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Process Based Management and the Central Role of Dialogical Collective Activity in Organizational Learning. The Case of Work Safety in the Building Industry

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Process Based Management and the Central Role of Dialogical Collective Activity in Organizational Learning. The Case of Work Safety in the Building Industry

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Abstract:

The notion of "process", which describes the cooperation of heterogeneous practices and competences for a given output, has gained a major position in managerial practices for the last twenty years. This paper presents three ideas about organizational dynamics and processes and tests their applicability in the case of work safety improvement in a building company. The first idea is that the success of the process notion shows the central role of "conjoint" (as opposed to "common") collective activity in organizational learning. Conjoint collective activity is dialogical ("acts speak") and mediated by the utilization of semiotic systems (languages and technical and managerial tools). The second idea is that organizational learning is neither based on the actors' individual subjectivity nor on the technological and objective artefacts engaged in the processes, but rather on the reflexive understanding and ongoing redesign of processes by the process actors themselves, in the frame of a reflexive inquiry, a "collective activity about collective activity" which is triggered and kept in motion by axiological judgments (process evaluation). The third idea is that the possibilities to configure processes in a given organization are multiple. The reflexive inquiry enacts a specific social, spatial and time configuration of the process, its "chronotope" in Bakhtin's vocabulary, which plays a major role in the way actors can make sense of their collective activity and transform it. A longitudinal case study about work safety on the building yards shows that it is difficult to "control out" risk at work once designs have been established, in the frame of the "project execution" process, but it is easier to "design out" risk, when the actors of the process collectively design and redesign their collective activity, from the very first phases of a building project to the end. Therefore a major way to improve safety consists in extending the chronotope of the collective activity under consideration, overcoming the traditional separation between "design / planning" and "execution". The conclusion summarizes the main theoretical, epistemological and practical issues involved in this research about conjoint collective activity.

Keywords: Business Process, Chronotope, Collective Activity, Collective Sense Making, Dialogism, Inquiry, Process-based Management, Safety Management

Résumé :

La notion de « processus », qui décrit la coopération entre pratiques et compétences hétérogènes pour aboutir à un certain type de résultat, a conquis une position clé dans les pratiques managériales au cours des vingt dernières années. Ce texte présente trois idées sur la place des processus dans les dynamiques organisationnelles; il teste leur applicabilité aux questions de sécurité du travail dans le cas d'une entreprise du bâtiment. Première idée : le succès de la notion de processus manifeste le rôle central de l'activité collective « conjointe » (combinant des activités complémentaires, par opposition à « commune », combinant des activités analogues) dans l'apprentissage organisationnel. L'activité collective « conjointe » est dialogique (« les actes parlent ») et médiatisée par l'utilisation de systèmes sémiotiques (langages et instruments techniques ou managériaux). Deuxième idée : l'apprentissage organisationnel n'est fondé ni sur la subjectivité individuelle des acteurs ni sur les artefacts technologiques objectifs engagés dans les processus, mais plutôt sur la compréhension et la reconception continue des processus par les acteurs du processus eux-mêmes, dans le cadre d'une enquête réflexive et dialogique, « activité collective sur l'activité collective » déclenchée et dynamisée par des jugements évaluatifs sur le processus. Troisième idée : il y a de multiples possibilités de délimiter les processus dans une organisation. L'enquête réflexive enacte une configuration spécifique sociale, spatiale et temporelle du processus, son « chronotope », pour reprendre le vocabulaire de Bakhtine. Le chronotope du processus influence profondément la manière dont les acteurs peuvent faire sens de l'activité collective et la transformer. Une étude de cas longitudinale sur la sécurité du travail sur les chantiers de bâtiments montre qu'il est difficile de supprimer le danger par des moyens de contrôle, une fois que la conception a été réalisée, dans le cadre du processus « exécuter le projet », mais qu'il est plus aisé de réduire le danger par la conception, quand les acteurs conçoivent et reconçoivent collectivement leur activité collective, des toutes premières phases d'un projet de construction jusqu'à son achèvement. Une voie majeure pour améliorer la sécurité est donc d'étendre le chronotope de l'activité collective étudiée, en dépassant la séparation traditionnelle entre « conception / planification » et « réalisation ». La conclusion résume les principaux enjeux théoriques, epistémologiques et pratiques de cette recherche sur l'activité collective conjointe.

Mots-clés : Activité collective, Chronotope, Dialogisme, Enquête, Gestion de la sécurité, Gestion par les processus, Processus, Sensemaking collectif

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"Human act is a potential text..." Mikhail Bakhtin (1986)

Once upon a time there was an engineer of the product design department of an automotive company. He led the team in charge of drawing the front wing of the future high range model. On that morning, he was not satisfied. The first sketch did not meet an enthusiastic approval in the weekly project meeting the day before. The representative of the marketing department required some customers' sample groups to test the design. Moreover the chief mechanical process engineer expressed some doubts about the technical feasibility of the shape: the stamping technology imposes severe contraints on the type of curve surface which can be manufactured at a reasonable cost.

He may interpret this situation in different ways. He may view himself as the member of a creating team in charge of designing a fine automotive object, proud to contribute to a collective creation. In that case, he will passionately cooperate with the other teams designing the body of the car, to get a beautiful assembled composition. But he may then perceive the customers' test as little relevant, since customers know nothing about industrial design. Furthermore he might consider the constraints imposed by process engineers as an irritating hindrance to creativity generated by technicians' narrow views and economic obsessions. He will not be prone to actively cooperate to the technical and economic optimization of the design.

Conversely he may view himself as one key contributor to the development of a new industrial and commercial product, which he hopes to be a stunning economic success. Then he will view himself as the member of an entrepreneurial team, including controllers, technology and marketing experts, in charge of a project whose result will play a key role for the economic destiny of the company. In that case, he will cooperate with process engineers willingly to collectively design a fine but easy to manufacture object. His creative power becomes a resource for an entrepreneurial project.

This tale stresses that, within organizations, one actor's activity is part of a collective activity. The way activity makes sense for the actor depend on the collective activity which frames it. How will the actor concretely participate in the project, to which purpose will he commit? Is he part of a collective process whose purpose if the creation of fine objects, or is he part of an industrial and entrepreneurial process? Here appears a key word: process. The collective activity which provides terms of reference for one actor's activity appears as a "process".

This paper will first analyze the diffusion of the "process" notion in management research and practices in the last twenty years. It will then propose to consider the "process" notion as one particularly important configuration of collective activity in organizations, which combines heterogeneous practices and competences. It is

characterized by dialogical sense making and mediated by signs – in particular, technical and managerial instruments. The third part of the paper will stress that, under certain managerial conditions, collective activity can be reflexive and permanently redesigned by actors in an "inquiry" in Dewey's sense (Dewey, 1938). This reflexive inquiry gives collective activity a spatial, social and time definition, its « chronotope » in Bakhtin's words (Bakhtin, 1982). The fourth part of the paper will focus upon the axiological dimension of collective activity related with actors' reflexive inquiry, which requires and produces value judgments to link particular contexts of action with general categories of meaning. The conclusion will summarize the main theoretical, epistemological and practical issues involved in this research about collective activity.

1. THE « PROCESS » NOTION IN BUSINESS STUDIES AND MANAGERIAL PRACTICES

What is precisely a "process"? The notion is actually implemented in very diverse ways, but as a general rule, processes involve the *cross-functional* coordination of local activities to achieve a *result* which fulfils some social or market need (new product, delivery, bill, after sales service...) or an important internal service (budget, accounts, technical maintenance…) A process is a set of operations linked by strong coordinations, which generally involve an intense circulation of information. The activities of the process are not similar but rather complementary: their operational contents and intrinsic knowledge are quite different.

The "process" notion was not invented in the eighties. In the field of production, manufacturing engineers have spoken of "production processes" for a long time. Taylorism (Taylor, 1911-1972) focused efforts upon production processes to try to reduce them to their technical dimension. Any process, industrial or administrative, has a "technical base", i. e. the definition of its toolbox (technical equipments, management and information systems), and the standard description of its operations (technological processes, administrative procedures). The technical base of the process is a set of artefacts engaged in the daily concrete activity. Taylorism tried to eliminate any "subjective" part of the process, and to provide a technical totalizing definition, which left no part to improvisation and creation and tried to reduce process to its rational models (Lorino, 1987 & 1989). Taylorism met serious difficulties, particularly from the sixties when the "crisis of work" (Coriat, 1994) took place. Management theoreticians and practicioners then focused their attention upon the human dimension of work (motivation, human relations, ergonomics, socio-technical analysis...), moving from the taylorian objectivism to a subjectivist approach. Yet they did not really challenge the interactional complexity of collective activity.

In the eighties, practicioners stressed the interactional complexity of processes, for performance reasons (quality, time, and cost). The term "process" has been more and more commonly used in business studies and practices for the last twenty years (Lorino, 1995). Total Quality approaches gave birth to process-based organizational models as tools for evaluation and certification. To justify that choice, it was argued that quality factors can only be found in the way organizational processes are implemented and controlled (Imai, 1990). In the same period "ABC" (Activity-Based Costing) methods were promoted in

management accounting. They base cost and performance control upon an activity and (at a more aggregated level) process segmentation (Kaplan, 1984; Kaplan & Johnson, 1987; Lorino, 1991). At the end of the eighties « Business Process Re-engineering » (BPR) methods were developed by consultants (Hammer, 1990). Their basic idea is "the radical redesign of business processes to achieve dramatic improvements in critical contemporary measures of performance, such as cost, quality, service, and speed" (Hammer & Champy, 1993). Process based models of organizations can be used to streamline collective activity, to eliminate redundancies and useless complexities, and to integrate information flows around common cross-functional data bases. Those ideas influenced the design of new management information systems, called "ERP"[1], based upon process architectures and integrating the functional applications around a unique data base system. Since Enron scandal, risk control is also increasingly approached through the analysis and the control of the business processes (Sarbanes-Oxley Act in the U.S.).

At the same time, collective activity was approached by organization science researchers in the nineties, with the study of communities of practice (Lave & Wenger, 1991; Wenger & Snyder, 2000). But, while practicioners were looking first at processes, researchers rather analyzed communities of practice and their approaches did not seem to converge. The sociological analysis of communities of practice was first interested in the common practices of actors located in cross-organizational networks (Yucatan midwives, butchers), whereas practicioners were first interested in the intra-organizational cooperation of actors whose practices and competences were deeply heterogenous. Research about communities of practice focused upon identity, networking, and knowledge sharing. At the same time, process-oriented practicioners faced coordination, cooperation, and complementarity issues, in instable and complex work situations where the very definition of roles and professions sometimes must be reconsidered. These two approaches of cooperation and solidarity may find their roots in the sociological work of Emile Durkheim (Durkheim, 1893-1947), who distinguished two types of social solidarity: "clanic solidarity" and "organic solidarity". Clanic solidarity can be observed in groups that base their spirit of cooperation upon shared values and inspiration, for instance within a given profession. Organic solidarity *de facto* imposes itself, in response to practical requirements, to those who take part in the same experience, decisive for their individual destiny: "the idea of a group whose members would be oriented in the same direction is the opposite of Durkheim's idea of organic solidarity, which is based upon regulated interdependence, with no common orientation of feelings (…) The crew of a boat, with their interdependence of destiny and survival necessity, imposing cooperation in spite of personal and emotional differences, might represent organic solidarity (…) Clanic solidarity can often be observed outside the organizations, crossing them: between shopkeepers, between engineers…" (Girin, 1995).

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[1] ERP for « Enterprise Resource Planning ».

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2. « PROCESS » AS THE PHENOMENOLOGICAL MANIFESTATION OF CONJOINT COLLECTIVE ACTIVITY

2.1. Conjoint collective activity: a focal issue for management

Organizations emerge in particular for practical reasons, to achieve processes which require the coordinated intervention of multiple and different classes of actors. Whatever the legal forms are, "the coordinated intervention of multiple and different classes of actors" *is* an organization. Division of labor and resource specialization reinforce conjunction and cooperation requirements (Chandler, 1977). Market extension and technical developments complexify processes from a technical, social and spatial point of view. Processes require more and more organizing. Processes appear as the phenomological manifestation of "conjoint" collective activity (different and complementary practices), as opposed to "common" (similar practices) collective activity (Vernant, 1997). The evolution of managerial practices (cross-funtional integration) imposes conjoint collective activity as a major research object, which involves heterogeneous competences, complex cooperation schemes, and shared work objects.

Processes are both interactional and transactional. They are interactional: the actors must interact in many ways; they must balance flows, harmonize standards and rules, synchronize their activity, and ensure coherence in resource allocation… Processes are also transactional: they allow groups of actors to achieve some global transaction with the world (Vernant, 1997) such as providing a product, a proposal, an information, a bill.... Interactions within the process must be managed in such a way that the transaction can be achieved in a satisfactory way. Reciprocally the transaction must be defined in such a way that interactions are feasible. When the basic characteristics of the transaction and the organization are stable and simple, process feasibility and effectiveness only require that actors respect well established rules and norms. The process as a situated and ongoing collective activity does not need to be visible: it can be "forgotten" behind the technical systems. But in many cases, the coherence between interactions and transaction must be continuously rebuilt, due to the permanent technical, social and market evolutions. Then the process becomes an issue for actors.

2.2. Process and dialogical sense making

A process appears to coordinate individual activities, but this is not really the case. Actors' activities are not individual. Their belonging to the process is reflected in their intrinsic content, their internal characteristics and their tools. Each actor's activity is *addressed* to other actors. For instance, a technician does not define a part-purchasing requirement for the purchaser in the same way as for another technician. He tries to anticipate the questions that the purchaser would need to ask him before consulting suppliers. Even in situations where there seems to be a very low level of cooperativeness and the process coherence is mainly assured by hierarchical coordination or by rules, the process is not confined to coordinated individual activities. Through their perception of rules legitimacy and relevance, the fulfilment of directives, the way tools and systems are used, actors address their activity to their hierarchy, to the designers of systems and rules, etc. Clot comments the train driver's work (1999): "His activity is…always addressed to several interlocutors simultaneously and it is also the recipient of others' activities, even if

the driver is alone in his cabin". In the process, each actor's activity responds to other actors' activities and anticipates their future responses. It does not address only the visible part of others' activity: it also integrates inferred elements as meaningful signs. What actors do not do is as meaningful in the dialogical interaction as what they do. Potential activity which is not achieved can be interpreted as what circumstances do not allow ("prevented activity" in Clot's terms), or what it is not necessary to do because "it goes without doing". Conjoint collective activity is a dialogical interaction (Bakhtin, 1984; Todorov, 1984), a "conversation in acts": activities "speak".

Any process has variants and options. To a variable extent any process must be adapted to partially unplanned situations through improvisation. It is then necessary to rebuild the transactional sense of the process and the way intra-process interactions are regulated. This discursive and dialogical interaction is cross-functional and involves multiple classes of speech and action. This is a practical difficulty for process oriented management, since it complexifies interactions and increases the risk of misunderstanding. But it can also help learning, since it connects different visions of the process, opens professional worlds and can avoid that the experts of one functional field gets fossilized in their routines.

2.3. Collective activity is semiotically mediated

As any human activity, the process activity is mediated by systems of signs (Vygotsky, 1934-1986): languages and tools. Bakhtin observes: "There is no experience outside its incarnation in signs" (Bakhtin, 1973). Anything interpreted (tools, noises, gestures, diagrams, words, tone of voice...) is a sign (Eco, 1973-1980). Semiotic mediations fulfil several functions:
- they distance actors from their own activity, and thus allow reflexivity: representing activities by signs enables actors to look back at their collective activity and make it an object for reflection and discussion;
- they enable actors to abstract activity from the singular here and now situation and to link it to generic classes of activity, activity "genres" (Dewey, 1938; Bakhtin, 1986; Clot, 1999; Clot & Faïta, 2000); it would otherwise be impossible to learn and to capitalize experience;
- they allow to socialize experience; in semiotic mediations, actors meet others, such as those who produced the interpreted signs (e.g., tool designers), other sign users (e.g., the users of the same equipment), those who interpret their signs, etc.
- they allow to configure the space, time and organizational extension of collective activity; signs keep traces of past activities, make their repetition easier, make present in the situation objects, actors and activities which are located far away (e.g., in subsidiaries in other countries) or in past or future periods; they partially free actors from immediate physical constraints to configure processes.

Semiotic mediations are not representations in the cognitivist sense. Their practical power is not unilaterally linked to their mimetic reproduction of the world, but also to the way they are interpreted by actors, involving their historic, cultural and emotional context.

The systems of signs engaged in collective activity provide what we shall call the "technical base" of the process: tools, glossaries, formal descriptions of tasks, all artefacts (written, oral, computer software, material structures of tools, plans, drawings, figures,

accounts) which constrain the collective achievement of the process, impose some coherence through time and space and link it to generic interpretations.

2.4. Technique and context

According to Bakhtin (Bakhtin, 1978 & 1986), speech involves language and context in a complementary way. Language is a set of resources and rules which is repeatable and partially decontextualized. It constrains speech by imposing rules and providing limited means of expression, but it also enables speech, since it provides reasoning structures and mutual intelligibility. But speech is not limited to language. It also involves a context, which contributes to sense – the semantic and syntaxic dimensions of speech, which refer to language, are completed by the pragmatic dimension, which introduces the context to make sense. Language is general and reproducible, whereas the context is unique. So is the speech: there are not two identical utterances, even if their linguistic content is strictly the same. Similar observations can be made for collective activity. The language of processes, i.e. the system to codify action, is what we have called the technical base of the process (decontextualized, repeatable, generic artefacts). It is engaged in singular contexts, which include spatial elements (sites where the process takes place), time elements (durations and dates, phases, calendars) and socio-organisational elements (in what units the process takes place, what actors are involved, what are the power structures). Those features, which organize the context, provide interlocutors – or better said "interactors" - what Bakhtin calls a "common horizon". The common horizon plays a major role in the actors' interpretation and in their ability to understand each other.

Bakhtin (Bakhtin, 1978, quoted by Todorov, 1984) criticizes two forms of empirical deviations in the analysis of discourse:
1. An objectivist deviation, exclusively interested in the linguistic material of utterances, as if their sense was entirely contained in the semiotic codification; the same type of deviation is common in the analysis of collective activity when *processes are reduced to their technical base*; it is then assumed that technical artefacts give a complete account of the actual process and determine activity. As a deliberate objective, taylorism tried to clear manufacturing processes of any subjective content to make their reduction to artefacts possible. It is a constant tendency of practicioners and researchers likewise to try to reify activity, and particularly collective activity, and to transform processes in computable / computerized rational representations.
2. A subjectivist deviation, exclusively interested in the psychism of the utterance author, as if he/she were isolated in his/her discursive activity, facing only a white sheet or a microphone. The dialogical dimension of any discourse, which addresses other discourses and is addressed by them, is then ignored. Here again, the same type of deviation is common in the analysis and management of collective activity, when trying to understand processes by analyzing actors' psychological dynamics, individual motivation and behavior. Yves Clot observes that an actor is never alone in his/her activity, since he/she dialogs with professional "genres": what other actors did before or will do later or usually do in similar situations. The actor "converses in acts" with process partners, who, in the same process, mobilise other genres of activity. Even works which seem to be very lonely

are haunted by interactors with whom the subject dialogically interacts through space, time and social structures.

3. REFLEXIVITY, INQUIRY AND CHRONOTOPE

3.1. The process is enacted by the way actors reflexively view and analyze it

Experts in process analysis know that there are many ways to define processes in an organization. The process analysis expresses a specific view about collective activity. By representing the organization as a system of processes, managers tacitly answer such questions as: "What are the most important coordinations? What are the most meaningful transactional outputs?" The operational actors themselves can analyze and (re)design their own processes. This reflexive "collective activity about collective activity" can be quite informal and take place in fairly ordinary interactions. For example, in a purchasing process, the maintenance technician usually defined requirements for part purchases and the accountant controlled the supplier's bill and paid it. One day, meeting the technician in the cafeteria, the accountant told him: "by the way, when you write a purchase requirement, please mention if the part is needed for ordinary maintenance or for heavy planned operations, it will help me". This is not an operational interaction, engaged in the direct course of the process, but an off line comment. Such daily interactions gradually redesign the process: the technician will fill the form differently, the accountant will immediately know if the purchase is an investment or a current expense.

By looking at the process reflexively, analyzing it, evaluating it, discussing it, and modifying it, actors transform it into an object of thought and action. The process does not exist in a given configuration in an ontological way, but it is enacted by the actors. "Expression precedes experience. It is its cradle" (Bakhtin/Voloshinov, 1925). Whereas ten different ways of defining processes in an organization could be imagined *ex ante*, actors' reflexive work selects a specific activity system as a process. For example, in the case presented in this paper, a collective reflexion was organized[2] in a building company about work safety. One conclusion was that the design of the building activity (planning and scheduling, technological options, team composition, resource budgeting) plays a key role in the safety of the yard. A working group collectively analyzed the process "designing and planning the building project", and its impact upon safety. It involved the main actors of the process. At some time, one question was raised about the composition of the group: should an architect be invited to take part in the reflection? Some members of the group had observed that the structural characteristics of architectural design have a significant influence upon the risk level on the building site. The group finally decided that architects would not be involved. In their majority, group members considered that the design of the building should be given to them as a constraining frame; it was not their job and they should adapt to it. The group enacted a specific conjoint collective activity: the process "designing and planning the building project", in which they did not include the design of the building.

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[2] This experience was achieved by Benoît Tricard, Ph. D. student at ESSECand Paris X University, under the supervision of the author of this paper.

3.2. The reflexive analysis of the process is an inquiry

To look back at their process reflexively, actors must be driven by some situation of surprise or doubt, for example, when they meet some problem of quality, safety, cost, or delay. It can be simply some fuzzy feeling that the process might work better. In some way the sense of the process is questioned and actors are confronted with the issue of rebuilding it, to continue to act together. This is what Ch. S. Peirce (Peirce) analyzed as an abductive way of reasoning: actors face a situation which does not conform to their expectation; they must build a new hypothesis. Abduction mobilizes creativity, imagination, emotions and unusual interpretive resources.

It is not always necessary to proceed consciously and deliberately in a collective way to operate the process. If conditions are fairly stable and simple, the process can be routinized by hierarchical and normative coordination. But it is necessary to proceed deliberately in a collective way to reflexively scrutinize the process. Of course this step does not systematically take place. Organizations do not automatically generate organic solidarity (Durkheim). If collective reflection takes place, it does not interrupt the normal course of the process. First, operational imperatives are not suspended by reflection. Second, hypotheses about the process must be tested in practice, and the actual operation of the process serves as their test bed. Collective reflexion takes place within the course of action and it modifies the norms of action, in the continuous flow of experience. This exploratory and experimental practice, which integrates hypothesizing, reasoning and testing in practice is what the pragmatists Peirce and Dewey called an inquiry: "all logical forms are examples of relations between means and consequences in the duly controlled inquiry (...) the methods of inquiry are *operations* done or to be done" (Dewey, 1938).

3.3. Building the "chronotope" of collective activity

By looking back at their collective activity, actors design its spatial, time and social configuration. They define a virtual perimeter marked with yardsticks, what Bakhtin calls a "chronotope", in literary critique (from "chronos", time, and "topos", place, in Greek): "the chronotope determines the artistic unity of a literary work in its relationship with reality" (Bakhtin, 1978). Quite similarly, "the chronotope determines the practical unity of a collective activity in its relationship with the world". The chronotope organizes the collective inquiry about the process, and thus it organizes the process itself. In the example of the process "designing and planning the building project" in the building industry, the group members were ready to sum up their efforts to collectively investigate the process, but in their eyes it had to start with an already designed building. They considered the building design as part of the context of their activity, and not as its object; they excluded the architectural design from the chronotope of the process. Of course the selected chronotope deeply influences the sense of situations and the resulting potentials for action. In this example, actors do not make much sense of the influence they may have upon the building design, and their action scope does not include this area.

3.4. The inquiry about the process is heterological

Due to the heterogeneity of the process, the inquiry is heterological, i.e. characterized by the diversity of competences, professional cultures and genres involved. Process heterology can be a powerful stimulus for exploration and innovation. The interaction between distinct genres may destabilize professional worlds and question solid beliefs. Conversely it is a permanent challenge for the coherence of collective activity. Compensatory mechanisms are carried out, such as norms and procedures imposed by a central authority and the regulation of interactions through instruments such as management information systems, which constrain the chronotope. For example the fordian assembly chain imposes the spatial layout of actors and the rythm of work. The diffusion of integrated management information systems (ERP[3]) is another example: this type of software constrains the process configuration by the way it organizes data flows (Lorino, 2006).

The process dynamics is based upon the resulting permanent struggle between standardisation and heterology. Collective sense making (Weick, 2001) generates gradual convergence in the process, reinforced by the increasing normative power of instruments. But at the same time the continuous flow of experience, lived in different ways by different actors in different positions, with their proper professional cultures and personal histories, permanently renews the process heterology. Some form of solidarity must counterbalance this natural tendency to diverge. According to Bakhtin, "'I' can reach accomplishment in the speech only by getting support from 'we'" (Bakhtin/Voloshinov, 1926). If this observation is transposed to collective activity, 'I' can reach accomplishment in the *activity* only by getting support from 'we'. To give inquiry some reasonable probability of success, there must be some emotional adherence to the inquiry as sense making practice, even though it may upset roles and professional identities. If such commitments do not emerge, the organizational changes often appear as hierarchical directives or technological impositions and are suffered with all kinds of social, psychological and managerial difficulties.

4. THE PROCESS INQUIRY HAS AXIOLOGICAL DIMENSIONS

It is one essential characteristic of utterances for Bakhtin "to be assigned values" (Todorov, 1984), whereas language "is alien to any axiological world": "Only utterances can be beautiful, or sincere, courageous or shy. All those attributes relate only to the organization of speech and utterances" (Bakhtin/Medvedev, 1928). The same observation might be made for collective activity. Actors' reflexive inquiry into the process must be triggered by their perception of some failure or some potential for improvement. The will to transform the process must be driven by some evaluative judgment, necessary for collective sense making: what values can be assigned to the present state of the process, what actions can modify them?

Only concrete collective activity, the situated "process in work", can be socially evaluated and considered as costly, competitive, reliable, safe or risky. The technical base of the process (formal description of tasks, models, technology, procedures) provides an axiologically neutral and static language of activity, describing tasks, instruments, and their

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[3] ERP = Enterprise Resource Planning

normal utilization. It provides actors' interpretation with a system of generic and abstract meanings, whereas the development of real collective activity, situated in a context, subject to adjustments and modifications, requires evaluative judgments. The performance evaluation of the process produces dissonances, triggers the inquiry and gives it rhythm and milestones. Even when a process is evaluated in a theoretical way, for instance in investment planning, when some technological option is evaluated, the evaluation takes into account hypotheses about future competitive cost, state of the art performances, probable conditions of implementation, market requirements, and all kinds of parameters which describe a virtual context. Evaluation and context are linked.

The evaluation of the process relates the singular concrete situation with general classes of values. For example, in the case study presented in this paper, the safety evaluation of the building process links concrete "here and now" work situations with general social values about work safety. Evaluation is always mediated by evaluation instruments, which can be formal (accounting, financial and non financial key indicators, scorecards, rates of accidents or quasi-accidents) or informal (rule of thumb, experience based qualitative judgment). Those which are actually engaged in the process and not only formal compliance with some bureaucratic imposition play a major role in the development of collective activity.

5. A CASE STUDY: SAFETY ON BUILDING YARDS

Research about collective activity involves *major social and practical stakes*, as the example of work safety on the building yards will illustrate. The case is based upon an in-depth longitudinal field study in one of the biggest construction and civil engineering companies in the world (more than 120 000 employees in the world in 2006). After years of effort to improve work safety on building yards, the improvement curve seemed to reach a limit. The accident ratio stabilized at a level which is still twice higher than in most other industries. The management of the company decided to explore the reasons of this standstill. So far, the company had had two types of responses: they worked on the psychology and behavior of actors (safety awareness, discipline) and they developed artefacts for safety management (procedures, controls, norms, technologies). These actions can be compared with the two "empirical deviations" analyzed by Bakhtin in his dialogism theory: either focusing upon the actor's psychism; or focusing upon the linguistic materiality of the produced speech, or the same two empirical deviations already analyzed in the case of processes: focusing upon the subjectivity of actors or upon the technical base of the process. Some of the corporate experts thought that policies focused upon the normative and the behavioral aspects of safety had reached their limits. They suggested that there were risk factors related with organizational structures and practices, rather than with behaviors. They asked two research teams (one in organization science, one in psychology of activity, both referring to Vygotsky's theory of activity) to jointly explore the problem.

5.1. Case study methodology

The research was focused upon activity rather than upon accidents, since danger generation can only be understood through the general conditions of normal activity. Accidents and quasi-accidents are exceptional events and provide a limited empirical basis

to study danger generation. By analysing normal activity, it was also expected to overcome behavioral explanations and to connect risk-taking with organizational factors such as mutual misunderstandings, lack of coordination, lack of experience feedback, time pressures, or inadequate competences.

It was necessary to adopt a methodological approach which allowed observing activity and the reflexive inquiry about activity achieved by the process actors. A cooperative inquiry methodology, involving the process actors as co-researchers, was adopted (quotations from Raelin, 1999):
-    research purpose: "practical knowing in the service of human flourishing", here work safety improvement;
-    interaction with actors: the research was made *with* rather than *on* "participants acting as co-researchers and co-subjects";
-    permanent objective of "facilitating the emergence of cooperative groups": a working group involving the process actors was co-convened by a researcher and a manager of the company.

5.2. A conflicting demand situation

As in many dangerous activities (road transport, fire fighting, civil engineering), the building industry faces a social contradiction with conflicting social demands. On one side, it is admitted that a high rate of work accidents is socially unacceptable. On the other side, a large part of the society tacitly admits that it is necessary to achieve those activities, for example to produce housing and buildings, within certain limits of cost and time, which supposes that the corresponding level of risk is accepted by concerned workers. This social contradiction reflects on the internal situation of conflicting demands in building companies.

In many situations a trade off was observed between delay and safety. The cultural system of the building industry identifies professional value with the ability to achieve projects in time and budget. In the customers' eyes, a performant company delivers the building in due time. A reliable construction manager, likely to have bright carreer perspectives, is the one who always concludes his project in time. A good operator finds solutions to avoid delays in difficult situations, as part of his professional pride. Everybody in the company knows that the overall economic situation of the firm very much depends on the average project time. On the other side, the company leaders have made strong commitments to safety. It has been declared one of the main strategic priorities. Rewards and threats try to enforce safer behaviours.

The potential contradiction is not clearly identified, since safety is first seen as a behavioral issue rather than an organizational issue. In the last resort, workers and supervisers are said to have the right to refuse a task they consider as dangerous. Here we have a typical "subjectivist" empirical deviation: the safety issue is not seen as a collective dialogical issue, but as an individual problem. There are very tight economic constraints (highly competitive sector, strong price pressures). As a result, project designers and planners try to minimize project time and cost to get contracts, recurring to rational representations of the future project implementation (standard cost and time, scheduling techniques). The actual activity is supposed to conform to the planned one. Here we have a

typical "objectivist" empirical deviation: collective activity is confused with its rational image (plans, schedules, budgets) and not really taken into account as situated dynamic development. Later, in production stages, when most of the design and planning options are frozen, if the workers face unplanned situations, they invent a compromise to do the job "as safely as possible", which means dangerously. Management tries to control behaviour but also wishes that the job is done in time. Safety management is reified, in the form of safety controllers, safety rules, incentives, and sanctions, to try to "control out" risk.

As a result, the operators face contradictory situations in which their "subjective" existence as feeling, reasoning and responsible beings is solicited in a general attempt to promote safe behaviors, but their "objective" existence as workforce (work time and cost) is planned to do things in time with no provision for problem solving and activity (re)design. They are supposed to "execute plans" and not to rethink activity in situations.

5.3. The working group (reflexive inquiry)

In a preliminary phase, actual situations of work were observed, through a durable presence on two types of settings: offices where the design and engineering of projects take place and building sites. Thirty-two representative contributors to the process were interviewed, to model the activity system and to translate it into text and diagrams. This representation was not expected to give an accurate description of the process, but to support collective discussion about design and preparation activities in the subsequent working group.

A working group involving nine representative actors of the "designing and planning the building project" process was established to achieve the collective analysis of the process from the point of view of risk generation. The group tried to free reasoning from routines and usual explanatory frames. The members had no hierarchical relationship with each other. They were considered as experts of the process and co-researchers in the research project. The group had eight meetings of three hours each. The executive who co-convened the group presented the results to the steering committee of the research project (corporate executives) whose members decided to pursue the project with beta site experimentation.

The group first validated the representation of the process and decided to analyze those activities which were viewed as the most critical for safety. Several organizational problems were identified and studied by the group, such as:

- No production actors are involved in the early phases, when, in response to a tender (a client's building project), the first design and plan of the building project are elaborated by the "price-making team" (design engineers), to make a commercial proposal to the client. Some production actors (site managers, foremen, subcontractors) should be consulted as experts about the technical options which directly impacts safety.

- All the actors who must intervene in the detailed design of the building project should be appointed from the very beginning, so that they can contribute to the first analysis of the project.

- In detailed planning and scheduling, important and almost irreversible decisions are made. They determine the rhythm of the future building project. Those choices would need operational expertise from foremen and subcontractors, who are seldom involved.

- There is no systematic experience feed-back, about either the building methods, or planning and scheduling options, especially from a safety perspective. For example, there is no analysis of the gap between planned and actually implemented methods. When a project ends, the site manager seldom records any feed-back before starting the next project, for lack of time and motivation. There is no feed-back about suppliers.

- Tasks which are critical for safety should and could be identified from the early phases of the project, at the stage of the commercial proposal, so that a specific attention could be given to them later, with adequate resources.

- There is a "break off" between project design and project preparation phases. In the first preparation activities, the members of the building team would need a support from the engineers who designed the project; especially for their own planning and subcontractors selection.

- According to the group members, the lack of resources in the early phases of a project (time, expertise support, budget) contributes to "design risk in". The official rule is "not to invest before the project is sold". To the contrary, risk could be "designed out" by investing more expertise and resources. It would not improve only safety, but economic performances too, since more careful design and planning involve higher immediate cost but probably spare time and money in later phases.

- There is no practical guide of existing competences for specific problems. For instance, when the engineering office must price a project, they meet serious difficulties to identify the needed competences.

5.4. The two main issues of the "prolonged design" process: safety anticipation and production "slack"

Most problems identified by the group raise one of the two following issues:
- the actors of design and planning do not generally seem to be aware that the safety of the future collective activity is significantly influenced by the result of their own activity (design and planning decisions, artefacts such as plans, drawings, equipments, contracts...): hence, the general impression of insufficient anticipation of safety issues;
- partial planning and design adjustments in later phases are not perceived as legitimate and important missions of the production actors; they are rather "unofficial" tasks, bound to "correct design deficiencies" which should never had taken place; those late adaptations do not benefit from any specific resource and time allocation, which would appear as organizational "slack"; hence the general impression of time pressure on production phases.

On the first issue, safety so far does not really appear as a strong priority for the early design activities. Safety is rather considered as an operational issue. Common wisdom in the industry justifies this lack of anticipation by claiming that safety anticipation is not feasible in the building sector: "we face nature", "each situation is new", "we only make

prototypes". In this light, anticipation is almost impossible because people do not even think of it as potentially useful. Therefore, there is limited incentive to try to forecast safety issues connected to construction technique.

Caring for safety is then a mission mostly left to production phases. This is coherent with the behavioral view about safety, according to which accidents mainly result from individual behaviors. Workers' behavior can only be controlled by production management. Production phases are then supposed to "execute" previously made plans and designs and to control safety. Many irreversible design decisions have been made. There is hardly any time or budget allocation for "correcting design mistakes or blanks", though it is unavoidable to face unplanned situations since a building project requires the coordination of many internal and external actors, engineers, foremen; it has to deal with uncertain weather conditions. On all the observed building sites, actors felt a tremendous lack of slack, and there was much non recognized improvisation.

The lack of slack makes the building activity look like the "tightly-coupled" technological systems analyzed by Perrow in his Normal Accidents Theory (Perrow, 1984). Here, the tight coupling derives from organizational rather than technological integration. According to Schulman (1993), one of the main features of Highly Reliable Organizations (HRO) is *conceptual slack*, i.e. "a number of diverging theories pertaining to the organization's technology and production processes are maintained simultaneously. Only after discussion and negotiation does the organization reach a decision upon the course of action to be pursued", whereas "one dominant theory on the technology and the production processes may easily lead to hasty, undue action and blindspots (Turner 1978)". **"**If a system is very tightly-coupled, time may be too short to negotiate the proper course of action, and HROs still rely upon rigid adherence to prescribed rules" (Rijpma 1993). In other words, organizational slack ("discussion and negociation") is necessary for conceptual slack.

5.5. The chronotope of collective activity plays a key role

As the main result of the study, it appears that the contradiction between achieving collective activity under economic and time constraints and ensuring safety at work can be at least partially removed by *modifying the chronotope of collective activity*. The structural characteristics of collective activity (time schedule, resource allocation, technological options, team composition, suppliers' choice), defined in the early stages of the building project, play a key role in the safety conditions of the subsequent building work. It proves to be difficult to "control out" (through rules, controls, incentives) risk if designs are considered as frozen. It seems much easier to "design out" risk, when the actors of the process collectively design their own collective activity, from the very first phases of a building project. According to Perrow (1999), "redundancy and all other safety measures should be designed in from the start and not added afterwards, since add-ons are disproportionately the source of accidents."

When limited anticipation in design stages is combined with little slack in production, tight-coupling produces situations in which economic performances and safety appear as - and are - contradictory. The solid coherence of such tacit judgments as "it is not possible to design risk out", "safety is mainly a behavioral issue", "safety must be managed through

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rules and specific control systems", "safety is a special problem which must be treated with a specific set of tools, it is distinct from operational management" outline a paradigm. This paradigm rests upon a view of collective activity which deeply influences professional reasoning, the definition of competences and the incentive systems. In this view there are two distinct and separate processes, "designing and planning the building project", "executing the building project". The main purpose of the first process is the technical and economic optimization of the project. The main purpose of the second process is the "execution" of plans in satisfactory economic and safety conditions. That is what the actors work for, what they are expected to do, and what their world is made of. The first process gives targets to the second one which tries to manage danger, when the constraints can hardly be slackened: it is even perceived as the challenge and the honor of the second process actors to solve all kinds of difficulties.

5.6. Transforming the chronotope of collective activity

Collective activity is configured by the way actors reflexively analyze it. They can transform its chronotope (time, spatial, and social frame). In the design of building activity, questions can be raised about the time configuration: does it include architectural design and long term feedback loops[4]? Questions can also be raised about spatial configuration: is collective activity limited to the yard, or does it include technical support, planning offices, workers' homes (danger of road accidents on their daily commute from home to workplace)? Questions about social configuration can also be raised: does the process include subcontractors, suppliers, architects, engineering companies, legal authorities? The more limited the configuration of collective activity enacted by the actors, the stronger the constraints suffered by them in building operations and the level of contradiction between economic performance and safety. To the contrary, the wider the temporal, spatial and social horizon of collective activity, the wider the margin for redesign and cooperative engineering, and the safer the project is likely to be. Broader cross-functional cooperation and long feedback loops are essential for learning. But on the other side the process must remain manageable and "thinkable" by actors.

The dominant cultural practice in most industrial societies tends to locate construction risk in a collective activity defined as *system operation* (building site in operation). It appears from the case that one powerful direction to improve safety consists in extending the space and time frame of the collective activity under consideration, trying to overcome the traditional separation between "design / planning" and "execution". By this key step, a new collective activity is enacted, a kind of "prolonged design process", that will be called here "designing and preparing collective activity" (DPCA), which starts in the very first phases of the project and goes on during most of the project, since adjustments and improvisation are required in all phases. This collective activity (planning and scheduling, determining technological options, team composition, subcontractors and suppliers' selection, design or plan adjustments, team preparation for critical tasks) involves actors traditionnally considered as "designers" and actors traditionnally considered as "doers", in a dialogical continuous interaction, over a long time period which encompasses most of the project duration.

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[4] Prefabricated parts vs on site pouring for instance, or self elevating systems vs classic coffering might be constructive modes which should take architecture into account.

Furthermore, all actors involved should be aware that they do not design "technical systems", but "collective activity", as a living and partially unpredictable process. The key issue is the actors' awareness that they are actually designing *their* own collective activity. Actors considered as "designers/planners" should feel involved in the building activity, and actors considered as "producers" should become direct actors of design and planning. So the collective activity traditionally divided between "system design" and "system operation" should be redefined as *collective activity design and preparation*. The focal point of organizational learning (in this case, learning to control danger) lies in the reflexive understanding and ongoing redesign of collective activity by actors, with the relevant chronotope. Designing safety in collective activity does not take place only in the first phases of the project: safety planning does not determine safe activity. Safety is also designed in the subsequent phases through the reflexive analysis of situations during the building execution. On-site actors are, *de facto* if not *de jure*, the reflexive designers of activity when facing unpredicted situations. This radical change in the actors' scope requires adequate resources (availability of design expertise, organizational slack such as re-planning sessions in the course of building, meeting time for on-site preparation tasks). It paves the way for the development of new tools more specifically addressing ongoing redesign and preparation, such as 3-D models to help teams to prepare the work for the most critical tasks, in simulated settings. Through the reflexive inquiry, actors develop their structure of roles and their capacity to improvise (Weick, 1998; Weick & Roberts, 1993).

The multiplicity of voices, related to different points of view, objectives, competences and motivations, is essential to maximize the probability to identify risk, to spot cognitive dissonances, and to trigger abductive inquiries. This diversity of voices, which Bakhtin (1984) names "polyphony", allows to mix viewpoints and to challenge "conventional wisdom". To "design safety in", organizations should ensure the polyphony of the inquiry. According to Perrow (1999), "Skepticism should be structured into the organization through explicit roles and generating worst case scenarios […]. Most important of all is increasing the role of external stakeholders in accident investigation and organizational changes […]."

6. CONCLUSION

From this case we conclude that dissatisfaction about some value, here safety, can trigger the reflexive inquiry of a process by the process actors with the purpose to adapt and redesign it. By doing so, the actors (re)define the "chronotope" of the process, i. e. its space, time and organizational configuration, which plays a key role in the way actors can collectively make sense of their activity. In our case, the actors' inquiry concluded that the traditional coexistence of two processes ("designing and planning the project", "executing the project") was an important organizational factor of risk. So a new configuration was proposed, the process of "designing and preparing collective activity".

This research about conjoint collective activity in the form of processes has theoretical, epistemological, methodological and practical stakes. From a theoretical point of view, for historical reasons (Lorino, 1989), management studies tended to view organizations as decision making rather than activity systems, with important consequences on the status of management tools and actors' rationality (Swieringa & Weick, 1987). Research about

collective activity aims at making collective activity a central research object for organization science within an activity-based paradigm of organization.

Stakes are also epistemological. In the frame of a paradigm based upon collective activity, the researcher cannot but appear as one actor of the situation. The researcher's presence inevitably transforms the social configuration of collective activity, its "chronotope". Claiming to observe an experience without being part of it appears as the "onlooker's fallacy" criticized by Mary Parker Follett a long time ago (Follett, 1924). The researcher's participation also changes the axiological dimension of activity. The researcher's "knowing" activity and the activity "to be known" that he/she studies are consubstantial. The researcher can build an understanding of the studied activity, but not an external transcendent knowledge. Comprehension is dialogical and appears as a response: "any comprehension is active and is already the germ of a response" (Voloshinov, 1977, quoted by Todorov, 1984). Research about organizations and collective activity would then follow an epistemology of comprehension rather than an epistemology of knowledge as meant in physical sciences, or more precisely an epistemology of "comprehension for action". From a methodological point of view, such an epistemology of comprehension calls for cooperative inquiry methods (Reason, 1988; Heron, 1996; Reason & Heron, 2001), which stress the importance of integrating research and practice and the active participation of organizational actors as co-researchers.

Last, stakes are practical. The central role of inquiry in organizational dynamics questions the managers' role and methods as much as it questions the researcher's role and methods. The inquiry – the frame of organizational change - cannot be achieved without the actors of the process. Managers can play an active role in it, according to their specific expertise, as other process actors do. Is there a specific contribution of managers as managers? They may play a particular role as the experts of inquiry, to trigger, conduct, and support its development; this form of managerial practice should be explored in some future research.

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