A Political Model for the Co-operative Production of Knowledge in the Design process : the Shared Medical File (SMF)

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Abstract. Both managerial, economic and competitive concerns in corporate practices as well as questions raised about the production of applied sciences explain the development of the vast field of research relating to sciences and the process of design which has emerged over the last ten years. The design process is complex and depends on knowledge mobilized by actors with regard to an object being produced. Existing research has primarily focused its attention on one of the three variables generally studied (knowledge, actors or object in progress), thus running the risk of divided and devalued comprehension of the whole phenomenon of design.

We offer a model (called the political model of the cooperative production of knowledge) which intends to show how what is designed is strongly dependent on the knowledge mobilized and produced by a group with various boundaries but considered as a democratic place (where *democratic* is understood in general term to describe a politicized place according to the political perspective in organization theory, thus as a place of conflict, compromise, of avoidance… [11]) where fundamental stakes around the object in production are raised. We then see the expertise as a creative political and opened-debate process of collective intelligence. We will propose an illustration of our reflection around the Shared Medical File (SMF), which represents a main but recent stake and object of interest for a sector being fully restructured.

1. THEORICAL BACKGROUND AND QUESTIONS

The innovation process involves designing and developing new products and services. The major process in innovation is the process of design and the development of objects, products or material or non-material systems. The activity of design however is still little known and the process of design remains difficult to model, particularly when we consider specific application fields. Several descriptions of the design process have been proposed. They are still too often a more or less faithful adaptation of the model of applied sciences. However, over the last few years, other approaches of design have developed which are based on the cognitive process, conversational practices, or on emerging phenomena of self-organization.

These rest on the realistic postulate that the identity of the actors involved in the design process is given at the beginning of the process and that much of the knowledge produced during the design process results from knowledge available, from characteristics of the world or constraints resulting from modeling and not from the very relative configurations of political patterns between the involved actors.

We adopt a pluralistic (or radical) perspective of organizations, by opposition to a rational or unitary perspective according to which an organization is considered as one actor with one set of coherent interests and beliefs [3].

However, the current context is characterized by a real rise in uncertainty, risks of all kinds[3] and controversies in professional knowledge [18], both in the sciences and in industry and technologies. In some fields, knowledge is passing through a crisis of legitimacy which is all the more strong since scientists in related disciplines and in so-called civil society have decided to take part in debates, thus amplifying them.

The design process is also concerned by these debates. The products of the design sciences relate to objects or systems built by human beings for human use. For this reason, the successful development of these systems involves taking into account the human aspects (dimensions) related to their design and their widespread use in society. These human aspects bring essentially into question the political dimension of the activities of design. What is political in the context of design ? It relates to what it is good and right from the point of view of all the interested parties (considering interested parties as actors who have interests to express and defend [9]). This definition is dependent on the relations of power which exist between the various actors and which become the basis for their collective and organized action. This definition is also dependent on the various representations of contexts and actions the actors mobilize during discussions and which lead to "negociated belief structure" [19] [4].

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[3] This situation is related to the expansion of "biosocial " techniques (food, health, environment...) and to the extent of the associated collective risks ("mad cow", genetic engineering, pollution...) [6].

[4] According to Donnellon, Gray and Bougon [5:53], « organizational members have two alternative sets of organizing tools at their disposal : (1) shared meanings and (2) shared communication mechanisms. ». We do not adopt the position of Weick [20] for whom « sharing of beliefs is not essential to the perpetuation of interlocked behaviors » [20 : 98] according to his concept of *double interaction*. We recognize that organizational members share some commun representations (social or collective representations, [16], even if what they share is not numerous.

This power relationship is based on the respective resources, information, or formal position inside organizations [15] available to the various actors engaged in the design situation. This means on the one hand that the potential participants in the design situation are not necessarily all "actors" in the beginning; and, on the other hand, that all actors do not have the same strategic capacities given their situation. In the concrete activities of design, this takes the form of a hierarchy in the categories of knowledge and then a hierarchy in roles and status : with on one side skilled actors, who mobilize specialized, standardized, sometimes certified knowledge, and on the other side unskilled (profane) actors who take part directly or indirectly in the effort of design or who will be impacted by the object or system designed.

The design process is also dependent on what degree the group of designers is open to others. In industrial projects, this openness can take the form of taking into account manufacturers, customers and any other actor who was once excluded from the traditional approach of design (operators, sales, maintenance or after-sales staff). This is one of the stakes of converging engineering : since members inside groups use various political processes of influence so as to make the group adopt an agreement[5], how to make a success of the identification and integration of new actors to improve the process of design and its impact on the object designed?

It is on the basis of these points that this article proposes a political model of design, by raising questions on two variables which are the production of knowledge and the composition of the group, and which play a role during activities of design. According to the political metaphor, the article seeks to better understand the design of objects that we call " constitutional objects ", because they have a dual political status (sanctioning of an agreement on the basis of facts resulting from a communication process) and a cognitive status (a framing, an action plan, a representation of these facts or more precisely the representation of knowledge resulting from an epistemic process).

The aim of this article is to propose a political model of the design process around two dimensions which are fundamental for us : knowledge management and management of the collective. We adopt a managerial point of view and then wish to produce methods of assistance to the project managers and originators.

We will illustrate our modeling of the process of design using examples from software engineering, the design of information systems and a field currently under study which is the Shared Medical File (SMF) in the field of Telemedicine.

2. A POLITICAL MODEL OF THE CO-PRODUCTION OF KNOWLEDGE

A presentation of the two axes of the model (§ 2.1) will enable us to propose a schematic of this model (§ 2.2).

2.1 The two axes of the political model of design

We propose a political model for the cooperative production of knowledge, based on two axes :
- the first axis is concerned with the field and the degree of cooperation between specialists and laymen in the production of knowledge : from a simple unilateral application of universal knowledge to the cooperative formulation of what counts as a problem (problem setting).
- the second axis is concerned with the degree of structuring and legitimacy of the collectives engaged in the collective action : from the restricted team of originators producing an "enclosed" but legitimate knowledge to an extended collective uniting all the stakeholders[6], including emergent ones (external customers, trade union organizations, users, suppliers, partners…) [7].

On the axis of the production of knowledge, the principal dichotomy involves the division between *specialists* (or skilled people) and *laymen*. Along this axis, the joint production of knowledge can take four distinct forms (or four situations) :
- on a first level, cooperation does not exist. The object to be designed (artifact, product, service, component, decision...) results essentially from the application of universal knowledge by the specialists[8]. The production of knowledge concerns the originators exclusively.
- on a second level, cooperation between specialists and laymen is limited to the adaptation of the object designed by universal knowledge to the particularities of the contexts of application. The originators only marginally integrate some knowledge which is specific to the needs" and use of the objects.
- on a third level, cooperation is characterized by the opening of the collective of originators to all skills and knowledge, making it possible to enrich the knowledge to be produced in the design of the object within the framework of a given problem (cooperative problem-solving). In software engineering, RAD/JAD methodologies could be classified on this level.
- on the last level finally, cooperation extends to the identification, formulation and negotiation of the problem involved in the production of the new knowledge (cooperative problem-setting). This level presupposes the construction of a

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[5] Mintzberg [9] has identified 13 political processes (the construction of alliances, the construction of empires, the rivality beween two sides, specialized competence …) inside groups or organizations. More synthetically, Moscovici and Doise [13] propose 3 processes named conformity, normalisation and polarization. We could add another process related to enactment : adopting a 2th order definition of a problem in order to escape misunderstandings and unsuccessfull debates [21].

[6] The stakeholders are the individuals or the groups who depend on the organization to achieve their own goals and on which the organization also depends. The stakeholders of a firm or a project are often identified thanks to cartographies based on matrices of power/interest [10], which confirms the importance of political models of design.

[7] This axis should be related to work on the socio-dynamics of groups involved in the management of complex projects. Such work often correlates energy spent by the potential actors of a project (high, average, low) with the degree of synergy or else antagonism they are likely to express on the project. The art of project management would then involve maintaining and then widening the base of synergistic actors and controlling and circumventing antagonistic actors.

[8] Universal knowledge is a form of knowledge obtained by codification. Codification of knowledge is a conversion process of knowledge into message, wich can then be manipulated like information. Codification of knowledge is based on prerequisite of fundamentals and applided sciences. Knowledge is considered "universal" for three reasons : it is now freed from its link to a person (reification); its use is very little dependant from its context (decontextualization); its structure has in principle been optimized (rationalization). On the contrary, knowledge is considered to be "general" if it comes out of a political process of negociation rather than out of a technicist process of modelling. General knowledge deals with singularity of phenomenoms rather than search for regularity.

"space of intersubjectivity" which is not limited to the cognitive treatment of the object being designed (proposal for solutions, evaluations, goals to continue) but covers also axiological, ethical and moral dimensions. This level of cooperation results in the manufacture of general knowledge (by integration and rearticulation of local specificities) rather than universal knowledge (decontextualized and standardized).

The development of a dialogue between the various stakeholders is related to the increase in situations of uncertainty and risk. The options taken by the various groups become the subject of controversies (on the stakes, impacts, adopted solutions). These controversies involve an increasing exploration of the situation : actors and groups concerned (interest, identity, capacity...), various problems and links between them, solutions and feasible options. By integrating a plurality of points of view, requests and expectations, these controversies thus lead to the production of new knowledge through various phenomena of learning. Such a widened discussion shows that specialists and laymen and more generally each category of actor holds specific knowledge, involving diagnosis of the situation, interpretation of facts and the range of possible solutions. There is *in fine* a collective benefit which is the improvement of mutual knowledge.

On the second axis related to the structuring of collectives (or formation of groups), the main dichotomy rests on the distinction between **instituted groups** and **emergent actors**. Along this axis, the joint production of the collective can also take four distinct forms :
-   on a first level, the groups of design are already formed. There is no place for actors or groups of actors whose identity, functions and methods of intervention during the design have not already been perfectly defined. The stakeholders that might be concerned in fact delegate their rights of expression to these instituted representatives. In software engineering, this is typically the case of representatives of users who take part in Users Committees of the project in order to contribute to the design of the future system, to prepare its implementation, and to take part in its launch.
-   on a second level, often related to the rise of controversies or dissatisfaction surrounding the design of the object, emergent groups appear whose identity, composition and borders are specified only gradually. In this phase, the essence of the difficulty for each group revolves around the constitution of a specific identity and means to be heard. In sophisticated stages of development in projects characterized by strong relational complexity, the stake rests precisely on the redefinition of the field of the actors which is no longer given, and on the comprehension of the socio-dynamics which drive them.
-   on a third level, emergent groups initiate a dialogue with other emergent or already constituted groups. This third level is characterized by strong interactions and significant communication between the various groups. In terms of piloting, this stage is often most critical since it leads to the structuring of a " public opinion " whose points of view start to be articulated and which crystallize many conflicts within the process of design. This is why pilots often then begin to " deconstruct" the position of the actors by proposing for instance another formulation of the original project.
-   a fourth level finally sees a new collective being born which has known how to carry out the necessary compromises and adjustments with all the stakeholders. We call these groups "extended collectives" (because of their dual sense of the variety of mobilized knowledge and the variety of interested parties taken into account); these groups are no longer limited

to a mere aggregation of individuals or to already constituted groups but result from a political process of formation (in the sense of the formation of a political group).

2.2 The political model of design and the organization of collective design

We represent the political model of design with the following diagram :
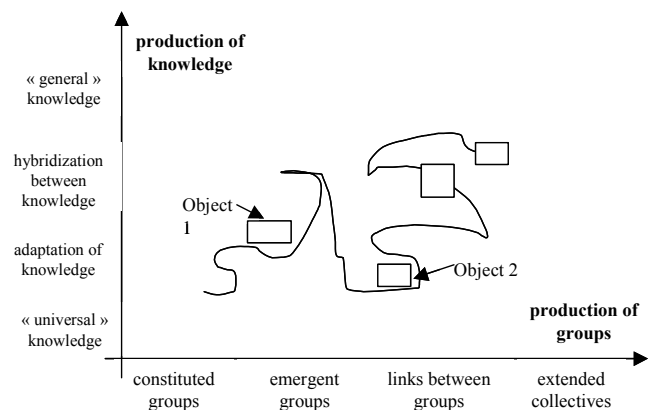

Figure 1. Political Model of Design

This model makes it possible to explore the multiple possible configurations of the process of design, keeping in mind that the two variables suggested can be analyzed both in an asynchronous and synchronous way. Thus it is possible to move along the axis of the production of knowledge without altering the modes of constitution of the groups. In the same way, it is possible to move on the axis of the composition of the groups without altering the methods of organization of the production of knowledge. The interdependence between the two variables will however be very strong in situations of design where uncertainty, risks or controversy between the stakeholders will be determining elements in the design situation.

The political path charted between the idea or the request and the finally designed object will depend on many devices conceived to better integrate the points of view of the actors involved in the design and to thus support the production of shared knowledge.

Some of these mechanisms are located at the bottom and on the left of the model whereas others, which are more participative, are on top and on the right of the model. Muller and Ali [14] have established a recent theoretical framework for the participative steps which can concern various stages of the life cycle of software.

Among the most frequent devices, we can mention benchmarking (which sometimes makes it possible to justify in advance, without debate, the choice of one data-processing solution over another), investigation of user-satisfaction, calling on experts like ergonomicists, trainers or managers in order to adapt a disfunctional system to a particular context of use, the installation

of interface roles between stakeholders (correspondents, project managers-users...), the creation of new roles (like monitoring of information systems or CKO's to manage knowledge), participative techniques of design (like RAD), the direct set-up of integrated software packages of management which make it possible to implement an international professional standard without having to define the specific needs of the firm, the installation of pilot projects in order to try out a technology[9] and finally the development of levels of description (or abstraction) in the system to reduce the semantic distance between the language of the users and the conceptual language of the dataprocessing specialists (for example the hierarchy of the levels "external-conceptual-internal" in methods of design). We can also mention a significant recent trend which aims at defining governance of information systems in firms[10].

Each one of these steps presents strong points but also flaws. What is thus important is to be able to establish criteria to evaluate the various design stages.

These criteria must be consistent with the model presented, i.e. explicitly taking into account the axis of the production of knowledge and the axis of the formation and mobilization of the groups. These criteria can be structured around three dimensions :
- degree of involvement,
- level of implementation,
- induced learning.

Areas	Criteria
Degree of involvement	Intensity (participation of non-specialists)
	Opening (in terms of diversity of the consulted groups)
	Quality of contributions
Level of implementation	Technical conditions of access to the discussion
	Transparency and "traceability" of argumentative exchanges
	Clarity of the rules for organizing debates
Induced learning	Shared expertise
	Interactivity between participants

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[9] It is often necessary to recreate on the "outside" (in the organization, a department...) the conditions of the environment of design ("interior") where the system was developed. This results in the installation of pilot projects, which are contexts generally furthest away from the normal operation and routines of the company, where one has gathered the most "advanced" and most desirous users of the product, where nothing is left to chance in term of training, and where the project team is most motivated. This is what explains the frequent difficulties of deployment in departments which were not pilot environments, and which can lead in certain projects to the abandoning of the installation.

[10] The governance of a company refers to the whole of its practices, structures and the procedures which specify the division of the capacity, the distribution of the responsibilities and the modes for control between the various participating components of an organization. The structure of governance establishes which interests the organization should be dedicated to and how its objectives and its priorities should be selected [8: 231-232]. The CIGREF, a french trade association representing the Management Departments of Information systems from the principal major French groups registers the "control mechanism of information systems in the strategy of the company" as the nodal point of its new associative project « CIGREF 2005" (doc. Ronéo). It is known as that "the control mechanisms of information systems raises the question of 'how the systems of information are controlled are directed' ".

Figure 2. Procedures for the participative design

This model seeks to describe one of the dynamics at work in design processes. Its objective is to understand how to better control dynamic cooperative production of knowledge and take into account stakeholders within the activities of the design of products and services. The fact of design is seen here as a political process and design as a political activity itself aiming at producing an object as a " constitution " [11] around a dual compromise : closure / openness (groups) - universal/general (knowledge).

But process dynamics is complex, iterative, unforeseeable and all the more so since the object of the process is " something " which must pass from the status of an idea to the status of an object of work and then to a final product containing knowledge on itself and on its design context.

This object to be constructed thus also becomes an object in the process of being constructed and, as such, incorporates and crystallizes positions, divergences or agreements at critical stages in the design process. The object to be produced is thus also a constituting object of the process.

Its importance is crucial in our political model of design because we also make the assumption that this political model of design must more precisely give an account of " objects " as processes, resources and results of the cooperative activity of design at a given time. We therefore propose to call these objects "constitutional objects"[12].

3. CONSTITUTIONAL OBJECTS

We refer here in spirit to the work of S. L Star [17] on "boundary objects" where it is shown that the coordination of heterogeneous actors can be carried out thanks to the implementation of "boundary objects", which are simultaneously adaptable to various points of view and sufficiently robust to maintain their identity through them. We also integrate the work of Jeantet, Tiger, Vinck and Tichkiewitch [7] on coordination by intermediate objects in integrated teams of product design. Lastly, the contribution of E. Wenger [22] seems to us closest to the political vision we wish to explore with regard to the capacity of individuals to effectively connect their knowledge with those of others in communities of practice (cognitive synchronization).

In Wenger's work as in Star's work, connections between the various communities can be ensured by objects called " boundary objects ". All objects or artifacts which belong to several practices can play the role of boundary objects. These artifacts are seen as "reifieid" elements, which can be concrete objects (prototype, management tools, metric, version of a software, model, etc.) or symbolic systems (words of the language for example). In Wenger's

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[11] In the political sense of the term.

[12] Constitution ("law ", " institution"). Action to establish legally (Jur.). Way in which a thing is made up (16th century) : arrangement, composition, provision, form, organization, structure, texture. All the somatic and psychological congenital characteristics of an individual. Character, complexion, conformation, personality, temperament. " Creation " (of the world) (13th century). Action to constitute a unit; its result. Composition, construction, creation, construction, development, foundation, formation, organization. (1683) Charter, fundamental texts which determine the shape of the government of a country. Fundamental law. Constitutional : who constitutes, forms the essence of something.

work, reification indicates a process which involves giving form to an experiment by producing artifacts which solidify the experiment to some extent, at least for a time. It can take the form of an abstracted concept, tools, symbols, stories or words. Reification thus covers a great number of processes like manufacturing, design, representation, naming , description, perception, etc. Reification to some extent compensates for the contextual and evanescent character of the participation. The duality of participation/reification and its correct balance are the constituent conditions of collective practices.

For Wenger, boundary objects are characterized by four dimensions :
- *abstraction* : the general character of the boundary object leads to a certain level of abstraction.
- *versatility* : the object can be used for several activities, therefore several practices.
- *modularity* : the object consists of several parts mobilized in various situations according to the actors involved.
- *standardization* : the information contained in a boundary object must be in a directly interpretable form to be used locally.

These characteristics are relevant. However, they mainly concern mechanisms which allow for the constitution of objects, and less those concerning their use in instituted collective practices. However, what interests us in a context of design is the identification of the properties which explain the emergence, organization and functionality of such objects, rather than certain characteristics of use. If one wants to better understand the phenomena of constitution, we must propose a representation of the same criteria, but from the point of view of their genesis.

By using the theoretical background of social psychology relating to social representations ([1], [2], [12]), we propose to conceptualize constitutional objects around four variables corresponding to the variables of Wenger. We also indicate some examples of dimensions to be taken into account.

Areas	Dimensions
Structure (**abstraction**)	elements, hierarchization, dispersion of information, complexity, public dimension, focusing, autonomy of the object…
Functions (**versatility**)	interpretation, preparation for action, support for consensus, contribution to conceptualization, contribution to collaboration, contribution to argument (inferential pressure), justification of behaviours and standpoints...
Actors (**modularity**)	relationship between objects and positions, statutes and configurations of groups (individual and collective identity) and articulation with concrete social practices (concretization, anchoring...)
Normativity (**standardization**)	orientation of behaviours, legitimization, constitution and reinforcement of identity, standardization and conformisation…

Figure 3. Characterization of constitutional objects in design

4. THE SHARED MEDICAL FILE (SMF)

We will illustrate the first elements of the political model of cooperative design through the case of the Shared Medical File, which is a significant topic in the vast sector of telecare (being currently overhauled[13]). This essential object in the economy of e-health is important within the framework of our model under construction in order to question the role of new (and often challenged) actors in the process of design, and the boundary between profane and skilled knowledge.

The sector of health has been undergoing reorganization for at least 15 years now and the roles of actors and institutions have also been redefined so as to answer two major challenges : how to reconcile costs and quality ? How to handle the increasing complexity of situations and tools for diagnoses and modes of intervention and technologies for patient care ?

The sector is being reorganized mainly around the general model of the Network[14], which is presented as allowing a better control of costs, a mutualisation of expertise in favour of a more systemic approach to patient care (instead of a stepbystep approach to the patient with the risk of expensive redundancies in care or weak comprehension of disease, etc.), and especially greater autonomy for the patient, namely home-care made possible by technologies of communication (tele-monitoring, tele-diagnosis, webcam, etc.).

The Shared Medical File (SMF[15]) is one of the main elements in the implementation of a network between health partners, and for this reason it involves significant stakes : enriched medical expertise, collective and overall management of the patient, personalization of care and autonomy for the patient (who can remain at home); formalization of knowledge on patients and on medical practices, etc.[16]

[13] Telecare refers to all the applications of ICT's to the field of health and covers applications as varied as telemedicine, remote medical monitoring, teletraining, remote or collective diagnosis and all that concerns medical procedures (and pre- medical or post-medical procedures) that are computer- aided, remote, with data banks, etc. as well as electronic markets for the purchase of specific materials.... Generally, for a better knowledge of the emergent media in medical practices, see [4].

[14] Network or mode of horizontal coordination between actors; it is this term which is used to indicate the programmes of reorganization around care; we take it for granted since it is not the object of this article to define it more precisely; let us note however that there is a large variety of networks : City Hospital network for outpatient post-operative home-care in, networks of care around a particular pathology (diabetes, AIDS...) and networks of care centered on the person (network of maintenance of old people at home). This large variety has risen both from the objects of these networks as well as from the very wide variety of regulatory devices and experiments undertaken for over 20 years (when these networks were set up by associations, starting from observations on the ground and often in a largely non-formalized way).

[15] Or computerized medical File, because this last circulates more and more between the interested parties on the Internet (Intranet of hospital, extranet of a network) and more generally on the Internet or Medical Social Network (RSS designed and exploited at the request of the State by Cegetel; the RSS has been brought into service since 1998 and allows the circulation of the Electronic Files of Care between doctors and health insurance services; tools such as the Carte Vital for the patient or the Card of of Health Professionals allow a secure registering of signatures and entries on the RSS, and thus a secure registering of data relating to the Patient, under the terms of the principles on medical secrecy.

[16] The SMF can also be defined as a specific Information System around which doctors interact because they have to exchange information about the same patients. However, Information System has often been designed in accordance with the traditional hierarchical structure of hospitals and other care organizations. A more decentralized view in management and in Information System, as offered by CSCW backgroung, could improve

But the SMF is also the subject of important questions : what happens to medical secrecy, the main ethical principle in medical practices[17] or the share between private and public life ? How to ensure security of circulating or stored information ? Will it be possible to maintain the principle of continuity of care between the various components which handle their own technologies[18] ? What are the long-term costs of these information systems ?

The SMF is thus at the same time an architecture and inserted piece of knowledge which relates to the operation of the network and the patients concerned. There does not yet exist a standard model. Like any innovation in its emergent phase, one can observe an expansion of experiments (succeeding with more or less finalized SMF's) which come either from the field, or from the regulatory system, and which bring into play many actors and various carriers of different interests and stakes.

The study of this expansion shows how much the SMF being designed depends at the same time on stakeholders allowed to take part in the work of design and on their carrying scientific or profane knowledge. However its still very ambivalent status, since it calls deeply into question the sector in its entirety, also questions the productive or interesting properties of the SMF seen as a "constitutional object" in allowing the process of design to go forward.

We will develop these points in two distinct cases : the situation of design as managed by the State and as managed by various operational actors (in the field).

Experiments managed by the State reproduce the traditional diagrams of the fragmented and partitioned organization of the health sector, which is itself the object of reform in the network approach . Openness to new actors is problematic here : the patient is only too often is disregarded as a major actor while his/her needs and expectations might well be integrated in the process of design of the SMF. In fact, the patient's unskilled approaches are necessarily devalued and regarded as unscientific because produced (by definition) outside the scientific community as controlled by the State (ministries, universities, laboratories…)[19].

This is particularly important since to admit the legitimate patient as bearing knowledge could offer a springboard to many other claims, such as : what is the valorization and recognition of the role of nurses in the production and follow-up of care ? What role and responsibility is shared between the Doctor (in the broad sense), the patient and his/her family ?

Indeed, more concretely, there is the question of representation of the patient. Who, out of associations consisted assigned by the State or emerging from the field (associations of consumers for ex.) could claim to speak for the patient and his/her family ?

Debates on networks and the SMF are still too recent. The process of design runs up against the slowness of the constitution of intermediate bodies or new representative bodies in a political and professional play strongly resistant to innovations. To find the right representative body and to legitimize it in its role is not easy and can take time.

On the other hand, financial actors (Medical insurance or medical benefit funds) can see their role over-valued since they are seen as legitimizing "the network approach" recommended by the State, which is carried out in the name of cost control. Such experiments thus tend to reproduce old legitimacies and models. They remain closed to new debates relating to the patient whom they want to give greater responsibility (principle of autonomy) but no role in discussions, since no actor representing patients takes part in the design of the SMF.

Thus, this process of design internalizes social debates which should make development of the SMF an appropriate forum for a complete recasting of the health system, but which block it for the same reasons, because of their importance.

Emergent experiments from the ground also carry political questions. They often take place in partitioned and fragmented organisational contexts whose operation in networks is too recent to be widely accepted. Thus, the SMF which tends to be designed is much more the result of problems which each participant wishes to see regulated rather than the result of a vast project of reorganization of health care services.

The partitioned structure of the health system has hardly allowed the emergence of common knowledge and a common will to work in a horizontal way between internal services within an institution or between several institutions. Ignorance of the real roles of actors makes it very difficult to constitute an initial group for the design of an SMF. The risk is thus that the final SMF is a disjointed collection of hybrid pieces of knowledge which is not operational.

In the two cases rapidly approached, contributors of technology (ICT engineering...) or promoters (such as laboratories closely involved in the processes of teletraining and telemedicine) are easily able to make a place for themselves in design groups to better control cooperation and knowledge used during the discussions. Their importance is evident[20] but is exacerbated when the circumstances pointed out above prevent other actors from playing their roles.

Let us return to our model to understand the difficulties of design of an SMF. In both cases of design, what causes problems is openness to various actors, to different knowledge (or the level of hybridization according to our model) and to new collectives instituted or recognized as representatives and being able to act as representatives of new interests (or the level of links between the groups). Moreover this openness does not relate to the same dimensions which characterize the SMF as a constitutional object.

Circle A represents the process initiated by the State, which is confronted with the difficulties of opening up to new groups and new forms of knowledge. Circle B represents the process initiated by operational actors, who are confronted with the difficulties of forming a universal body of knowledge while starting with hybrid knowledge.

In the first situation of design (circle A), the difficulty rises from the near impossibility for the State to admit the hybridization of knowledge. This refusal rises doubtless from a hard vision of what is seen as the normative nature of the SMF (or up to what point the State can question through the SMF the legitimacy of health institutions , quality standards of health production, etc.). One can think that when this hybridization is allowed, openness to new representatives and contributors of knowledge will be possible.

The reverse is found in the second situation (circle B). What raises problems here is the opportunities and organisational possibilities of connections between a multitude of groups and institutions that do not know how to work together or which are unaware of themselves. Here it would seem that the critical dimension of the SMF is that relating to its functions. The degree of versatility is equal only to the degree of diversity of the participating parts. However, we have said how much the experiments evoked here are often pragmatic and are discovered only as they come up while the SMF as constitutional object is processed. What is thus missing is a project (in the sense of a teleological vision of a complex process during its own process) relating to the functions of the SMF. One can in the same way think that when this hybridization of the parts is allowed, the coherent integration of disparate bodies of knowledge will be more possible.
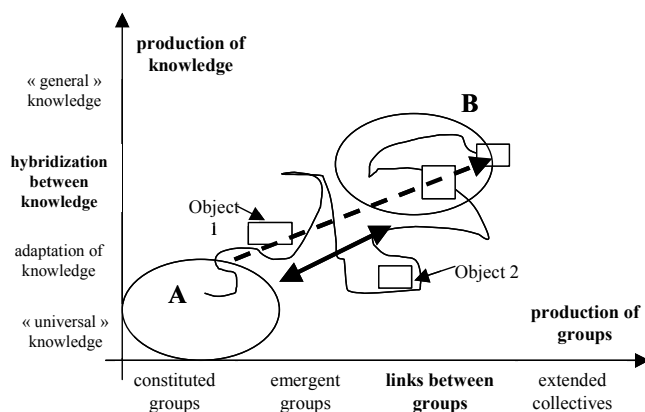

Figure 4. Spatial design of an SMF

Two particular levels of variables on each axis thus appear critical. This could militate for mixed approaches of the Up-Down and Bottom-Up type to allow learning from what emerges in each situation (full arrow connecting the two circles on the drawing).

Lastly, the movement of a mixed design process which learns from experiments initiated by the State and by instituted parts as well as those initiated by more operational parts could depend on the quality of the SMF as a constitutional object or on its structure, its functions, the actors and the degree to which it is normative.

Current experiments are still too very few to develop this point precisely.

5. CONCLUSION

Project management can take support from the political model presented in this paper. From the managerial point of view which is ours, the dialogue between cooperation and produced knowledge

will interest the manager for two reasons :

- it can aim at piloting, improvement or control of a process of collaborative work and then be useful in the production of knowledge as a tool to act on cooperation;
- or on the contrary, it can aim at knowledge management or facilitate the emergence and capitalization of emergent knowledge during the design process and then act on the composition of the working group as an independent variable.

In the first case, the question is to know which knowledge to prioritize in supporting the development of cooperative work : when (in the beginning or during the process) is it necessary to introduce disorder through knowledge into a group, and would this be done for its benefit, or with the risk of blocking it, or else to even support its destruction ? Is it better to have an agreement on poor knowledge (because coming from consensus) or to promote constructive divergences ?

In the other case, the question relates to the structure of the working group. A previously defined structure, according to rational criteria of professional skills, even of political positions (in the sense of the stances of an actor) can have an economic goal (refusal of " organizational slack") or the goal of imposing order (to be pressed on a team known in advance).

But this has two weaknesses : (1) only the incidents (problems, incomprehension, tensions between the members) already known or indexed in a kind of repertory of the type "good practices" or "guide of the procedures" will be accepted and then handled[21]; (2) this mobilization of knowledge makes it difficult to bring out new knowledge.

To conclude on the two goals from a managerial point of view (to act on knowledge for better cooperation, or act on the group for better production of knowledge), the manager can easily be required to confront the risk of impoverishment :
- impoverishment of the knowledge produced in the name of the forced search for a consensus,
- impoverishment of cooperative work in the name of cohesion or availability of mobilized knowledge.

The question of knowing if a group involved in design must naturally seek a consensus for progress would merit further development.

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[21] In other words, the actors will agree to take them into account and resolve them. It is not the appearance of a problem which counts then in the progression of a work of design but the way in which this incident can be located, and understood out of a list of already existing cases, or even transposed for discussion within the design group.

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