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ABSTRACT:

This paper explores the methodological implications of non-representational approaches of organizational complexity. Representational theories focus on the syntactic complexity of systems, whereas organizing processes are predominantly characterized by semantic and pragmatic forms of complexity. After underlining the contribution of non-representational approaches to the study of organizations, the paper warns against the risk of confining the critique of representational frameworks to paradoxical dichotomies like intuition versus reflexive thought or theorizing versus experimenting. To sort out this difficulty, it is suggested to use a triadic theory of interpretation, and more particularly the concepts of semiotic mediation, inquiry and dialogism. Semiotic mediation dynamically links situated experience and generic classes of meanings. Inquiry articulates logical thinking, narrative thinking and experimenting. Dialogism conceptualizes the production of meaning through the situated interactions of actors. A methodological approach based on those concepts, "the dialogical and mediated inquiry" (DMI), is proposed and experimented in a case study about work safety in the construction industry. This interpretive view requires complicating the inquiring process rather than the mirroring models of reality. In DMI, the inquiring process is complicated by establishing pluralist communities of inquiry in which different perspectives challenge each other. Finally the paper discusses the specific contribution of this approach compared with other qualitative methods and its present limits.

Key-Words:

Activity, Dialogism, Inquiry, Interpretation, Pragmatism, Research Methods, Semiotic Mediation, Work Safety

RESUME :

Ce papier explore les implications méthodologiques d'approches non représentationnelles de la complexité organisationnelle. Les théories représentationnelles sont centrées sur les formes de complexité syntaxiques (relationnelles) des systèmes, alors que les processus d'organisation sont principalement caractérisés par des formes de complexité sémantiques (sens des représentations) et pragmatiques (effets pratiques). Après avoir souligné la contribution des approches non représentationnelles à l'étude des organisations, l'article met en évidence le risque d'enfermer la critique des cadres théoriques représentationnels dans des dilemmes insolubles telles que "intuition" contre "pensée réflexive" ou "théorisation" contre "expérimentation". Pour résoudre cette difficulté, il est suggéré de recourir à une théorie triadique de l'interprétation, et plus précisément aux concepts de médiation sémiotique, d'enquête et de dialogisme. La médiation sémiotique relie de manière dynamique l'expérience située et des catégories génériques de significations, construites socialement. L'enquête articule la pensée logique, la pensée narrative et l'expérimentation. Le dialogisme conceptualise la production de significations à travers les interactions situées des acteurs. Une approche méthodologique fondée sur ces concepts, "l'enquête dialogique et médiatisée" (DMI), est proposée et expérimentée dans une étude de cas sur la sécurité du travail dans l'industrie de la construction. Cette vision interprétative exige de complexifier le processus d'enquête plutôt que les modèles représentationnels de la réalité. L'approche DMI complexifie le processus d'enquête en établissant des communautés d'enquête pluralistes, au sein desquelles des perspectives interprétatives différentes peuvent interagir. Dans sa conclusion, l'article discute la contribution spécifique et les limites de cette approche en comparaison d'autres méthodes de recherche qualitatives.

Mots-clés :

Activité, Dialogisme, Enquête, Interprétation, Médiation sémiotique, Méthodes de recherche, Pragmatisme, Sécurité du travail.

JEL classification : Z 00

Research Methods for Non-Representational Approaches of Organizational Complexity. The Dialogical and Mediated Inquiry.

Introduction

Representational epistemologies have played a key role in the study of complex systems. Their potential fecundity for the analysis of complex organizational processes has been a recurrent issue in literature (Anderson et al. 1999), as well as their limits, analyzed by diverse streams of organization research (Manning 1979, Chia 1996, Tsoukas 1998, Tsoukas and Chia 2002, Shotter 2006, Cooper 2007, Nayak 2008). Alternative approaches to the study of organizations were developed, like narrative studies (Czarniawska 1998 and 1999, Tsoukas and Hatch 2001), processual frameworks (Shotter 2006, Cooper 2007, Nayak 2008), organizational design (Boland and Collopy 2004), collective sensemaking (Weick 2001, Weick and Sutcliffe 2007), theory of activity (Engeström 1987, Clot 1999, Adler 2005), pragmatist and semiotic analysis (Lorino, 2001, Lorino and Tarondeau, 2002), amongst others.

A first question about the study of complexity in organizations will be briefly debated in the first part of this paper: can the concepts and techniques developed by complexity researchers within representational frameworks contribute to non-representational studies? We shall argue that it may be the case in some organizational situations, but that the type of complexity generally faced by organization studies is not the predominantly syntactic complexity with which complexity theories have been mostly concerned. Organization studies face predominantly semantic and pragmatic forms of complexity, which require different concepts and methods.

In the second part of the paper, we underline the important contributions of nonrepresentational, in particular processual and narrative approaches, to the study of organizational complexity. We also observe that the authors who criticize representational epistemology sometimes develop dualist oppositions, like intuition / reflexive thought, creative thought / logical reasoning, continuity / discontinuity, singular versus generic, prereflexive versus reflexive conscience. These dichotomies may be effective to trigger discussion, but they run into two types of danger. First, they develop counter-images of representational epistemologies which may appear as their symmetric image in a pendulum move. They may then miss the more fundamental theoretical critique which questions the whole dualist framework *per se*. Second, they may lock organization researchers in aporetic dilemmas which make field work and connection to practices difficult.

The third part of the paper suggests that the whole debate about "representations" can be reframed in a non-dualist epistemological framework, the triadic theory of interpretation, first developed by Charles Peirce (1958/1931), later widely developed and used in philosophy (Derrida 1967), literary and cinema theory (Todorov 1973), semiotics (Eco 1976, Eco & Sebeok 1988), psychology (Lacan 1966, Balat 2000), linguistics (Ransdell 1980) and knowledge engineering, but still a fairly unfrequent reference in organization studies. In particular, the concepts of semiotic mediation (Peirce 1958/1931, Vygotsky 1986), inquiry (Peirce 1958/1931, Dewey 1980/1938) and dialogism (Bakhtin 1981 and 1984, Todorov 1981) will be used to overcome problematic dichotomies. In the fourth part, a research method based on these concepts, the "dialogical and mediated inquiry", is then tested in a field study concerning work safety on building sites. The conclusion reviews some of the differences and specific contributions of the proposed method, compared with other qualitative methods. It outlines some limits of this work and issues to further investigate.

1. The representational approach of complex systems and its limits

1.A Representational theories of complexity

Representational epistemology will be defined here as an epistemology which assumes that human mind can reproduce reality in a way that corresponds to the real world (Goldman 1986). Representational epistemologies are realist: objects are supposed to exist and to be governed by laws independently from subjects' observation. Their cornerstone is the theory of "truth as correspondence". In their cognitivist version (Simon 1982 and 1996), "representing" more precisely means paralleling the objects of the world with physical symbols which can be manipulated according to logical rules ("computable" symbols): "(The cognitivist hypothesis is that) cognition can be defined as computations of symbolic representations" (Varela et al. 1991). Representations then appear as logical shapes which can alternately reside in human (brains) or objective (texts, computers) substrates. The "representation" concept provides a theoretical link between individual (mental representations) and organizational (shared mental representations and artificial representations) learning.

In this framework, complexity is defined in multiple ways, but always as an objective attribute of the system under scrutiny. In most cases it involves the high number of system elements and connections between elements and the high diversity of interrelation rules: "roughly, by a complex system I mean one made up of a large number of parts that have many

interactions" (Simon 1996: 183). In other words, complexity is defined as a *syntactic* characteristic of the system. Considering the three dimensions of sign (Morris, 1938): syntax (formal relations between signs), semantics (relations between signs and the objects they signify) and pragmatics (uses and effects of signs within the behavior of the interpreters), the cognitivist framework makes the strong assumption that "the syntax of the symbolic code mirrors its semantics" (Varela et al. 1993: 42). The correspondence with real phenomena is ensured through the formal logical relations between symbols, which reflect the real relations between the objects of the world. Semantics is contained in the information processing syntax. Complexity is the syntactic complexity of interrelations.

The representational approach has methodological consequences. First, there is a clear frontier between the inside and the outside of the system. For example, in Ashby's law of requisite variety, a set of disturbances D starts in the world outside the system, and a set of variables E describes the inside of the system (Ashby 1956: 210). As a result, the researcher has the status of an *observer*, external to the object of research, and she/he should be a rational information processor. The rigour of observation, "unbiased" by the researcher's subjectivity, appears as a major methodological issue. Another methodological implication is the abstraction or decontextualizing principle: "Cybernetics offers a single vocabulary and a single set of concepts suitable for representing the most diverse types of systems" (Ashby 1956: 4). The model can and should be made as independent of the singular contexts as possible.

1.B Limits of the representational framework

The representational theories of complexity helped to master high levels of syntactic complexity in many areas of social life. However scholars have repeatedly pointed out their limits for organization studies. The abstraction principle tends to ignore the actual situatedness of research. Any inquiry takes place in a specific situation which influences the nature of representations (Chia 1996: 215, Tsoukas and Hatch 2001). Tsoukas and Hatch observe that any decontextualization move is itself embedded in a specific context; trying to escape context A generates context B, so that context is inescapable, "no matter how many interpretive moves we make" (Tsoukas and Hatch 2001: 999). The representational view stresses the representation as an intellectual artefact and tends to conceal the ongoing work of representing and theorizing (Nayak 2008), as Czarniawska (1999: 14-15) observes about the Newtonian scientists, quoting Schaffer (1993: 279): "the 'amnesia' of realism, in which the work that establishes representations is forgotten". Considering the "observer" as a rational

information processor leads to a "lack of reflexivity" (Chia 1996, Tsoukas and Hatch 2001): it hides the presence of a representing subject behind the representation. Last, philosophers like Bergson (2001/1907) and James (1998/1890) showed how representational frameworks miss the permanent flow of vital experience and the continuous process of irreversible and unpredictable creation and destruction (Chia 1996, Shotter 2006, Cooper 2007, Nayak 2008): "the essence of organization is life" (Chia 1996: 215). Time, for example, appears in the representational accounts as a variable in a model, much alike spatial variables, losing the essence of time as discovery, feeling and flow of experience.

These critiques lead to an alternative view of complexity, not as a characteristic of the inquired system, but as an interpretive construct of the inquirer, what Tsoukas and Hatch call "second order complexity": "organization might be not only a feature of the world, but also a feature of our thinking about the world... One way of viewing organizations as complex systems is to explore complex ways of thinking about organizations-as-complex systems" (Tsoukas and Hatch 2001: 980). This view raises a methodological question: can the concepts and techniques developed by complexity researchers be used in non-representational approaches, by changing their epistemological status? Instead of providing accurate descriptions of real systems, can they be considered as interpretive tools to support sensemaking, positing that "the developing logic of complexity theory itself is entirely compatible with an interpretive approach" (Tsoukas and Hatch 2001: 981)? To answer this question, it is necessary to return to the representational view of complexity as primarily syntactic. "In the case of human language, it is far from obvious that all of the semantic distinctions relevant in an explanation of behavior can be mirrored syntactically" (Varela, Thompson and Rosch 1991: 42). Complexity theories allow building numerous and complex interrelations between the variables which describe a system. However in many situations, the main difficulty to understand organizing processes is rather of a semantic nature: how to build meaningful variables, how to make sense of the signs which circulate in the organization? Difficulties are also of a pragmatic nature: what practical effects do representations including those produced by researchers - have or are likely to have?

Actually the very notion of "data" (="given" in Latin) assumes that the semantic problem has been solved: elementary units of meaning are supposed to exist, thanks to the syntactic structure of the representation. Herbert Simon identified this difficulty in "The sciences of artificial" (Simon 1991: 80-81), when he observed the ambiguous meaning of a sentence for lack of context. However he solves the problem by attaching a drawing to the sentence, i.e. by

adding graphic information (spatial positions) to complete the syntactic structure of the initial message.

The "elements" of an organizational system are interpreting subjects, who can permanently transform the meaning of signs and the spatial and temporal framework of their action. At any moment, the list of the so-called "variables" of the system, and the semantic and pragmatic content of each of them can be modified. The first question for the inquirer then is not the relational complexity of descriptions, but to know if the system is altogether describable in a meaningful way.

An example can illustrate this semantic/pragmatic difficulty. Morel and Ramanujam (1999: 289) analyze the adaptive dynamics of organizations. They assume that an organization can be described as a system of "interaction between complicated functional units" and, like a physical system, can "rely on mathematically proven or computationally justified facts". Then the authors analyze the adaptation of an organization as self-organization, guided by the goal of "improving the performance of the worst-performing units" rather than "on the more diffuse objective of maximizing performance". It happens that one of the authors of this paper experienced a similar approach in the nineties. Researchers developed artificial intelligence systems to schedule complex manufacturing systems on the basis of their critical resources - the "worst-performing units" (e.g. bottlenecks) - named "constraints". Those models proved to be effective to help situated decision-making when the "constraints" of the manufacturing system could be defined, but that happened rarely. The identification of the "worst-performing units" was contingent to so numerous and ever-evolving contextual factors that it often proved impossible to give the word "constraint" a pragmatic and semantic content.

Furthermore if complexity is viewed as a characteristic of the interpretive relationship between inquirers and situations, the focus of attention should move from the complexity of the research object to the complexity of the inquiry process. In contrast to Ashby's law of requisite variety, it is not clear that representations with a high level of descriptive complexity are more effective than simplified heuristic supports in situated inquiries with a high social and interpretive complexity (how many inquirers are involved, with what range of professional competences...). If the purpose of models is not replication but mediation for inquiring, representations must be objects of critique and discussion, whereas descriptive complexity is interpretive, then we need theories and methods for the *complex interpretation of systems* rather than the *observation of complex systems*.

2. Non-representational approaches of organization studies

2.A The contribution of non representational approaches of organizations

Scholars who developed non-representational approaches of organizations (Weick 1979 and 2001, Chia 1996, Czarniawska 1998, Tsoukas 2000, 2005, Tsoukas & Hatch 2001, Tsoukas and Chia 2002, Shotter 2006 and 2008, Cooper 2007, Nayak 2008) contributed valuable insights for the study of organizations, e.g. the necessity to contextualize organization research; to make the researcher visible, with her/his personal identity and position (reflexivity); to restore "the breath of life" (Chia 1996: 215), the inspired and creative moves of organizational life and the transforming power of human imagination; to take into accounts emotions and feelings; to make use of non logical ways of thinking, like narratives, metaphors and abduction; to give an account of time as the continuous flow of experience. These are decisive steps to overcome the limits of representational approaches of organizations and to develop an interpretive view of complexity (Tsoukas and Hatch 2001).

2.B The risk of dualist deadlocks

However, the critique of representational epistemology sometimes runs the risk of a pendulum move opposing non representation or intuition to representation and developing dualist oppositions, like theorizing versus experimenting, intuition versus reflexive thought, creative thought versus logical reasoning, continuity versus discontinuity, "aboutness" versus "withness" (Shotter 2006), space versus time, structure versus process.

Representational epistemologies are based on the specific status of representation as the *true* copy of reality. The critique of their shortcomings can follow two distinct tracks. It can question the notion of representation ontologically, or it can question the epistemological status of representations as true reproductions of the world and re-conceptualize them as signs mediating situated interpretations. The first option leads to questioning reflexive thought, since reflexive thought is mediated by signs and "inner speech" (Peirce 1958/1931, Bruner and Postman 1949, Vygotsky 1986, Varela et al. 1991): "a thought unembodied in words remains a shadow..." (Vygotsky 1986: 498). The importance of "pre-reflexive cogito" in organizational life can be explored, but philosophers who developed the concept of pre-reflexive consciousness (Merleau-Ponty 1945) did not theorize it as an alternative to reflexive thought, rather as a distinct moment in the flow of experience, which includes reflexive thought mediated by language and signs. Even Bergson (2003/1907, 2005/1919), who

inspired recent work about processual approaches in organization studies (Shotter 2006, Cooper 2007, Nayak 2008), in his quest of intuition as a vital elan, disqualified language in its "ready-made" dimension, but he nevertheless searched a "language of time", made of "good metaphors", a type of image that is "almost matter and almost mind" (Bergson 2003/1907).

When radically questioning the representation concept, there seems to be sometimes the dream of regaining a direct access to some "true" or "real" world, beyond the mimetic forms which ordinarily veil it, in a realist stance: "to return to the true nature of things" (Nayak 2008: 182), or "to relate ourselves appropriately to (the very events occurring around us)" (Shotter 2006: 587). Perception is sometimes described as starting from a white sheet: "The work of human senses begins in indefinition. Their task is to create a world of meaningful forms out of structural absence" (Cooper 2007: 1547), a view that many psychological theories of perception reject: "Perceiving is a process which results from the stimulation of a prepared or *eingestellt* organism" (Bruner and Postman 1949).

The dichotomy representation-intuition can lead to paradoxes, like the dilemma contextual / generic judgment. On one side, it is essential for organization studies to preserve the richness and singularity of situated processes. On the other side, it is also a key requirement to somehow produce generic (though not universal) propositions and to avoid confining research in the singularity of each situation, which would make learning impossible.

In another non-representational option, organizational processes - and research about them – are read as narrative practices (Czarniawska 1998, 1999, Tsoukas and Hatch 2001). Here the dilemma "reflexive thought / intuition" is avoided. Narrative thought is reflexive. It does not conform to the static representational views, but it nevertheless makes use of representations, in the specific form of narratives. The living experience of time is recreated twice, first through the elaboration of a plot to build a story (Ricoeur, 1984), second through the situated experience of narrating.

Processual and narrative approaches raise the issues of purpose and evaluation. Are living and narrative processes purposeful? Does the concept of evaluation necessarily refer to the measurement of a variance between a target and a real situation, i.e. to a representational framework? Scholars' answers to those questions are contradictory. Some, like Cooper, consider that "the work of process has no specific goal or end but it is simply the regeneration of itself as pure action" (Cooper 2007: 1559). In the post-modernist view of narrative analyzed by Czarniawska (1999), narrating is an exclusively deconstructive exercise in which the (temporarily) conclusive state of the story is just the last story told amongst an endless range of possibilities. Others, like Tsoukas and Hatch, observe that "narrative is infused with

motive" (2001: 1002). The dilemma between "evaluation as a variance-based judgment", leaving no space to situated creativity, versus "no purpose and no evaluation", makes experimentation and cooperation with practitioners difficult. There may be a way around by making a clear distinction between cognitive and existential purposes. A cognitive purpose - the predictive knowledge of what should be in the future - involves variance judgment. An existential purpose, which does not produce precise norms of action but prompts emotions - "I want to survive as an individual, we want to survive as a social group" - can generate temporary and fallible cognitive purposes: "that is today what we think we should achieve to survive in the future". Rather than a variance-based measurement, evaluation can then be defined as an ongoing judgment about the existential purposes and can be changed at any moment.

Another important issue for non-representational frameworks is the social characterization of the subject. Is the subject - of processual theorizing (Nayak 2008), of understanding "from within" (Shotter 2006), of narrative practices (Czarniawska 1999, Tsoukas and Hatch 2001) - a social or a pre-social subject? Is it individual or collective? Here again, dualism may set us a trap if opposing "individual subjectivity" to "collective subjectivity". Organization studies need to overcome "false dilemmas" (Tsoukas 2000: 534) and to reframe the debate about representation by focusing on the ongoing represent*ing* process.

3. The proposed theoretical framework: mediation, inquiry and dialogism

After briefly defining organizations as processes of collective action, we suggest to resort to the theory of triadic interpretation developed by the pragmatist philosopher Peirce (1958/1931). We explore then the concept of semiotic mediation, to overcome the dichotomy "representation/intuition"; the concept of inquiry, to overcome the dichotomies "theorizing / experimenting" and "narrative thought / logical reasoning"; and the concept of dialogism, to overcome the dichotomy "individual/collective".

3.A Organizing as a semantically complex collective action

We take Weick's dynamic view of organizations as a permanent process of organizing (Weick, 1979) and Schatzki's definition of organizations as "nexuses of practices and material arrangements" (Schatzki 2005: 471). Organizing will be viewed here as collective activity, i.e. the permanent collective effort to transform the world and, at the same time, to interpret this

effort reflexively. It is a process mediated by material and symbolic artefacts. In activity imagination plays an important role. The attention to "what people do" is not sufficient, because activity is more than "what people in organizations *actually do*" (Yanow 2006: 1744) and more than observable behaviours. It involves actors' ongoing inquiries to imagine and at times actually transform their own practice, all that Clot (1999) calls the "frustrated or prevented activity", what actors would be ready to do but are prevented from doing by circumstances, what they imagine, dream or fear could be done. The instantiated part of human activity is "the tip of the iceberg". This is a major source of semantic and pragmatic complexity to study activity.

3.B Triadic interpretation and semiotic mediation

Organization research sometimes tends to identify any form of semiotic mediation with representational approaches. This may be explained by the saussurian or structuralist tradition (Saussure 1983) in social studies. Interpreting would mean producing dyadic signs (signifier / signified), in which a physical signifier (sounds, words) is conventionally linked to a signified concept, with no reference to the practical context. The meaning of a sign would exclusively proceed from its relationship with other signs within a socially established syntactic system. Signs can then easily be identified with pre-established and ready-made concepts, in which the singularity of the living experience has no part. Peirce proposed an alternative triadic theory of interpretation, in which a sign is a thing which stands for something, "in some respect" (1958/1931), not a representation of..., but a representation of ... to... Semiotic mediations can be anything interpreted (Eco, 1988), far beyond language and speech (concepts, tools, images, mimics, acts...). Any mediation refers to an object O of the world, but not to associate it with one signifier A, but with two signs, "B represents O in respect to A". Interpretation is dynamic, a move from O-A to O-B, and then to O-C, etc., in a cascade of interpretive moves (Peirce 1958/1931, Eco 1988). The meaning of a sign does not lie in its syntactic relationship to other signs but in the social and situated context of its use.

The triadic mediation links the singular here and now objects to generic categories "to some respect", for some transformation purpose. Mediations simultaneously belong to the situated experience and to social classes of meaning ("*genres*"), overcoming the dichotomy "situated / generic". Reciprocally, the involvement of genres in actual situations allows their continued re-invention. For example, the meaning of a word is simultaneously (i) a common and relatively stable reference, used in conversations, (ii) ever-evolving through its situated uses. Semiotic mediation allows reflexive thought, by transforming singular situated action

into thinkable, recordable and debatable issues. Vygotsky and Mead observe that thought is mediated by signs: "In a thought process there has to be some sort of a symbol that can refer to this meaning, that is, tend to call out this response, and also serve this purpose for other persons as well" (Mead 1934: 146).

Semiotic mediation involves categorizing, not as a static classification, but as a door open to new relations to other objects. For example, the vocabulary of colours segments the physical continuum of light (Eco 1988: 128, Varela and al. 1991: 167-170). The act of naming and categorizing impoverishes the endless and indivisible diversity of reality. But it makes colour a feature of discussion, technical descriptions, poetry and metaphors. It creates a new reality, for example a conversational reality, which in turn generates infinite living possibilities. What impoverishes also opens new potentials. Discontinuity creates new continuities. From a temporal point of view, mediation embodies past situations and projections into the future in a "threefold present": present, past-in-the-present and future-inthe-present, through the continuous flow of discourse (Ricoeur 1984). It addresses the "paradox of the (n)ever-changing world" mentioned by Cohen (2007: 782): "Each performance (of a routine) is different, and yet, being a routine, it is the same". Cohen suggests solving the paradox through "patterns-in-variety", similar to what is designated here as "genre": categories involved in situated meaning. From a spatial point of view, mediation makes present in the process distant events and beings and locates experience in translocal processes populated by imagined actors.

By linking the situated experience with socially built genres, the semiotic mediation constructs a common world, shared by the distinct participants in the situation – a "common horizon of practical possibilities" (Joas 1996), in which social interactions and mutual intelligibility can take place. The mediating signs are inhabited by a crowd of other subjects, their past, present, future or distant users. "There are no neutral words and forms – words and forms that belong to no one; language has been completely taken over, shot through with intentions and accents (...) All words have the taste of a profession, a genre, a tendency, a party, a particular work, a particular person, a generation, an age group, the day and hour" (Bakhtin 1981: 293).

3.C Inquiry

Ethnomethodologists stressed the role of inquiry in producing social practices: "Garfinkel's very way of understanding situated practical action was through the temporal concept of inquiry, both as an orientation to the future and a form of unnoticed work, which takes effort" (Fox 2006: 430-431), and in the research about practices: "Garfinkel and his followers used that insight as their own starting point for their studies of members' methods of inquiring practical action" (Fox 2006: 430-431). The concept of inquiry was developed by pragmatist authors (Peirce 1958/1931; Dewey 1980/1938), who considered the development of knowledge as an adaptive human / social response to environmental conditions and an active restructuring of the environment (Dewey 1991/1903). The process of inquiry closely interlaces narrative thought, logical reasoning and experimental action to make sense of and transform situations. Hands and feet participate in it as much as brains: "Thought is not armchair activity" (Miettinen 2000). The pragmatist inquiry does not respond to an epistemology of scientific truth, but to an epistemology of comprehension for some purposeful action: "not true, but meaningful" (Peirce 1958/1931). Inquiry is media*ted*: it uses material and symbolic instruments, "tools for acting in the world rather than mirrors for reflecting it" (Tsoukas 1998: 782). It is also media*ting:* it produces new mediations, instruments and languages.

In its first step, the inquiry (Dewey 1997/1909; Dewey 1980/1938; Miettinen 2000) is triggered, not by a cognitive variance or a problem, but by an existential unease. The usual course of activity is disrupted, raising precognitive questions (e.g. survival as an individual, as a group, as a system of values, etc.). The second step defines a problem: "Without a problem, there is blind groping in the dark." (Dewey 1938: 108). The inquiry is an exploratory interaction with the world rather than a problem-solving procedure, since the problem is not given. The definition of a problem provides "the criterion for relevancy and irrelevancy of hypotheses and concepts" (Dewey 1938: 108). In the third step, the analysis of the conditions leads to the presupposition of a possible explanation of the situation, what Dewey calls "a working hypothesis". Building a hypothesis requires a type of reasoning which is neither inductive nor deductive, but what Peirce calls "abduction" (Peirce 1958/1931; Eco and Sebeok 1988): it tries to create a plausible narrative account of the situation. Abduction combines logical reasoning (to be plausible, the narrative hypothesis must fulfil some logical conditions), aesthetical judgment (the hypothesis must be "elegant"), analogy, metaphor or pre-reflexive moves (Peirce speaks of "flashes"). It mixes intuition and reasoning.

The subsequent steps of the inquiry combine reasoning and experimenting. Wittgenstein stresses the difference between narrative hypotheses and empirically testable propositions (Wittgenstein 1964). This distinction echoes Karl Weick's preoccupation that "the role played by empirical testing of hypotheses (...) leads theorists to construct trivial theories" (Weick 1989: 516, quoted by Nayak 2008: 185). It would be equally disturbing to limit hypotheses to

empirically testable propositions in the name of rigor and to disregard any issue of validation in the name of free creativity. Deductive and inductive reasoning develops non-testable narrative hypotheses into testable propositions, to validate the story, not as a "true representation of the world", but as a viable way to rebuild experience. Experimenting is a key feature of the inquiry. Theorizing and experimenting are not two separate processes, but two aspects of the same process: "Action screened through thought turns to another action... Concepts can emerge and take shape only in the process of an activity which makes sense and is orientated towards a goal" (Vygotsky 1994). Finally, the inquiry has two kinds of outcomes: new practices and new concepts, which are temporary and fallible

The inquirer's active participation in the practical transformation of the situation is not seen as a modality of observation ("participant or non participant observation"), but as a radical alternative to it. The organizing process must be studied from within, as "organizational becoming" (Tsoukas and Chia 2002), for two reasons. First, if there is no "truth as correspondence", there can only be a pragmatist validation of hypotheses, through their practical effects. Second, as human activity is more than "what people actually do", research must make its potentialities emerge. As Vygotsky observes: "to study something means to study it in the process of change (in order to) discover its nature, its essence, for it is only in movement that a body shows what it is" (Vygotsky 1978: 65): studying and transforming activity go hand in hand.

3.D Dialogism

The inquiry is a *collective process*, not in a holistic sense, as the amalgamated expression of a collective subject, but in an interactional sense, as the product of permanent exchanges between subjects. By dialogism Bakhtin (1984) means that there are explanations of the world that emerge in the zone of contact between multiple consciousnesses (Bakhtin 1984): "constantly and intensely, we watch and capture the reflects of our life in the plane of other people's consciousness" (Todorov 1981: 146), "truth is not born inside the head of an individual, but between people collectively searching for truth, in the process of their dialogic interaction" (Todorov 1981: 149).

For Bakhtin, no utterance, no speech, no sign, can be attributed to the speaker alone; it is the product of interlocutors' interaction and, in a wider way, the product of the whole complex social situation. "Speech – as in general any form of sign – is inter-individual. Whatever is said, is outside the "soul" of the speaker and does not belong to him only. The speaker has rights on the speech, but the listener has also his rights, and the voices which resound in the author's words also (since there is no word which belongs to none)" (Bakhtin quoted by Todorov 1981: 83). Following a trail open by Bakhtin himself when he notes that "human act is a potential text" (Bakhtin, 1986: 107), we extend his concepts of utterance and dialog to *acts* as utterances and *collective activity* as a dialog between acts. Widening Gadamer's assertion that "every text answers a question" (1989), we admit that "every act responds to acts". Tsoukas and Chia (2002: 579) identify the intertextual nature of managers' thought: "managerial intentions are best understood as an author's text, which is interpreted and further reinterpreted by those it addresses". For ethnomethodologists, the main form of "textual" expressions in organizations is activity itself.

Shotter (2008) stresses that the dialogical framework avoids intellectualist reductions and takes into account the situated and spontaneous dimensions of organizing. The importance of generic mediations in the dialogical approach should not be underestimated either. Dialogism is not a purely intuitive inter-subjectivity. In the first instance, dialogs relate texts, speeches, acts, and all kinds of signs, rather than psychic subjects: "dialogical relations constitute a special type of semantic relations, whose members can be only complete utterances, *behind which* stand (and in which are expressed) real or potentially real speech subjects, authors of the given utterances" (Bakhtin 1986: 124).

Admittedly, for Bakhtin, utterances only make sense in the situation, but they use words which are loaded with their previous uses. To theorize this double nature of dialog as situated and expressing categories, he defines the concept of "speech genre": "Each separate utterance is individual, of course, but each sphere in which language is used develops its own *relatively* stable types of these utterances. These we may call speech genres." (Bakhtin 1986: 63). There is a permanent iteration between the situated creativity of speakers, what Bakhtin calls "stylistic creation", and the generic systems of meanings ("genres") they use (Bakhtin 1986: 63-64). Genre and style constitute each other. Style is governed by genres, and it transforms them. There is an iterative relationship and not a binary opposition between responsiveness and abstraction, projection into the future and turning to the past. Spontaneous addressivity to others combines with generic frameworks of meaning-making: "The various typical forms this addressivity assumes and the various concepts of the addressee are constitutive features of speech genres" (Bakhtin 1986: 99). The generic mediation provides a "common horizon" for the mutual understanding of actors. It connects past and future: "Forming itself in an atmosphere of the already spoken, the word is at the same time determined by that which has not yet been said but which is needed and in fact anticipated by the answering word" (Bakhtin 1981: 280). Bakhtin does not oppose space, as a static structure, to time, as a dynamic flow,

but he calls "chronotope" the deep correspondence between space and time, not in the geometric way criticized by Bergson, but as two connected aspects of the sensuous experience.

For Bakhtin, two key aspects of dialog situations are "heteroglossia" (Bakhtin 1981: 300-301), i.e. the participation of multiple languages, and "heterology", i.e. the plurality of speech genres. The coexistence of, and conflict between, different types of speech brings dynamic contradictions between belief systems. In research methods, heterology involves, for example, productive *controversies* between different genres of discourses about work practices, e.g. between distinct professions (design engineers, building site managers, safety controllers, architects...). Dialogical research requires a subtle balance between *common world* and *heteroglossia*. No dialogical process can take place without actors sharing a common language: "The connection between the "T" and the "you" consists in the participation in a common linguistic world" (Cassirer 2000/1942: 52). To maintain a common world is a permanent work, since each subject's daily experience transforms her/his interpretive schemes in specific ways (March 1988). On the other hand, dialogical meaning-making requires the genuine plurality of voices and genres and the expression of differences.

3. E Some methodological implications

"Dialogical and mediated inquiry" (DMI), a research method based on the pragmatist theory of inquiry, Vygotsky's theory of mediated activity and Bakhtin's concept of dialogism, was tested through a cross-disciplinary research about safety in the construction industry, with two teams of researchers, in psychology and in organization studies. Work was studied as a dialogical activity, involving reflexive thought and inquiries, and mediated by languages, tools, professional and organizational rules and routines. In the inquiry perspective, the "practitioners" are actively involved in the production of concepts and the researchers in the process of organizing. Knowing and transforming activity are two sides of the same coin.

Some authors recommend that individuals' interpretive frames be enriched (Tsoukas and Hatch 2001) to face complexity: "complicate yourself" (Weick 1995: 56). In addition to this approach of complexity focused on subjects, the pluralism and diversity of the inquiry can be reached socially, through the formation of a pluralist community of inquiry (Dewey 1983/1916). This is a key step in the research process. The content and outcomes of inquiries depend on what voices are invited to dialog about activity: in other words: "communities of inquiry, complicate yourselves".

4. An empirical illustration of dialogical and mediated inquiry

4.A The context

In a large construction company (140 000 employees in 2006), after years of effort to improve work safety, the accident ratio reached an asymptotic limit, at a level still twice higher than in most other industries. Managers decided to explore the reasons of this stagnation. So far, the company had two types of response to the safety problem: first, they worked on the individual psychology and behaviour of actors (safety awareness, discipline); second, they developed artefacts for safety management (procedures, controls, norms, technologies). These actions can be compared with the two "empirical deviations" mentioned by Bakhtin (Bakhtin 1978, quoted by Todorov 1981: 35). Researchers who study speech would tend to focus either on the subjective psyche of speakers, or on the linguistic material of their discourse, and they overlook the "living material" of dialogical and situated speeches. Some managers thought that policies for work safety fall into the same trap when they are limited to individual behaviours and technical artefacts and overlook important organizational risk drivers (lack of adequate competence, lack of coordination, lack of experience feedback, time pressures, inadequate incentives). Their analysis converged with recent research orientations in the field of safety, stressing the organizational nature of risk, particularly with the development of "resilience engineering" (Hollnagel et al. 2006).

The company asked two research teams, one in organization science (O.S.) and one in work psychology, to jointly explore the safety issue. Two Ph. D. researchers achieved an indepth longitudinal field study within the company, from 2004 to 2007. The inquiry was obviously triggered by an existential unease: The frequency of accidents was viewed as unacceptable from a human and strategic point of view.

4.B The research teams

The two teams of researchers – a Ph. D. student and her/his supervisor in each discipline – shared theoretical references: Vygotsky's theory of activity and Bakhtin's theory of dialogism. They agreed on a DMI approach. There were different levels of inquiries:

- in each discipline, researchers and field actors established communities of inquiry to analyze collective activity,
- the two research teams met every two months to dialog about theoretical and methodological issues,
- researchers and corporate executives met every three months in a steering committee.

The researchers were aware that, belonging to different scientific disciplines, they had different objects and methodological requirements, in a word: different "genres". But they developed common basic principles, based on DMI ideas, as a "common horizon" for their dialog. The research would be based on the analysis of normal activity rather than the analysis of accidents. There is a multitude of incidents and the few actual accidents are a non representative sample. Moreover accident avoidance is as interesting a material as accident. Therefore the research project studied how ordinary activity generates or avoids danger.

There were also differences between the two teams' theoretical and methodological options:

- About the research design: the psychology team focused on the reflexive transformation of professional genres, through communities of inquiry whose members, belonging to the same profession (site managers, team leaders, workers), could easily develop a peers' assessment of their respective professional practices. It was assumed that the transformation of professional genres would ultimately lead to the transformation of the organization. The O.S. scholars focused on the transformation of the organization through communities of inquiry whose members belonged to different professional genres while cooperating in the same cross-functional mission. The encounter of actors belonging to different functions was expected to challenge conventional professional views.
- About the definition of the work situation: a local, observable and filmable work situation, in psychology; a translocal situation, the process: "design and plan the building project", in O. S.
- About the instruments mediating the inquiry: edited video-tapes in psychology; graphic sketches, diagrams and textual descriptions of the cross-functional process in O.S.

4.C Psychologists' dialogical inquiry

The psychologists followed a research method called "cross-self-confrontation" (Clot and al. 2001, Clot 2009). It aimed at transforming professional genres by gradually widening the perspective, with the following steps:

1st step: production of a mediating artefact. A researcher immerses herself in the building situation on a specific site, for a few months. She shoots work situations with a video- camera and edits scenes to get meaningful and reasonably long cuts, showing dangerous situations.

 2^{nd} step: individual reflexivity – self-confrontation, and development of the artefact. She shows the scenes to the actor involved in the filmed situation, to get his/her comments. The actor builds a discourse about his/her own activity. The researcher films the actor's comments.





3rd step: dialogical reflexivity – cross-self-confrontation, and development of the artefact. The researcher organizes cross-sessions involving two actors achieving the same type of task (two operators, or two site managers...). She shows them the work scene involving actor A and A's comments, on one side, and the scene involving actor B and B's comments, on the other side. She asks for A's comments on B's comments and B's comments on A's comments. The selected situation makes practice differences between A and B visible and triggers a "controversy" between actors. The researcher regulates the dialog by refocusing it, if necessary, and asking questions. In most cases, the controversy develops in a constructive way, with little intervention from the researcher.





4th step: dialogical inquiry in a broader community of inquiry.

The researchers show the scenes and the comments by A and B to a group of A and B peers, including A and B. The group discussion about the scenes starts from A and B filmed work and discussion. Potential practice changes are discussed. The community of inquiry has been widened within a given professional genre.





4.D Dialogical inquiry in organization studies

Research design

O.S. researchers wished to analyze collective activity in a more macroscopic sense than psychologists. They found necessary to inquire the "translocal" dimension of activity (Smith 2006) because processes that extend outside the scope of immediately observable work govern local activity, though they do not determine it. The pioneer of institutional ethnography Dorothy Smith warned about "the lack of hooking the local to the extra-local and

trans-local", in an interview with Karin Widerberg (Widerberg 2004). In this case, the central object of inquiry was collective activity under the form of "processes" (Lorino 2007). A process is defined as the cross-functional ("heterological" in Bakhtin's terms) articulation of local activities necessary to achieve some meaningful transformation of the world, e.g. "develop a new product", "design the building project"... A process always involves an intense circulation of objects and information, and a gradual transformation of the environment, combining "ready-made" tasks and situated improvisation. The activities within a process have different technical contents. As a consequence, a process raises issues of mutual intelligibility and communication, which are key issues for safety.

It was decided to focus the research on two processes: "achieving on-site building operations", "designing and planning the building project". The present paper is mainly concerned with the second process. A preliminary study involving document analysis, interviews, discussions in the steering committee and on-site observation suggested that most dangerous situations are closely linked with design and planning options (time scheduling, resource allocation, technological options, team composition, subcontracting decisions). Managers and researchers agreed that safety could be significantly improved by changing the designing and planning process. This was an abductive inference, producing an unproven and not directly testable hypothesis. O.S. researchers followed then a four step inquiry process (Tricard 2009), which can be paralleled with the psychologists' inquiry.

	Psychology team	Organization studies team
1 st step	Film production	Process textual and graphic
		description
2 nd step	Self-confrontation	Individual validation of process model
3 rd step	Cross-self-confrontation	Process analysis by the process group
4 th step	Collective analysis of the cross-self-	Cross-group analysis of priorities for
	confrontation and action proposals	action

The steps of the O.S. inquiry are detailed in table 2.

Table 2

St	eps of the inquiry	Outcomes
1 st step: production of mediating artefacts.	Direct field observation, on two types of settings: 12 days spent in offices where	For the process "design and plan the building project": 3 flow-charts
incurating arteracts.	building projects are designed and engineered; 100 days on two different building sites to observe and analyze work situations (including the investigation about the genesis of a particular dangerous situation: the newel investigation). 26 interviews with actors of the two inquired processes: 2 clients, 2 salesmen, 4 design engineers, 4 site managers, 4 chief engineers, 4 foremen, 2 plans providers, 2 service providers specialized in safety work, 2 subcontractors.	representing the process. Narrative of a specific situation of risk: The "newel story". Establishment of two communities of inquiry, one about the process "achieve on-site building operations", one about the process "design and plan the building project".
2 nd step: participants' personal enrolment into	Interviews of the participants in the communities of inquiry (validation and	First views about the most critical steps for safety in the process
the inquiry	enrichment of the mediating artefacts).	Validation of a slightly modified description of the process as acceptable to start the inquiry.
3 rd step: dialogical inquiry about safety	Five 3 hour meetings of each community of inquiry.	For the process "design and plan the project": selection and first analysis of 15 activities viewed as "critical for safety". Production of new instruments: the list of critical activities, sheets assessing each critical activity from the safety point of view, proposed action plans.
4 th step: widened dialogical inquiry	Five 2 hour meetings of a new community of inquiry, involving a foreman, a site manager, a commercial manager, a process engineer, a safety controller, a chief engineer, plus the two researchers.	Combination of the analyses made on the two processes. Production of a proposal for action including 55 "micro-changes" on the processes and a proposal for a systematic risk management process.
Final report of the dialogical inquiry	Report to the steering committee. Formulation of the proposals for action as a fictional narrative: the "newel fiction".	The "newel fiction" and the proposed risk management process are validated by the manager in charge of safety, but not further experimented.

1st step: production of mediating artefacts

The first phase aimed at producing artefacts which describe the usual unfolding of the "design and planning" process in the form of texts and diagrams: definition of activities, description of coordination modes, description of actors' roles, main information flows, control and management tools. This description has no prescriptive goal, nor any claim to scientific truth. It is only intended to support collective discussions in the future course of the inquiry. Another input to the inquiry developed in this phase was the narrative account of a dangerous situation observed by one of the researchers: the story of the newel.

The story of the newel

An accident occurred on a construction site and was reported by a safety controller:

Accident circumstances	Consequences	Action recommendations
While pushing a form panel using a	A 77 day sick leave.	Remind workers of the dangers of
jumper bar, a worker broke his		moving panels with jumper bars and
thumb.		of the correct utilization of this tool.

This high-rise office tower was constructed around a technical core for services, elevators and stairs. This newel is symbolized in figure 4 by an octagon entirely surrounded by a platform (stripes). This platform lies on a specific self-climbing coffering tool, which was tailor-made to build the surrounding wall of the octagonal newel. It lifted itself from level n to level n+1 after finishing the coffering work at level n. As it is illustrated by the top view in figure 4, the newel is the central part of a triangular building:

Figure 4: top view of the office tower to build



Inside the newel, the internal walls are drawn with black lines. The rectangles symbolize form panels.

Some of the internal walls are surrounded by form panels (one ton steel panels used to pour concrete, symbolized by rectangles on figure 4) and some are not. Some areas inside the newel cannot be reached by cranes to lay down panels. Therefore, in principle, in these areas concrete cannot be poured with panels. Several alternative methodologies were considered for the construction of internal walls. They were considered too "time consuming" and finally ignored. At the end, all the internal walls, including the so called "unconstructible" ones, were built with the same form panels. For each panel that could not be laid with a crane, six workers used a jumper bar to lift it and push it to the right place, which could be situated thirty feet away from the crane accessible area. Seven levels of the tower were built this way, infringing basic safety rules.

Three interviews (project design engineer; site manager; management controller of the site) and an in-depth documentary investigation provided us with three clues regarding the genesis of the situation, to build a narrative. First, long before actual construction started, suppliers of specific self-climbing coffering tools were

invited to tender. The invitation specified: "there is no doubt that any kind of assembling operation in the course of construction would delay its progress. Therefore we will view favorably any tender that avoids it". It was also specified that "propositions must comply with health and safety regulations". Second, the budget that pricing teams initially forecast for the project was finally lowered by 30%. Third, the workers who built the newel got a significant bonus at the end for completing their task in time.

Two of Bakhtin's dialogical principles will be used here to interpret those events (Table 3). The first principle states that "meaning (communication) implies community. Concretely, one always addresses someone, who does not assume a purely passive role: the *interlocutor* participates in the formation of the meaning of the *utterance*, just as the other elements – similarly social – of the context of *uttering* do" (Todorov 1981: 30). According to the second principle: "Let us agree to use the familiar word 'situation' for the three implied aspects of the *extraverbal* part of the *utterance*: The space and time of the *enunciation* ("where" and "when"), the object or theme of the *utterance* (that "of which" it is *spoken*); and the relation of the *interlocutors* to what is happening ("evaluation")" (Todorov 1981: 42). These two principles of text analysis are transposed here to activity analysis, replacing the words "utterance", "uttering", "extraverbal", "enunciation", "acted" (italic type). The two principles are used in the second part of the table to structure the newel story.

I able 3	
First dialogical principle	Second dialogical principle
One always addresses someone, who does not	Let us use the familiar word "situation" for
assume a passive role: the other actor participates in	the three aspects of the <i>context</i> of <i>activity</i> :
the formation of the meaning of the act, just as the	The space and time of <i>activity</i> ("where" and
other elements - similarly social - of the context of	"when"), the object or theme of an <i>act</i> (that
acting do.	"about which" it is <i>acted</i>), and the relation of
	the <i>actors</i> to what is happening
	("evaluation").
The meaning of lifting and pushing panels with a	The meaning of the situation of lifting and
jumper bar responds to the meaning of:	pushing panels with a jumper bar depends on:
• previous activities: Writing the conditions in the	• the circumstances of this work: It takes
invitation to tender for panel providers;	place in the most complicated part of the
scheduling the project; planning significant	building - the newel - when the project is
bonus for the most complex tasks of the project;	getting more and more behind schedule;
• simultaneous activities: Assessing the newel	• the purpose of lifting and pushing panels:
construction progress as "behind schedule" (this	Doing the job in time? Earning a bonus?
activity itself responds to the previous activity of	Demonstrating bravery?
project scheduling);	• the level of satisfaction about the
• future activities: Evaluating the workers'	activity: Is risk bearable compared to the
performance and rewarding it financially (this	workers' interests and values?
activity itself responds to the previous activity of	
planning incentives).	

Table 3

No theory of deterministic risk genesis was drawn from that story. Each construction project is far too specific and complex. Nevertheless, this investigation definitely convinced researchers and managers that risk was not mainly rooted in individual behaviors. The apparently individual act of risk taking actually addresses a set of past, simultaneous, and future activities involving a broad community, in particular design and planning activities. Therefore, it was necessary to inquire a wide process, far beyond the boundaries of the construction site. Two communities of inquiry were formed to investigate the processes "achieve on-site building operations" and "design and plan the project", with representatives of the professional genres involved in each process.

The subsequent steps of the inquiry

In the second step, the participants in the communities of inquiry were interviewed separately, to validate the description of the work process and to express their first views about the most critical activities for safety.

In the third step, the two communities of inquiry inquired the processes with the support of the artefacts built in the first step. In the fourth step, the two communities merged to confront and combine their analyses. The participants in the discussions adopted rules to guarantee free expression, e.g. members would not be quoted personally out of the group. There was no hierarchical relationship between group participants. They were considered as experts of their own professional genre. All the group participants were "involved as both coresearchers and co-subjects" (Raelin 1999). The cross-functional process which takes place daily to design and plan projects is often fragmented and veiled by the division of labor and the separation between functions. The inquiry makes it re-emerge as an object of thought, debate and action, through living dialogs which stage actors' interdependencies.

Table 4 (Tricard 2009) presents an example of such a dialog, about one of the fifteen activities selected as critical for safety: "subcontractors mark up their tasks on construction plans". This activity takes place in the last segment of the process "design and plan the building project", which concerns the final preparation of site operations (figure 5). Eight actors participate in the dialog: a foreman, a site manager, a commercial manager, a process engineer, a safety controller, a chief engineer and two researchers.



Figure 5: diagram of the final part of the process "design and plan the building project"

Table 4	
Dialog sample starting with the analysis of the activity: "subcontractors mark up their tasks on construction plans"	Dialogical transformation of the collective activity
Researcher 1: You have chosen to select this activity as critical for safety	
Site manager: ok, but something is missing on this diagram. I had	Technical problems identified:
tremendous risks on my previous construction site because of a lack of	- Lack of early anticipation of co-
anticipation of co-activity between main structure construction, our job,	activity with subcontractors.
and several subcontractors. This generated dangerous core drillings and	
back fillings of the main structure that we finally did only a few days	
before delivering the building. We did it in a rush, with the wrong tools	
Chief engineer: Anticipating the coordination of co-actors, including the	- Lack of technical skills to
main subcontractors, is a critical task. It requires expertise of several	understand and anticipate the
techniques that we seldom have in our teams. But nevertheless it's almost	subcontractors' methodologies.
never forecast or budgeted. Coordination meetings should be arranged	
with the main subcontractors early enough to anticipate risky co-activity	Organizational problem identified:
and take safety into account when scheduling tasks. Everyone knows that	Usual absence of dialog between
when subcontractors do not talk to each other it's a mess! It also raises	co-actors.
questions about skills in structure analysis. Since we do not have these	New activities suggested: early
skills, an engineer coming from the structure design office should join	coordination with subcontractors,
these meetings to validate decisions that might affect the structure	validation of decisions that might
strength.	affect the structure strength.
Researcher 1: shall we take this action into account?	Extension of the scope of inquiry.
commercial manager: If felevant ideas emerge from our discussions,	of inquirers on the need for
construction projects	or inquirers on the need for
Site manager: Both the building's structural and technical skeletons	experimentation.
should be designed at the same time. Otherwise we might discover last	Extension of a "classic activity"
minute works that could affect the structure, whereas the building is	temporal/spatial configuration:
already finished and about to be delivered.	Synchronizing the selection of the
Researcher 2: Do you mean that subcontractors and structure design	main subcontractors and of the
offices should be selected simultaneously?	structure design office impacts
Chief engineer: Yes, completely integrated for the main subcontractors.	safety on sites.
If not, we might be up the spout, like I was more than once!	Professional view of the foreman:
Foreman: We are chatting a lot but how do we save guys? How to deal	technological design does not
with unexpected situations? How to improvise?	eliminate improvisation.
Safety controller: What if safety rules must be bypassed to have the	
works done? Safety supervisors should be assigned on sites.	Organizational problem identified:
Process engineer: This might prevent other actors to feel responsible for	Isolating safety management from
safety.	other activities is not effective.
Researcher 1: I have spent four days observing a senior safety controller	
at work; I have interviewed two juniors. None of them seemed to have	Organizational problem identified:
much power or authority on sites	Power of safety controllers.
Safety controller: and yet they often shoulder responsibility for safety	Entension of soons and
December 2: We did not raise this question about breaking sefects rules	extension of scope and
during the previous meetings, did we? Maybe because we try to evoid	professional genres: Scope
Safety controller: situations where rules must be broken to get the	- In this dialogue Researcher 2
work done exactly. In England "Safety managers" have a real political	safety controller and foreman try to
weight They are involved in the very early stages of projects design	move safety management from
Foreman: Is safety a goal when scheduling the phases of a project and	controlling risk out to designing it
marking subcontractors' tasks on construction plans? Do they wonder	out.
how to dig a hole in concrete? Actually, when we realize that it [work] is	- Professional genre extension:
going to take too long, we forget safety	This dialog helps the safety
Site manager: work in progress and safety are opposite goals. A	controller to extend his
foreman's job is to speed along! He says we'll do it our way, and	"controlling" role to the very early
ourselves [site managers], we close our eyes! A Safety manager could be a	activities of project design.
good idea to put safety forward. Because prevention goes with	
punishment!	
Foreman: Shall we arrange our next meeting on a boxing ring?	

This dialog has three interrelated results:

- First, actors who are not used to talk to each other, even less in such a reflexive mode, extend their professional genre from daily operations to *dialoging about* operations. The last part of table 4 dialog (foreman / site manager) shows how the foreman explores activities in which he is usually not involved. Since the beginning of the conversation (and probably long before), he has suspected that safe methodologies are neglected when designing a project. Finally he concludes with the site manager (they never met before) that safety conflicts with work in progress if not "designed in" in the early phases of the project.
- Second, this conversation about collective activity extends the social, spatial, and temporal scope of the research object itself.
- Third, a proposal emerges from this, and other, dialogical exchanges: a systematic process of risk assessment mediated by new procedures (independent risk reviews, 3-D simulation of critical tasks...) would continuously adapt the scope of risk analysis to each phase and keep alive the dialog between the different professions involved.

Unfortunately this risk management process was not experimented on a full scale during the research, though it was debated at an executive level. Several suggestions were implemented separately on distinct projects. But, at this stage, these fragmented experimentations did not provide a formal feed-back on reliable results in terms of safety improvement. It was a reason to stage the proposed new practices in a short story titled: "the newel fiction", which revisits the "story of the newel" and is viewed by some managers as a potential training support.

A narrative outcome of the dialogical inquiry: The newel fiction

(Each sentence (or part of sentence) transcribed in bold type is a quote of the propositions produced by the inquiry and corresponds to some local experimentation. The fiction appears as a kind of "envelope" of multiple and scattered initiatives. It tries to embody "what *may* be, the possibilities now open to us" (Follet 1924: 2) in an imaginary but credible setting. A senior manager in charge of preventing workplace accidents agreed on its plausibility. We select here some excerpts.)

"G Project" is a high-rise office tower project. As soon as our firm was officially invited to tender, Franck, one of our safety managers recently hired was assigned risk analysis. As defined in the new procedures, Franck must forecast the main risk drivers for each new project. Thanks to the new job definitions, Franck has enough political weight to arrange meetings all along projects with internal or external experts to study construction practices that may reduce workplace risk. Since it was an unusually high and complex building, Franck, in his first risk analysis report, asked for a limited budget to develop specific construction practices. With this budget, Franck and Jack, the engineer in charge of evaluating the selling price, could hire Leo, a senior service provider specialized in civil engineering who had been involved in feasibility studies for large stadiums and an arch-shaped office building.

A first feasibility meeting was arranged, involving the safety manager (Franck), the civil engineer (Leo), and the engineer in charge of evaluating the selling price (Jack). Leo commented that several internal walls of the newel might be difficult to build the "normal way" because of the immediate vicinity of the surrounding wall. He advised Franck and Jack to involve subcontractors providing self-lifting coffering tools in the study of an ad-hoc methodology for the building of internal walls. A senior foreman, Joe, the most experienced foreman of the company for the construction of skyscrapers, was approached by executives to be the chief foreman of G project. Jack, like every commercial engineer, had recently been trained in risk analysis and was asked to spend one full day per month on construction sites. He decided to arrange a meeting about construction practices with Joe on his current construction site.

At the first glance at the architectural drawings, Joe severely criticized the architect: *I've never seen such a newel! I see no other way to pour concrete there but lifting and pushing steel form panels with jumper bars because cranes won't get there. Only a huge bonus could incent workers to do that job!* Remembering his recent **training in risk analysis**, Jack answered that a safety rule forbids that workers lift more than 50 pound weights. They quickly estimated that lifting each panel would then require 40 workers! Then Joe looked more carefully at the top view drawings of the first ten levels. He noticed that the first seven levels were similar: *"Maybe, for these seven levels, concrete could be poured by using one very large tool for both the surrounding wall and the internal walls. This tool would be hoisted seven times and then replaced by a less costly tool for the construction of the next thirty levels". Joe and Jack agreed that the required investment was worth studying in terms of safety and time saving. They quickly set their idea down in writing and drawing.*



Meanwhile Joe was officially assigned the task of studying the construction feasibility of G Project as an expert in construction practices: for such an important and complex project, it was required that an experienced foreman participates in the design. As a selling investment, a budget was allocated to allow Joe spending one day per week to provide his expertise in construction practices.

Jack sent an invitation to tender to three panel suppliers. He described Joe's idea in this letter and mentioned that any effort to design a proper method before the project is sold to the final client would be viewed favorably if their project was selected. Two suppliers tendered. One of them demonstrated the feasibility of the foreman's idea. Jack pre-selected this key subcontractor with the foreman's agreement, before the project was actually selected by the client. He immediately arranged a meeting involving the foreman, the safety manager, and a subcontractor technical engineer. Through several iterations, they simultaneously designed a customized tool and a work method taking safety into account. Jack noticed that the additional expenditure for a customized tool was compensated by the savings in workforce time and the improvement of safety. When tendering for G Project to the client, the CEO put safety forward as a competitive advantage for his company.

4.E The dialog between the two research teams

In the course of the project, the two research teams met every two months. Through this dialog, they built new views about some critical theoretical and methodological issues, for example (i) the importance of the unperformed part of the activity and (ii) the access to the organizational dimension.

From the beginning, the psychologists stressed the importance of the unperformed part of the activity as a major resource for transformation. In response to that idea, less familiar to them, O.S. scholars tried to combine it with their concept of heterological (cross-functional) activity. They stressed that the unperformed part of activity could be partly unveiled in the dialog between actors who belong to different professions. In their attempts to redesign cooperative practices, professional genres challenge each other. Heterological dialogs can surface unperformed parts of activity and, as a result, may be a key aspect of the ongoing "organizing" process (Weick 1979).

The access to the organizational dimension was also a debated issue. Would the study of specific work situations give researchers access to broader organizational issues? The psychologists feared that cross-functional groups would give rise to the classical role-playing of the formal organization and to functional ready-made speeches. They finally recognized that, under certain conditions, cross-functional dialogs can produce valuable insights on the organizing process. For their part, O.S. scholars feared that intra-professional dialogs would not lead to organizational insights but would only juxtapose discourses characterized by monological professional perspectives. They finally recognized the depth of "insiders' views" in the peers' exchanges. The two teams concluded that methods based on professional communities (stylistic diversity) and process communities (heterology) are actually complementary and should be combined.

5. Discussion and conclusion: the methodological contribution of dialogical inquiry

This paper analyzed the limits of complexity theories, which focus on the syntactic complexity of systems, for the study of organizing processes, which predominantly raise problems of semantic and pragmatic complexity. The contribution of non-representational frameworks, in particular processual and narrative studies, was underlined. Considering the risk to confine the discussion to dichotomies like intuition / reflexive thought, logical thought / narrative thought, theorizing / experimenting, it was suggested to use a triadic theory of interpretation, based on the concepts of semiotic mediation, inquiry and dialog.

What are the distinctive features of DMI, compared with other qualitative frameworks? Four characteristics will be mentioned here. First, DMI is more about *knowing by transforming* than *observing*. Second, from a methodological point of view, the core of the inquiry is the *dialogical meaning making* process rather than *"data"-processing*. Third, the inquiry involves *field actors as co-inquirers rather than informants*. Fourth, the formation of a *community of inquiry* (Dewey 1983/1916) is a key step in the research process.

5. A Knowing by transforming versus observing

To understand organizing processes "to some respect" (e.g. from the point of safety), it is necessary to access, not only observable behaviors, but also underlying inquiries. This requirement can be fulfilled through an active dialog with and between field actors, in response to an existential trigger. "Accessing..." means "transforming...". "All doing is knowing and all knowing is doing" (Orlikowski 2002: 251). With action research, DMI shares the commitment to transform situations. But the inquiry is not an observation modality, as it tends to be in the Lewinian tradition of action research. For Lewin, participation is a condition to build a true and accurate representation of the situation, "even in exact mathematical terms" (Lewin 1939: 24). DMI is closer to non representational and pragmatist streams of action research, in particular cooperative inquiry (Heron and Reason, 2001), for which the subject's interference with the field is the very condition for knowing.

So-called "observation" is actually an interpretive and active treatment of reality, depending on the context and the purpose of research. No agent overlooks the complex situation: "There is no privileged position from which reality might objectively be viewed" (Tsoukas 1996). Follett criticized what she called the "onlooker fallacy" in 1924: "We wish to do far more than observe our experience, we wish to make it yield up for us its riches (...) We must face the fact that it is seldom possible to observe a social situation as one watches a chemical experiment (...) We need then those who are frankly participant-observers, those who will try experiment after experiment (...) Brilliant empiricists have poked much pleasant fun at those who tell us of some vague *should-be* instead of *what is*. We want something more than either of these; we want to find out what *may* be, the possibilities now open to us. This we can discover only by experiment. Observation is not the only method of science" (Follett 1924: 2).

5.B Dialogical meaning making versus data processing

In DI, research does not face the issue of *truth*, a major concern for other qualitative methodological frameworks, like ethnographic studies: "Do informants speak the truth as they know it to the fieldworker?" (Van Maanen 1979: 544). DMI rather faces issues of *meaning* for purposeful action. What can be validated is not the "true" correspondence with reality, but the practical effects of the inquiry. Attempts, for example in practice-based studies, to give an accurate account of activity through detailed and exhaustive descriptions, direct observation,

audio and video taping, or "shadowing", can provide a valuable empirical material, but they are seldom sufficient to access actors' inquiries. It can even lead to a somehow desperate accumulation of analytical data, which risks identifying activity with observable behaviors and producing monological accounts of actors' inquiries by researchers.

The critical difficulty of field inquiry does not lie in data collection and treatment, but in building a community of inquiry and creative dialogs about activity. In DMI, meaning does not emerge from data, as it is expected to do in grounded theory (Strauss and Corbin 1990, Yoo and al. 2006). Researchers do not dialog with data, but with actors who become corresearchers and claim their right to co-produce concepts, in their own language.

5.C Co-inquirers versus informants

In DI, all inquirers are participants and all participants are inquirers. That is why interviews play a limited and specific role. In the interview situation, even if its interactional dimension is underlined (Kvale 1996), interviewees are seen as sources of information and researchers as recipients and interpreters of information. The individual interviews achieved in the above case study did not aim at providing the researchers with a set of data to ground their theorizing work. They were instrumental to building a disposable artefact (e.g. diagram and textual description of the collective activity), an intermediate tool to mediate the following steps of DMI. Those interviews had a procedural rather than substantive nature.

In the community of inquiry, in contrast to collective interviews or focus groups which aim at "collecting data" (Kvale 1996: 101), dialogs aim at building *something new* together, in quest of a purpose. The community of inquiry is more similar to design teams, involved in the collective (re-)design of some complex object (here collective activity), than to collective interviews.

In the dialogical exchange, speeches and deeds cannot be unilaterally attributed either to researchers or to organizational actors. Admittedly there are distinct skills and roles in the community of inquiry. But the classical dichotomy between researchers and practitioners, concept and practice producers, representing and represented agents, data processors and data providers, interviewers and interviewees is fundamentally questioned, in contrast to ethnographic studies (Van Maanen 1979) or some interpretive approaches: "interpretive researchers make sense of others' sense-making in the field: we construct representations of the situations we study" (Yanow 2006: 1748). In table 4 dialog, it would be difficult to determine with precision who is the author of what idea. Actors are inescapable inquirers of

their own activity, in its depth and potentialities: "Some professional practitioners do have a capacity for reflection-in-action on their own frames and theories of action" (Schön 1991: 353).

5.D A key step in the research process: Forming a community of inquiry

To "complicate the inquiring process", a strong recommendation for DI is: "communities of inquiry, complicate yourselves"! The composition of the community of inquiry has a significant impact on the purpose and the scope of the inquiry, by defining the range of speech and activity genres concerned (degree of heterology) and how far social practices can be questioned. For example, in the above case, the inquiry could be restricted to direct actors of the building site or open to the engineers and planners who design projects. The factors of danger related with project design will then be more or less accessible to the inquiry. "To broaden and deepen their capacity for reflection-in-action, professional practitioners must discover and restructure the *interpersonal* theories of action" (Schön 1991: 353, emphasized by us).

5. E. Limits and perspectives

Four limits of this study call for further field research. First, the practical experimentation of new practices in this construction project was only partial and scattered. In view of the major role of experimentation in the DMI approach, it would be necessary to achieve new indepth case studies which would go further into the experimenting phase. Second, in the case of work safety, the existential nature of the purpose is obvious, since the physical protection of human health and life is at stake. It would be useful to test the validity of the concept when the existential purpose of collective inquiry is more symbolic and distant, for example the preservation of a professional or organizational identity. Third, a major outcome of the dialog between psychologists and organization scholars concerned the possibility to combine dialogical inquiries *within* professional genres with dialogical inquiries *versus* process communities). The theoretical and methodological articulation of those two complementary perspectives involving different forms of dialog must still be clarified. Fourth, are there cases in which representationalist approaches are helpful and others in which non-representationalist approaches work better? It may be a reasonable guess, to further explore,

that "observation" is an acceptable substitute for "inquiry" when the interpretive modes can be taken for granted, because they are unproblematic, repetitive, and generally accepted, in fairly stable organizational settings. Then the main forms of complexity are syntactic and meaningful quanta of information ("data") are unambiguously defined and used by actors. Whenever change, uncertainty, exploration, innovation, diversity of languages and potential misunderstandings continuously question meanings and practices, the inquiring process would return to the forefront.

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