

A political model of co-operative production of knowledge in design process : the Shared Medical File (SMF)

Eddie Soulier

Enseignant chercheur, UTT
Membre du laboratoire Tech-CICO, UTT
eddie.soulier@utt.fr

Corinne Grenier

Enseignante chercheur, groupe ESC Troyes
Membre du laboratoire Tech-CICO, UTT
Cgrenier@esc-troyes.fr

Summary

Both managerial, economic and competitive concerns in firms practices as well as questioning about the production of sciences applied explain the development of the vast field of research relating to sciences and the process of design which emerged since ten years. The design process is complex and rests on the knowledge mobilized by actors for an object to produce.

The various work existing have especially put their attention on one of the three variables generally studied (knowledge, actors or object in progress), with the risk of a divided and devalued comprehension of the whole phenomenon of design.

We propose a model (called political model of co-operative production of knowledge) which intends to show how what is conceived is strongly dependent on the knowledge mobilized and produced by a group with various boundaries, but considered as a democratic place (thus as a place of conflict, compromise, of avoidance...) where fundamental stakes around the object in constitution are raised. We conceive then the expertise like a creative democratic 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 in full restructuring.

1. Theoretical background and questions

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

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

However, the current context is characterized by a real rise of uncertainty, risks of any nature¹ and controversies on the professional knowledge (Schön, 1983) as well in the field of sciences as in that of industry and technologies. In some fields, the knowledge pass through a crisis of legitimacy all the more strong that the scientists of related disciplines and the so-called civil society decide to take part in debates, amplifying them consequently.

The design is also concerned by these debates. The products of sciences of the design relate to objects or systems built by the men and for a human use. For this reason, the successful development of these systems rests on taking into account of the human aspects (dimensions) related to their design and their diffusion in the society. These human aspects put essentially in question the political dimension of the activities of design. What the policy in the contexts of design is ? It relates to what it is good and right to make from the point of view of the whole of the interested parties. This definition is in addition dependent on the relations of power which exist between the various actors like the basis for the collective and organized action.

This power relation is based on the respective resources available to the various actors engaged in the situation of design. That means on the one hand that the potential participants in the situation of design are not therefore all "actors" at the beginning ; and on the other hand that the actors do not have the same strategic capacities, because of their situation. In the concrete activities of design, this takes the form of hierarchy in the categories of knowledge and, then a hierarchy of roles and status : on a 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 the conceived system.

The design process is also dependent on what degree the group of designer is open to the others. In industrial projects, this overture can take the form of taking into account of the manufacturers, customers, and of any other actor who were excluded before from the traditional approach of design process (operators, salors, personnel of maintenance or after-sales). It is there one of the stakes of converging engineering : how to make a success of the identification and the integration of new actors to improve the process of design and its result in the object conceived ?

From that, this article proposes a political model of design, by questioning us on two variables which are the production of knowledge and the composition of the group, which play a role during activities of design. According to the political metaphor, the article seeks to better understand the design of the objects that we call " constitutional objects ", because they have a double political status (sanction of an agreement on 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 a knowledge resulting from an epistemic process).

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

¹ This situation is related on the expansion of the "biosociales " techniques (food, health, environment...) and to the extent of the associated collective risks ("insane cow ", genetic engineering, pollution...) (Hatchuel, 2001).

We will illustrate our modeling of the process of design for examples resulting from software engineering, the design of information systems and a field in the course of steady which is the Shared Medical File " (SMF) in the field of Telemedecine.

2. A political model of co-production of knowledge

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

2.1 The two axes of the political model of design

We propose a political model of co-operative production of knowledge, which is based on two axes :

- the first axis is concerned with the field and the degree of co-operation between specialists and laymen in the production of knowledge : from a simple unilateral application of universal knowledge to the co-operative formulation of what counts as 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 gathering all the stakeholders ², even those which are emergent (external customers, trade-union organizations, users, suppliers, partners...) ³.

On the axis of the production of the knowledge initially, the principal dichotomy rests on the cut between specialists (or skilled men) and laymen. Along this axis, the joint production of knowledge can take four distinct forms (or four situations) :

- on a first level, the co-operation does not exist. The object to be conceived (artifact, produced, service, component, decision...) results essentially from the application of universal knowledge by the specialists. The production of knowledge concerns the originators exclusively.
- on a second level, the co-operation between specialists and laymen is limited to the adaptation of the object designed by the universal knowledge to the particularisms of the contexts of application. The originators integrate only marginally some knowledge which are specific to the " needs " and to of the objects.
- on a third level, the co-operation is characterized by the opening of the collective of originators to all competences 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, the steps of the type RAD/JAD could be classified on this level.

² 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 power/interest (Mendelow, 81), which confirms the interest of the political models of design.

³ This axis is to be brought closer work of socio-dynamics of groups applied to the management of complex projects. This work often crosses the energy level spent by the potential actors of a project (raised, average, weak) with the degree of synergy or unlike antagonism that those are likely to express on this project. The art of the management of project would then consist to maintain then to widen the base the synergistic actors and to control and circumvent the antagonistic actors.

- on the last level finally, the co-operation extends to the identification, the formulation and the negotiation of the problem or “problematization” on which the production of new knowledge will carry on (cooperative problem setting). This level presupposes the construction of a " space of intersubjectivity " (Zarifian) which is not limited to the cognitive treatment of the object in the course of design (proposal for solutions, evaluations, goals to continue) but covers also axiologic, ethical and moral dimensions. This level of co-operation results in the manufacture of general knowledge (by integration and rearticulation of local specificities) rather than universal (decontextualized and standardized).

The development of the dialogue between various stakeholders is related to the rise of the situations of uncertainty and risk. The options taken by the various groups are the subject of controversies (on the stakes, the impacts, the 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 waitings, the controversies thus lead to the production of new knowledge through phenomena of learning. Such a widened discussion shows that the specialists and the laymen and more generally each category of actor holds specific knowledge, bearing on the diagnosis of the situation, the interpretation of the facts or the range of possible solutions. There is in fine a collective profit which is the improvement of mutual knowledge.

On the second axis related to the structuring of the collectives (or formation of the groups), the main dichotomy rests this time on the distinction between instituted groups and emergent actors. Along this axis, the joint production of the collective can take four distinct forms there too :

- on a first level, the groups of design are already made up. There is no place for actors or groups of actors whose identity, functions and methods of intervention during the design would not have already been perfectly defined. The stakeholders which could be concerned delegate in fact their rights of expression to these instituted representatives. In software engineering, it is typically the case of the representatives of the users who take part at 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 starting.
- on a second level, which is often related to the rise of the controversies or the 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 turns around the constitution of a specific identity and of means to be heard. In sophisticated steps of developments of projects characterized by strong relational complexity, the stake precisely rests on the redefinition of the field of the actors which is not any more given and the comprehension of sociodynamics which animates them.
- on a third level, the emergent groups initiate a dialogue with other groups 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 who crystallize many conflicts within the process of design. This is why the pilots often then engage with " de-construct " the position of the actors, by proposing another formulation of the project of origin for example.
- a fourth level finally sees a new collective be born which had knew to carry out the compromises and the adjustments necessary with the whole of the

stakeholders. We decide to name these groups as " extended collectives " (because of its dual sense of the variety of the mobilized knowledge and of the variety of the interested parties taken into account) ; these groups are not yet limited to aggregation of individuals, or with the groups made up but result from a political process of formation (within the meaning of the political formations).

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

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

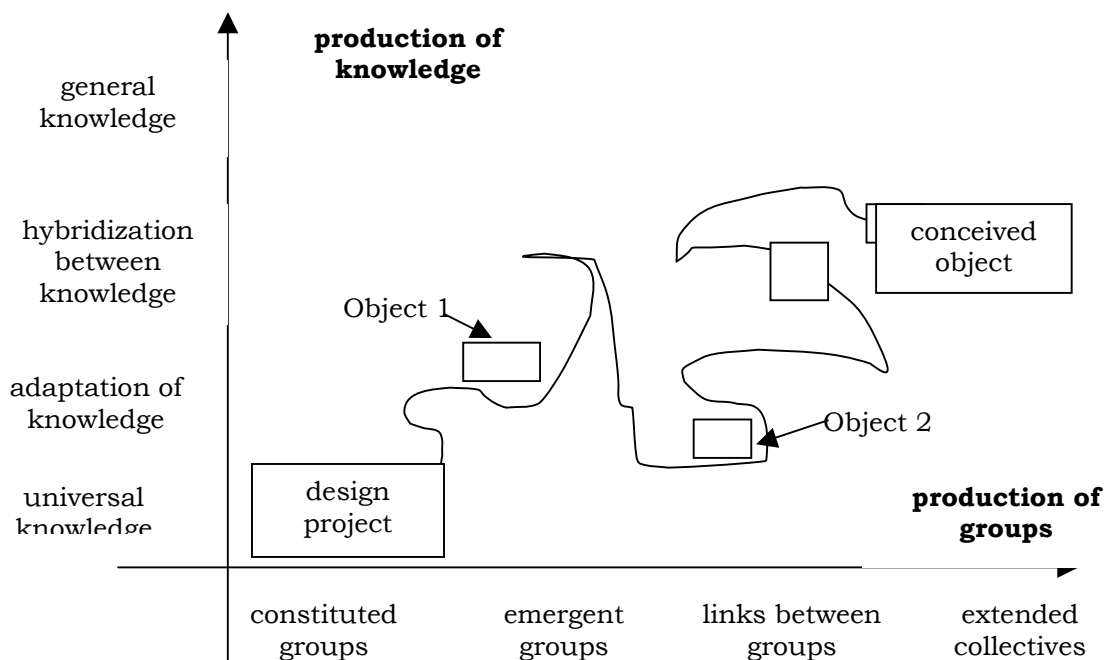


Fig. 1 Political model of design

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

The political course between the idea or the request and the finally designed object is dependent on very many devices which were imagined for better managing the

integration of the points of view of the actors of the design and thus supporting the production of shared knowledge.

Some of these mechanisms are located in bottom and on the left on the model whereas others, which are more participative ones, are in top and on the right on the model. Muller and Ali (1997) have made a recent heorical background on the participative steps which may concern various stages of the cycle of life of the software.

Among the most frequent devices we can mention the benchmarking (which make it possible sometimes to justify by advance, without debate thus, the choice of a data-processing solution on another), the investigation of satisfaction user, the call to experts like the ergonomists, the trainers or the managers in order to adapt a dysfonctionnel system to a context of particular use, the installation of roles of interface between the stakeholders (correspondents, head of user project...), the creation of new roles (like the controls of work of information system or the CKO to manage knowledge), the participative techniques of design (like direct place of integrated software packages of management which make it possible to implement a world professional standard without having to define the specific needs for the firm, the installation of projects control in order to try out the technology ⁴ or finally the development of levels of description (or abstraction) of the system in order to reduce the semantic distance between the language of the users and the conceptual language of the data processing specialists (for example the hierarchy of the levels of design " external-conceptual-intern " in the methods of design). We can also mention a significant recent tendency which aims at the definition of a governance of information systems in the firms ⁵.

Each one of these steps presents strong points but also flaws. What thus imports is to be able to dispose of criteria to evaluate the steps of design.

These criteria must be in coherence 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 :

- the degree of implication,

⁴ It is often necessary to recreate at " outside " (in the organization, a service, etc.) conditions of the environment of design where the system ("interior") was developed. That results in the installation of pilots, who are the contexts generally furthest away from normal operation and the routines of the company, and where one gathered the " advanced " users more and petitioning of the product, where nothing was not left randomly in term of accompaniment and formation, and or project equips it is justified the most. It is what explains the frequent difficulties of deployment in the services which were not pilot, which can lead in certain projects to the abandonment of the installation.

⁵ The government of company indicates the whole of the practices, the structures and the procedures which specify the division of the capacity, the distribution of the responsibilities and the modes for control between the various fascinating parts of an organization. The structure of government establishes which interests the organization should be useful and how its objectives and its priorities should be selected (Johnson et al., Stratégique, Publi-Unions Editions, 2000, p. 231-232). The CIGREF, trade association representing the Directions of the Information systems of the principal great French groups registers the " control surface of the information systems in the strategy of the company " like the red wire of its new project associative « CIGREF 2005 (doc. Ronéo). It is known as that " the control surface of the information systems raises the question of ' how and the systems of information'controlled are directed ".

- the level of implementation,
- and the induced learning.

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

Fig. 2 Procedures for the participative design

This model seeks to describe one of the dynamic in work in the processes of design. Its objective is to understand how to better control dynamic co-operative production of knowledge and taking into account of the stakeholders within the activities of design of products and services. The step of design is seen here like a political process and the design like a political activity itself aiming at producing an object as " constitution" ⁶ around a double compromise : closure / opening (groups) - universal/general (knowledge).

But processual dynamics is complex, iterative, unforeseeable and this more especially as what is object of the process is " something " which must even pass from a statute of idea to a statute of object of work then to an final product containing knowledge on itself and on its context of design.

This object to be built is also an object in designing which incorporates and crystallizes positions, divergences or agreements at critical times of the processes of design. The object to be produced is also a constituting object of the process in the course of being done.

Its interest is crucial in our political model of design because we also make the assumption that this political model of the design must more precisely give an account of the " objects " as process, resources and results of the co-operative activity of design at the same time. We propose to call them " constitutional objects» (*objet constitutionnel*) ⁷.

⁶ With the political direction of the term.

⁷ Constitution ("law ", " institution"). Action to establish legally (Dr.). Way in which a thing is made up (XVIème century) : arrangement, composition, provision, form, organization, structure, texture. Together congenital characters somatic and psychological of an individual. Character, complexing, conformation, personality, temperament " Creation " (of the world) (XIIIème century). Action to constitute a unit; its result. V 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, form the gasoline of something.

3. The constitutional objects

We refer in the spirit with work of S. L Star (1989) related to the " boundaries objects " (*objets frontières*) which show that the coordination of heterogeneous actors can be carried out thanks to the implementation of " boundaries objects ", which would be at the same time adaptable to various points of views and sufficiently robust to maintain their identity through them. We also integrate work of Jeantet, Tiger, Vinck and Tichkiewitch (1996) on coordination by the intermediate objects in the integrated teams of product design. Lastly, the contribution of E. Wenger (1998) seems to us closest to the political vision which we wish to explore with regard to the capacity of the individuals to effectively connect their knowledge with those of the 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 " boundaries objects ". All the objects or artifacts which belong to several practices are likely to play the role of boundaries objects. These artifacts are heard here like "reified" elements, which are being able to be concrete objects (prototype, management tools, metric, version of a software, model...) or symbolic systems (words of the language for example). In Wenger 's work, the reification indicates a process which consists in at least giving form to the experiment by producing artifacts which solidify the experiment to some extent, for a time. It can take the form of an abstracted concept, tools, symbols, stories, words. The reification thus covers a great number of processes like manufacturing, conceiving, to represent, name, describe, perceive, etc. The reification to some extent comes to compensate the contextual and evanescent character of the participation. The duality participation/reification and its well balance are the constituent conditions of the collective practices.

For Wenger, boundaries objects are characterized by four dimensions :

- The abstraction : the general character of the boundary object leads to a certain level of abstraction.
- The versatility : the object can be used for several activities, therefore several practices.
- Modularity : the object consists of several parts being able to be mobilized in various situations according to actors.
- 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 especially concern the mechanisms which allow the constitution of the objects but rather little those concerning their use in the instituted collective practices. However, which interests us in a context of design, it is the identification of the properties which can explain the emergence, the organization and the functionality of such objects, rather than certain characteristics of use. If one wants to better understand the phenomena of constitution, we should propose a representation of the same criteria, but in the case of their genesis.

By using the theoretical background social psychology relating to the social representations (Moscovici, 1984, Abric, 1987, 1994), we propose to conceptualize the 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 to action, support for consensus, contribution to conceptualization, contribution to collaboration, contribution to argumentation (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...)
Normalcy (standardization)	Orientation of conduits and behaviours, legitimation, constitution and reinforcement of the identity, standardization and conformisation,...

Fig. 3 Characterization of the constitutional objects in design

3. The Shared Medical File (SMF)

We will illustrate the first elements of the political model of co-operative design through the case of the Shared Medical File, which is a significant topic in the vast sector of telecare (in decomposition and rebuilding ⁽⁸⁾). This essential object in the economy of e-health is interested within the framework of our model in construction to question the role of now actors (and often challenged) in the process of design and boundary between profane knowledge and skilled knowledge.

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

The sector reorganizes mainly around the general model of the Network ⁽⁹⁾, which is presented like having to allow a better control of costs , a mutualisation of the

⁸ Telecare is the whole of the applications of the TIC to the field of health and covers with the applications as varied as the telemedicine, the medical remote monitoring, the teleformation, the diagnosis remote and collective or all that concerns the medical gestures (and pre medical or post medical) computer-assisted remote, the data banks... as well as the existence of electronic places of markets for the purchase of specific materials.... Generally, for a better knowledge of the emergent mediatized medical practices, to see *La santé et les autoroutes de l'information*, sous la direction de D. Carré et JG Lacroix, L'harmattan, 2001

⁹ Network or mode of horizontal coordination between actors; it is this term which is used to indicate the programmes of reorganization around the care; we take it for asset since it is not the object of this article only to define it more precisely; let us note however that there is a large variety of networks: network City Hospital on the ambulatory care in residence post operational, networks of care centered on a particular pathology (diabetes, AIDS...) and networks of care centered on the person (network of maintenance of the old people in residence). This large variety has risen at the same time from the objects of these networks as well as the very large variety of the lawful devices and the experiments undertaken for

expertises in favour of a more systemic approach of the patient (no yet more step by step approach of the patient with the risk of an expensive redundancy of acts or a weak comprehension of its disease ...), and especially an autonomization of the patient, namely a maintenance with residence allowed thanks to technologies of communication (tele-monitoring, tele-diagnosis, webcam ...).

The Shared Medical File (SMF ⁻¹⁰) is one of the main pieces of the implementation of network between the partners of health and for this reason it is carrying significant stakes : enriched medical expertise, collective and global dealt of the patient, personalization of the care and autonomization of the patient (who can remain in residence); formalization of knowledge on the patients and on the medical practices...

But the SMF is carrying strong interrogations : what becomes the medical secrecy, main deontologic principle in medical practices ⁽¹¹⁾ or the share between private life / public life ? How to ensure the security of information circulating or stored ? Will be able one to maintain the principle of continuity of the care between various parts which handle their own technologies ⁽¹²⁾ ? Which are in the long term the costs of these information systems ?...

The SMF is thus at the same time an architecture and inserted knowledge piece which relates to the operation of the network and the patients concerned. There does not exist yet of standard model. Like any innovation in emergent phase, one can observe an expansion of experiments (succeed with more or less finalized SMF) which come either from the ground, or from the rules, and which puts in presence many actors and various carriers of interests and different stakes.

The study of this expansion shows how much the SMF in design depends at the same time on the stakeholders allowed to take part in the work of design and carrying scientific or profane knowledge. However its statute still very ambivalent, because it deeply calls in question a sector in its entirety, also questions the productive or interesting properties of the SMF intended like " constitutional object " to allow the process of design to be held.

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

The experiments managed by the State reproduce the traditional diagrams of the parcellized and partitioned organization of the health sector, that even which is object of reform in the approach by the network. The opening to new actors is problematic there : the patient only too seldom is not regarded as a major actor for

more than 20 years (when these networks were set up by associations, starting from observations of ground and often in a little formalized way).

¹⁰ Or computerized medical File, because this last circulates more and more between the fascinating parts on Internet (Intranet of hospital, extranet of a network) and more generally on Internet or Medical Social Network (RSS conceived and exploited at the request of the State by Cegetel; the RSS is brought into service since 1998 and allows the circulation of the Electronic Sheets of Care between doctors and redemption funds; the tools such as the Chart Vital for the patient or the Chart of the Professionals of Health allow a securisation of the signatures and entries on the RSS, and thus a securisation as for the flow of the data relating to the Patient, under the terms of the principles on the medical secrecy.

¹¹ the actors and in particular the Order of the Doctors think of the concept of shared medical secrecy.

¹² What is called here the question of the interworking of technologies.

which the needs and waitings could be integrated in process of design of the SMF. Its profane approaches by nature are devalued, regarded as nonscientists because produced (by definition) apart from the scientific community controlled by the State (ministries, universities, laboratories ...) (13).

The more so as to admit the legitimate patient as bearing of knowledge can offer a springboard to many other claims : which valorization and recognition of the role of the nurses in the production and the follow-up of the care? Which role and responsibility shared between the Doctor (in the broad sense), the patient and his family ?

And more concretely, in any event the question of the representativeness of the patient arises. Who, of associations consisted by the State or emergent from the ground (association of consumers by ex.) could claim to speak to the patient and about his family ?

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

On the other hand, the financial actors (Medical insurance or medical benefit fund) can see their role on-developed with the reason which they legitimate " the approach network " preached by the State when the latter is carried out in the name of the control of the costs. Such experiments thus tend to reproduce old legitimacies and models. They remain closed with the new debates relating to the patient whom one wants to give them more responsibility (principle of autonomisation) but to draw aside from the discussions since no actor who can represent them takes part in the design of the SMF.

Thus, this process of design interiorizes societal debates which would make development of the SMF an appropriateness for complete recasting of the health system, but which blocks it for the same reasons, because of the importance of these same debates.

The emergent experiments from the ground are also carrying political questionings. They often take place in partitioned and parcellized organisational contexts whose operation in network is too recent to be largely accepted. The, the SMF which can be conceived is much more the result of the problems which each participant wants to see regulating than the bearing of a vast project of reorganization of the services of care.

The partitioned structure of health system hardly allowed the emergence of common knowledge and a common will to work in a horizontal way between internal services in an institution or between several institutions. The ignorance of the real roles of the ones and others make very delicate the constitution of a initial group for the design of SMF. The risk is finally thus to lead to a SMF which is more a badly articulated collection of knowledge which are then not operational and hybrid.

¹³ And certain doctors who experienced DMP while wanting to take account of patients note that some are not very inclined to deliver their opinion; they do not include/understand inevitably the role of it that it is awaited them, as if it were not easy to become citizen!

In the two cases quickly approached, the contributors of technology (ICT engineering...) or promoters (such as the laboratories strongly implied in the processes of teleformation and telemedicine) will be able easily to clear a place in its groups of design and to better control the co-operation as much as the knowledge used during the discussions. Their importance is certainly obvious (¹⁴) but certainly exacerbated when the circumstances pointed out above prevent the other actors from playing their role.

Let us return to our model to understand the difficulties of design of a SMF.

In both cases of design, what cause problems are the opening to various actors, to different knowledge (or level of hybridization according to our model) and to new collectives instituted or recognized like representative and being able to play as representatives of new interests (or level of the links between the groups)

Moreover this opening does not relate to same dimensions which characterize the SMF as a constitutional object.

Circle A represents the process initiated by the State, which is confronted to the difficulties of opening with new groups and new forms of knowledge. The circle B more represents the process initiated by operational actors, which is confronted to the difficulties of forming a universal knowledge starting from hybrid knowledge.

In the first situation of design (circle A), the difficulty rises from the quasi impossibility of the State to admit the hybridization of knowledge. This refusal rises doubtless from a hard vision of the normalcy of the SMF (or up to what point the State can put in question through the SMF the legitimacy of the institutions of health, the quality standards of production of health...).

One can think that it is when this hybridization is more allowed that the opening to new representatives and contributors of knowledge should be able.

With the reverse in the second situation (circle B). What raise problems are the opportunities and the organisational possibilities of connections between a multitude of groups and institutions which do not know how to work together or which are unaware of themselves.

There 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 said how much the experiments evoked here are often pragmatic and are discovered only as they are raised when the SMF as constitutional object is processed. It thus misses a project (within the meaning of teleological aiming of a complex process during its own process) relating to the functions of the SMF. One can in the same way think as it is when this hybridization of the parts is allowed that the coherent integration of disparate knowledge will be more possible.

¹⁴ the DMP rests on a technological layer essential.

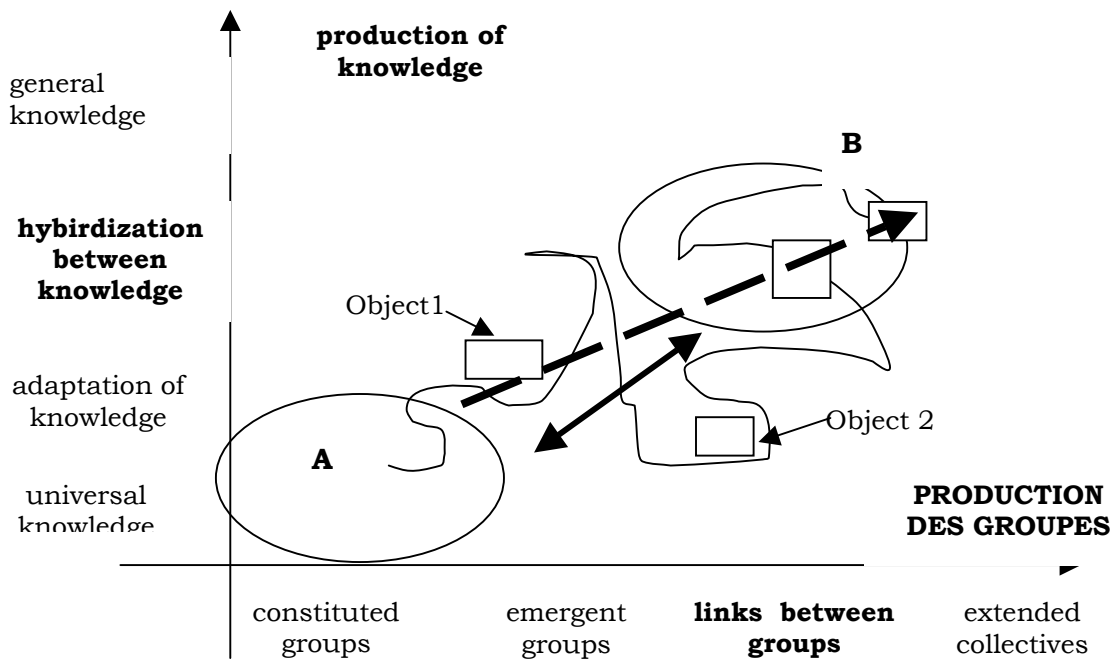


Fig. 4 Space design of a DMP

Two particular levels of variables on each axis thus appear critical.

This could militate for mixed approaches of type Up-Down and Bottom-Up of such kind to allow learning from what emerges in each situation (full arrow connecting the two circles on the drawing).

Lastly, the move of a process of design mixed which learn from experiments initiated by State and instituted parts and those initiated by more operational parts should depend on the quality of the SMFas a constitutional object or of its structure, its functions, the actors and its normative degree.

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

4. To conclude

The management of project can take support on the political model presented in this paper. From the managerial point of view which is ours, the dialogue between co-operation and produced knowledge will interest the manager for two reasons :

- it can aim at piloting, the improvement or the control of a process of collaborative work and then will be interested in the production of knowledge as a tool to act on the co-operation;

- contrary, it can aim at the knowledge management or facilitate the emergence and the capitalization of emergent knowledge during design process and then will act on the composition of the working group like independent variable.

In the first case, the question is to know which knowledge to privilege to support the development of co-operative work : when (beginning or in progress) is necessary it to introduce disorder by knowledge into a group, for the benefit to enrich it, or with the risk to block it, or else to even support its bursting ? Is it better an agreement on often poor knowledge (because coming from consensus) or constructive divergences ?

In the other case, the question relates to the structure of the working group. A beforehand defined structure, according to rational criteria of professional competencies , even of political positions (within the meaning of plays of actor) can have an economic aiming (refusal of a " organizational slack") or an aiming of order (to be pressed on a team known by 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 then treated ⁽¹⁵⁾ ; (2) this mobilization of knowledge makes it possible with difficulty to make emerge new knowledge.

To conclude on the two aimings from a managerial point of view (to act on knowledge for better cooperating, or acting on the group for better producing knowledge), the manager can easily be to confront at the risk of impoverishment :

- impoverishment of the knowledge produced in the name of the forced search for a consensus ?
- impoverishment of co-operative work in the name of a cohesion or an availability of mobilized knowledge?

The question of knowing if the group in design must naturally seek the consensus to progress would deserve fuller developments.

Bibliography

. Abric J.-C., *Coopération, compétition et représentation sociale*, Cousset, Del Val, 1987

. Abric J.-C., *Pratiques sociales et représentations*, Paris, PUF, 1994 (ed. 2001).

. Carré D., Lacroix J.G. (sous la dir.), *La santé et les autoroutes de l'information*, L'harmattan, 2001.

. Hatchuel A., « Agir public et conception collective : l'expertise comme processus démocratique » in Goux-Baudiment, Heurgon E., Landrieu J. (coord.), *Expertise, débat public : vers une intelligence collective*, Colloque de Cerisy, Editions de l'aube, 2001.

¹⁵ with knowing the actors will agree to take them into account and to solve 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 located hearth, included/understood through list of already existing cases, even translated to be put under discussion within the group of design.

- . Jeantet A., Tiger H., Vinck D., Tichkiewitch S., « La coordination par les objets dans les équipes intégrées de conception de produit », in de Terssac G., Friedberg E., *Coopération et Conception*, Octares Editions, 1996.
- . Johnson G., Scholes H., *Stratégique*, Paris, Publi-Union, 2000.
- . Mendelow A., *Proceeding of the Second International Conference on Information Systems*, Cambridge, MA, 1981.
- . Moscovici S. (ed.), *Psychologie sociale*, Paris, PUF, 1984
- . Muller M.J., Haslewell J.D. and Dayton T., “Participatory Practices in the Software Lifecycle”, in Helander and al. (Eds), *Handbook of Computer-Human Interaction*, 1997.
- . Star S.L., « The structure of ill-structured solutions : Heterogeneous problem-solving, boundary objets and distributed artificial intelligence” in Huhns M., Gasser L., *Distributed artificial intelligence*, vol. 2, San Mateo, Morgan Kaufman, 1989.
- . Schön D.A. *The Reflexive Practicionner. How Professionals Think in Action*, USA, Basic Book Inc, 1983.
- . Wenger E., *Communities of Practice. Learning, Meaning, and Identity*, Cambridge University Press, 1998.