to reducing differences of these particular kinds, and applying these tools or processes. At this hard end of the IS problem spectrum, the method of solution essentially consists of the following stages, with stages 2 and 3 being plausibly iterative: 1) define the problem; 2) assemble the appropriate techniques; 3) use techniques to derive possible solutions; 4) select most suitable solution; and 5) implement the solution. This structured approach to conceiving IS support for organizational work, requires judgment in terms of a set of guidelines, which stimulate the intellectual process of analysis.

● *The Soft Strand of IS Work*

In the soft strand of IS work, an organization is often seen at core as a social process, essentially a conversational process in

which the world is interpreted in a particular way which legitimates shared actions and establishes shared norms and standards. There is no single body of work, which underlies the soft approach to IS, but the works of Sir Geoffrey Vickers [27] provide quite an interesting reference. For Vickers, organizational members set standards or norms rather than goals, and the focus on goals is replaced by one on managing relationships according to standards generated by previous history of the organization. Furthermore, the discussion and debate, which leads to action is one in which social action is based upon personal and collective sense making. Thereby, organizations are also regarded as networks of conversation or communicative exchanges in which commitments are generated [16, 30]. And IS support should be thought of as making such exchanges easier – the exchange support systems. Consequently, at the soft end of the IS problem spectrum, a strategy for IS support needs to be thought of, through which desirable change and organizational learning are often considered as the aims. Its stages of development could be characterized as follows with plausible iterations in stages 3, 4, and 5: 1) define the situation that has provoked concerns; 2) express the situation with different sets of concerns; 3) select concepts that may be relevant; 4) assemble concepts into an intellectual structure; 5) use this structure to explore the situation; 6) define changes to the situation as the problems to be tackled; and 7) implement the change processes.

It should be noted that in the ‘hard’ methodology, the techniques contain both the concepts and the structure, and they are often well defined, whereas in the ‘soft’ methodology, the concepts and the structure are independent and need to be specified separately. This may involve greater iteration around the stages mentioned as progress is made in learning about the situation. Thereby, we may consider methodology be it hard or soft, as a description of how to think about the process of analysis prior to doing it. The intellectual process of choosing concepts and deciding how they might be structured in a methodology is indeed concerned with thinking about how to think. This is itself an unusual process; however, it has the advantage that the resultant methodology is tailored to fit the particular situation, and the analyst know why they are doing what they are doing and how and what they are doing relates to what they will be doing next. Given the great variety of organizational design problems for IS support, considerable flexibility must exist in the concepts and structures available to the analysts. It is believed that unless the particular methodology is assembled as a conscious part of the analysis, it is very unlikely that the changes and solutions identified will represent an effective output of the analysis. More importantly, the specific methodology needs to be explicit in order to provide a defensible audit trail from recommendations back to initial assumptions and judgments. Consequently, thinking about how to think in designing IS support situated in the SSM framework is about planning the intellectual process to follow up with the design itself.

8. SYSTEMS THINKING AND SSM

As mentioned in the Introduction, one of the most obvious characteristics of human beings is our readiness to attribute meaning to what we observe and experience in the world outside ourselves. We have in our heads stocks of ideas by means of which we interpret the world. It seems clear that such ideas may come from two sources. They may be part of the genetic inheritance of mankind, namely, truly innate; or they may be built up as a result of our experience of the world. What

is being of interest is that we perceive the world through the filter of – or using the framework of – the ideas internal to us, but that the source of many or most of those ideas is in fact the perceived world outside. Thus, the world is continually interpreted using ideas whose source is ultimately the perceived world itself, in a process of mutual creation. As human beings, we enact this process every day, usually unconsciously. But, if we now add the thought that we are able consciously to think about our own mental processes, then the ideas we have can be used explicitly in some methodology to interpret perceived reality [11]. Indeed, this is an instance of holistic (or systems) thinking, implying the application of consciously organized thought, where the word ‘systems’ has been used to imply the concept of a whole entity, carrying such characteristics as a single whole (emergency and hierarchy), properties which have no meaning in terms of the parts of the whole [3, 12]. In systems thinking, accounts of wholes (or models) are formulated as holons [15, 20, 21], and these can be set against the perceived world, in order to learn about it. Within the systems movement [4, 11, 12], two schools of thought are complementary: that which takes the world to be holonic (hard systems thinking) and that which creates the process of enquiry as a holon (soft systems thinking), where the former assumes that the perceived world contains holons, and the latter takes the stance that the methodology (or the process of enquiry) can itself be created as a holon. More intuitively, the hard tradition (also called systematic thinking) assumes that systems (holons) exist in the world and can be engineered to achieve declared objectives, while the soft tradition (also called systemic thinking) assumes that the world is problematic, always more complex than any of our accounts of it, but the process of enquiry into the world can itself be engineered as a learning system (holon). It is this shift of systemicity from assuming systems to exist in the world to assuming that the process of enquiry into the world can be organized as a learning system, which defines the two tracks of systems thinking today. In the case of SSM, we have a cyclic methodology, which is itself a systemic (we would better say, holonic) process, one which within its procedures happens to make use of models of holons (the human activity systems). In everyday language, we say that SSM is systemic in two senses. Namely, it is a systemic process of enquiry, which happens to make use of ‘systems models’, each of which is conceived as a set of activities so connected as to make a purposeful whole.

9. THE ENQUIRING PROCESS THAT IS SSM

In examining real-world situations characterized by purposeful action, we can always think about the world in different ways, relate these concepts to our experience of the world and so form judgments, which can affect our intentions and, ultimately, our actions. In other words, with intentions, we can decide to do one thing rather than another, in light of how we are interpreting our situation. By purposeful action, we mean deliberate, decided, willed action, whether by an individual or by a group. And it would seem a good idea if such purposeful action deriving from intentions were based on experience-based knowledge rather than consisting merely of random thrashing about. In SSM, when a real-life problem situation arises, our typical approach of enquiry is to formulate some purposeful holons in the form of models of human activity systems (HAS), which it is hoped will be relevant to the real-world situation, and use them by setting them against perceptions of the real world in a process of comparison. That comparison could then initiate debate leading to a decision to take purposeful action to improve the part of real life, which is under scrutiny. This description of SSM

represents a stream of thinking and debate, which is essentially logic-driven. It uses the purposeful holons as logical machines, which can be used to question the real world. But in general, though logic has a part to play in human affairs, we need also to pay attention to the cultural aspects of human situations, the aspects that make them particularly human. In recent years, a second stream of enquiry, called the cultural stream, has been developed in SSM, which interacts with the logic-driven stream. The cultural stream basically comprises three examinations of the problem situation. The first looks at the intervention of the situation itself, by the so-called improvers of it, the users of SSM. The second examines the situation from the angle of social concerns. The third investigates the situation from the angle of political concerns, the power-based aspects of human affairs. It is clear that the logic-driven stream and the cultural stream will interact, each informing the other. Which selected relevant HAS models are actually found to be relevant to the people in the problem situation will tell us something about the culture we are immersed in. Also knowledge of that culture will help both in selection of potentially relevant systems and in delineation of changes which are culturally feasible. Here, it should be noted that what in the end turns out to be feasible will itself be affected by the learning generated by the project itself: human situations are hardly static. Besides, changes implemented as a result of the use of SSM certainly would change the problem situation as originally perceived, and in the new situation, the cycle of learning stimulated by the methodology can begin again. This is in principle never ending, and ending a system study is indeed an act of discretion. Overall, the aim of SSM is to take seriously the subjectivity, which is the crucial characteristic of human affairs, and to treat this subjectivity at least in a way that could be characterized by intellectual rigor.

10. REMARKS OF CONTINUING CHALLENGES IN IS WORK

In the previous sections, we examined the organizational context in which most work on information systems is performed, and discovered the idea of an organization to be subtler than we usually bother to acknowledge. Namely, many people increasingly feel that being a member of an organization is more like being part of a family than being the servant of a rational machine. For such people, social reality is constantly being constructed and reconstructed in a social process in which meanings are negotiated. For them, an organization does not exist as an independent entity but is part of sense making by a group of people engaged in dialogue, an essential characteristic of the learning organization [18, 19, 22, 24]. This makes the idea of information, and information system much more problematical, since information is now obviously related in some profound way to meaning attribution and sense making. Equally, this view will not automatically embrace would-be-scientific methods of investigation and research, based on systematic data collection aimed at hypothesis testing. It will seek alternative processes of inquiry in such areas as interpretative action research [1, 5, 15, 17]. If information is interpreted as what we get when human being attribute meaning to data in a particular context, then an information system (IS), in the full sense, will be a meaning attribution system in which people select certain data out of the mass potentially available and get them processed to make them meaningful in a particular context in order to support people who are engaged in purposeful action [9] Systems-thinking offers an important insight into this role of information systems, which are not created for their own sake, but should serve or support people

engaged in what for them is meaningful action. Consequently, the implications from soft system thinking are as follows: SSM can provide a way of conceptualizing the social processes in which, in a particular organizational context, a particular group of people can conceptualize their world and hence the purposeful action they wish to undertake. That provides the basis for ascertaining what information support is needed by those who undertake that action. Only then does it become appropriate to ask how modern information technology (IT) can help to provide that support, and to provide it. This is to see information systems as systems, which attribute meaning to selected data in which someone has an interest, by processing it – usually by means of IT – in a way which makes it meaningful to users of the system. It should also be of interest to note that meaning attribution can never be completely institutionalized, which will continue to make IS a rich and fascinating area of work. Meanwhile, although it is accepted that technological development may well create new possibilities which may lead to a re-thinking of organizational forms and processes, it is a fundamental proposition of systems thinking that in order to conceptualize, and so create a system which serves, it is first necessary to conceptualize that which is served, since the way the latter is thought of will dictate what would be necessary to serve or support it. The starting point of this work, then, is a re-thinking of what is entailed in providing informational support to purposeful action in the real world of organizations. From that, a clearer view emerges of the nature of information systems and IS development as a field of study.

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