

Knowledge construction in dialogical workgroup processes within the aerospace context

Holford, W. David

University of Quebec at Montreal (UQAM)

Holford.w_david@uqam.ca

ABSTRACT

The role of dialogue towards producing complexified knowledge is examined along with its implications for management. This paper:

- 1) Presents the 'how' and 'why' of an effective knowledge complexifying dialogical process occurring at the interpersonal level; and*
- 2) Attempts to propose how management can help achieve this within their organization.*

Across an ethnographic case study of workgroup members within a large North American aerospace firm, a dialogical model is proposed describing both verbal and non-verbal interactions leading towards knowledge complexification. Such an outcome is achieved in part by workgroup managers who nurture an environment conducive towards mutual trust and respect; and where individuals are given the time and freedom to express themselves, all the while being open to differing viewpoints and experiences. It is proposed that this, in turn, can be attained across a parental 'safety net' approach.

This single case study prevents us from generalising outside of the firm's context. Additional workgroups/teams within other institutions within the knowledge-based economy are to be envisaged.

1. Introduction:

Organisations can be fertile grounds for the knowledge they possess as well as create. Furthermore, knowledge creation leading towards enriched or complexified knowledge can be viewed as having both a ‘defensive’ and ‘offensive’ role within organizations: ‘defensive’ in that it is primordial in terms of trouble-shooting, problem solving and avoiding deleterious consequences (for example, Weick (2001) speaks of “simplications produce blind spots...” and “...with more differentiation comes a richer and more varied picture of potential consequences”); and ‘offensive’ in that it is essential for product and service innovation (Nonaka *et al*, 1995, 2004). For organizations to create complexified knowledge which can help them prosper in the long run, management must adhere to a paradoxical set of values and practices: they must place their first priority on treating their workers as human beings in the fullest sense, rather than profit at all cost. Although this paper does not intend to make any exhaustive synthesis into the various aspects management needs to open itself towards if it is to truly embark upon a socio-humanistic path (for such a synopsis one can read Aktouf and Holford, 2009) that also implies long term and renewable economic prosperity, one particular dimension that will be reflected upon is of Man as a being of speech, and the place and the role of dialogue within the knowledge economy. More specifically, this paper, across a past ethnographic case study, first examines and describes the role of dialogue towards producing complexified knowledge; and then proposes the implications for management.

2. A Few Words on Knowledge

Knowledge is seen as occupying a central place in contemporary modern societies. Yet numerous equivocal concepts have resulted in a range of definitions. Some have come to see it as being divisible into two broad categories: namely, representational and anti-representational knowledge (Kakihara and Sørensen, 2002; Von Krogh and Roos, 1996). The representational view sees knowledge as being a representation of a pre-given world with these representations resulting from human cognition (Kakihara and Sørensen, 2002), where cognition in this case consists of purely ‘rational’/logical dimensions. Such knowledge, being universal and codifiable, is seen as being storable and easily transferable in a controlled manner between individuals and organizations in formal and systematic manners (Szulanski, 2000).

The anti-representational view sees knowledge as interpretation, as relationship and as process (Kakihara, and Sørensen, 2002):

- 1) Knowledge as interpretation emphasises the tacit and personal subjective aspects of knowledge that is hard to formalise and hard to communicate, share or transfer (Polanyi, 1966).
- 2) Knowledge as relationships emphasises that knowledge is intrinsically relational to its surrounding world. Knowledge is a result of human mental acts, be it individual, group or social, and those acts are interdependent on various socio-cultural contexts.
- 3) Knowledge as process emphasises the dynamic and fluid aspects of knowledge, emerging from the interaction between subjectivity (e.g. beliefs, emotions, etc.) and objectivity (‘truth’) (Polanyi, 1966). Furthermore, knowledge is seen as a non-static entity resulting from the process of ‘knowing’ by which human beings make sense of the world (Varela *et al*, 1991).

Furthermore, the knowledge taxonomy of non-representational vs representational can be transposed into an alternative taxonomy of tacit vs explicit knowledge (Nonaka and Takeuchi, 1995). Explicit knowledge covers all of the representational view of knowledge, but also overlaps onto anti-

representational dimensions. These latter dimensions cover the very nature of the interpretative/contextual semantic aspect of language such as interpretative ethnographic texts (Geertz, 1998), text as discourse and fiction (Van Mannen, 1988), etc. Tacit knowledge on the other hand is solely non-representational in nature, which Takeuchi (2001, p. 319) divides into ‘technical’ and ‘cognitive’ aspects: the former being related to “informal and hard-to-pin-down skills and crafts” as well as “subjective and personal insights, intuitions, hunches and inspirations derived from bodily experience”; and the latter being related to “beliefs, perceptions, ideals, values, emotions and mental models so ingrained in us that we take them for granted...yet shapes the way we perceive the world around us”.

Beyond the tacit/explicit categorisation, other authors have proposed additional ‘types’, such as Scharmer’s (2001) ‘self-transcending’ knowledge typically associated with artists (which seems to ‘precede’ tacit knowledge) with their “ability to sense the presence of potential; to see what does not yet exist” (2001, p. 68).

Our ‘knowledge of knowledge’ is a continuously emerging field integrating various contrapositions (e.g. representational vs anti-representational knowledge (Kakihara and Sørensen, 2002); or tacit vs explicit knowledge (Nonaka *et al*, 1995, 2003, 2004)), where “knowledge is created in the spiral that goes through pairs of seemingly antithetical concepts such as order and chaos, micro and macro, part and whole...tacit and explicit, self and other, deduction and induction...” (Nonaka *et al*, 2001, p. 14). In essence, knowledge and its creation have an infinite range of ambiguous (here we adhere to Weick’s (1995) definition of ambiguity as being actions, ideas or concepts that are contradictory or “capable of being understood in two or more possible senses...” as opposed to a second definition of ambiguity which often refers to “obscurity” (Webster’s Collegiate)) or antithetical concepts to tap from as knowledge expands ontologically from the individual to Society (Nonaka and Takeuchi, 2004). Hence knowledge can be seen as a *synthesis of constantly emerging polysemic antithetical concepts*. This position is also congruent with Weick’s (2001, p. 60 and 167) argument that with “diverse views”, “ambivalence” and “...more differentiation comes a richer and more varied picture of potential consequences”; and that constancy of ambivalence ensures required organizational flexibility and resilience, since it generates necessary re-adjustments to preceding actions, which if left unchecked can lead to significant consequences.

2.1 The Individual and the Workgroup as an Ontological ‘Starting Point’

Our own ontological starting point as to where ambiguity, contradiction or equivocal points of views are first integrated is at the level of the individual (Nonaka and Takeuchi, 1995; Weick, 1995). Furthermore, we are also interested in examining the individual within the context of a workgroup environment. According to Enriquez (1992, p. 97 and 101), “the group constitutes the privileged location for the comprehension of collective phenomena”, in which the “group only establishes itself around an action to accomplish, a project to work on or a task to complete”. Group members interact with one another whereby communication is often viewed as the central process of the group. Keeping in mind that communication across dialogue is a prime mechanism for the sharing, conversion and creation of organizational knowledge (Nonaka *et al*, 1995, 2003, 2004), it is therefore at the level of workgroup dialogue that we first ask ourselves how and to what degree ambiguity is integrated.

3. Our Findings on Dialogue

A recent qualitative ethnographic case of specific workgroups within a large North American high-tech firm (pseudonym NorAm Aircraft Engines) allowed us to identify and/or validate certain thematic categories involved in knowledge-complexifying dialogue.

3.1 Perspective-giving

Very often perspectives were transmitted between members in the form of narratives. Here, we define the narrative form as being concerned with the temporal ordering of events, ideas and actions with a focus on “their sequential patterning, their duration and pace, their context and the role of actors” (Holman, 2000, p. 965). Narrations were used as part of overall descriptive explanations given by various members to either assure others that actions had been taken, justify one’s own position, report on progress in relation to a specific activity, provide background information to the meeting audience in general or simply to present old knowledge in an entertaining fashion.

The numerous examples of story-telling observed throughout various meetings should not be misconstrued as an argument that all forms of dialogue involved narrations. But it does bring up the notion of a more general category of *perspective-giving*. Boland and Tenkasi (1995, p. 357) speak of narratives as being inherent to the process they refer to as “perspective-making”; but this is in relation to the individual actually generating the narrative. Yet, as Dickey *et al* (2007, p. 50) recently remind us in their own literature review, perspective-making, when articulated towards another individual, involves “the objective...to induce a perspective” towards this very individual known as “perspective giving or perspective setting”. Hence, all examples of narration or story-telling can be included within the more general category of perspective-giving. But many more examples of non-narrative forms of perspective-giving were observed; and constituted a major form of exchange in perspectives between the meeting members throughout all of the meetings that were attended.

Here we take a moment to define the non-narrative form as “being concerned with non-temporal patterns such as relationships between propositions, argumentation, descriptions, ideas and evaluations” (Holman, 2000, p. 965).

3.2 Perspective-taking

All of the examples of perspective-giving would have us ask whether or not these perspectives were actually being ‘taken in’ by the listening members. When we refer to perspective-taking, we are not speaking of agreement on the part of the listening interlocutor but simply that he has taken the other’s point of view into account before making up or readjusting his own perspective (Boland and Tenkasi, 1995; Holman, 2000).

Sufficient cues were seen and/or heard to indicate that perspective-taking was predominant across all knowledge-complexifying dialogue.

3.3 Revision of Perspectives

Dialogue between members where perspective-giving and perspective-taking were in constant interaction, led to perspectives being continuously revised; thus echoing Dickey *et al*’s (2007, p. 49)

words, that “the ability to change perspective allows individuals to communicate with a multiplicity of partners who hold a wide variety of perspectives”. It often appeared in the form of partial discreditations whereby an individual’s assumptions, beliefs or practice could be self-perceived to contain both a degree of pertinence, while also needing to be modified in the face of another’s input. At other times, we could discern an individual’s *tentative* self-discreditation in the face of the other’s input, reminding us of Weick’s (2001) ‘healthy doubt’. On occasion, a ‘full’ or ‘complete’ self-discreditation of an individual’s retained assumption seemed to occur in parallel to the formation of a new perspective as a result of someone else’s input.

Examples of revisions observed throughout group member interactions, were easily discerned across cues such as “Oh ok, now I see what you mean” and “All along I was thinking it was doing...Now I get it.”.

3.4 ‘Dynamic/Static Boundary Objects’ as Boundary Constructions

The different types of mediums used in *helping* to transmit perspectives within the various intergroup meeting interactions that went beyond verbal articulation included the agenda sheet, active sketching from scratch, sketching to modify existing 2-D drawings and existing 2-D drawings themselves. Some of these ‘objects’ in their static forms such as the existing 2-D drawings could be classified according to Star and Griesemer (1989) as repositories. And although Bødker (1998) acknowledges the activity or mediation that occurs around most of these ‘objects’, they are nevertheless viewed as static representations. Yet in our case, all of the listed ‘objects’ were not only accompanied with some form of visible action on the part of actors, but that it was *during* the dynamic yet transient modifications of these ‘objects’ by these very same actions that perspectives were both given and taken. For example, in our case study, the meeting agenda sheet was actively modified across handwriting, as the discussions advanced from one item to the next. And in conjunction to this dynamic re-construction of the ‘object’ was the updating of everyone’s own sense and perspective of the topic at hand – i.e. we are looking at both imaginary/mental as well as physical de-constructions and re-constructions occurring in tandem.

The active process of sketching and re-sketching was found (across ad hoc interviews) to be a much more meaningful process for the participants as opposed to simply looking at the end-resultant sketch or construct. For example, in portraying gas flows within an engine combustion chamber, if the same explanatory words were used in the absence of specific motions and line drawing movements, one would have a less clear sense of the phenomena being articulated.

In all of these cases, we are looking at physical boundary objects being continually constructed and re-constructed by the subject-actors. Hence, we can speak of *boundary constructions*. Even 2D drawings without any visible line markings or modifications added to them, were always accompanied by finger movements across various features and physical phenomena the interlocutor wanted to bring a mental attention to (e.g. gas flows, stress distributions, a hole diameter, etc.). This created new mental bracketings (Weick, 1995) necessary for constructing new mental representations within the minds of the various interacting members.

4. Knowledge Construction Across Dialogue

Based on the four categories observed within the various group interactions, we can now propose a dialogical model on how knowledge seemed to be constructed. Our analysis clearly showed the two strong emergent categories of perspective-giving and perspective-taking to be complementary processes which helped the interlocutors attain what Boland and Tenkasi (1995) and Dickey *et al* (2007) refer to as ‘shared understandings’. A relatively clear transmission of a perspective not only clarifies a perspective in the sender’s mind (hence perspective-giving = perspective-making: Boland and Tenkasi (1995) and Dickey *et al* (2007)), but is also the first step towards providing the *potential* for the receiver to take in the sender’s perspective. That is not to say perspective-taking is an automatic process as a result of the sender’s perspective-giving. Taking in the other’s point of view, as Mead (1934) explained, involves “taking the attitude of the other” and of being fully human by maintaining “an inner conversation with a generalised other”. Furthermore, as Schober (1996, p. 142) states, “communication is unsuccessful when neither party manages to mentally ‘step into the other’s shoes’, to be non-ego-centric”.

Clearly seen within group and inter-group interactions was a continuous cycle of immediate reciprocity between the listener-become-speaker and the speaker-become-listener. Perspective-giving was received by perspective taking, or in a more layman’s term, ‘active listening’. This leads us towards a basic ‘perspective coordination’ between two interlocutors named ‘*Self*’ and ‘*Other*’ (central ‘loop’ in figure 1).

Closely associated to the perspective giving/perspective taking process was what appeared to the process of revision of perspectives in line with Krauss and Fussel (1991, p. 2), whereby each member’s perspectives within the inter-group meeting were periodically being revised in terms of their retained knowledge (as belief, opinion, practice, etc.). This revision of retained knowledge occurs as a result of the perspective-making process (reciprocal loop seen on both the left and right hand side of figure 1). In turn, a newly revised perspective retained by a member will also have an influence on the subsequent incoming perspective being taken in by this same member.

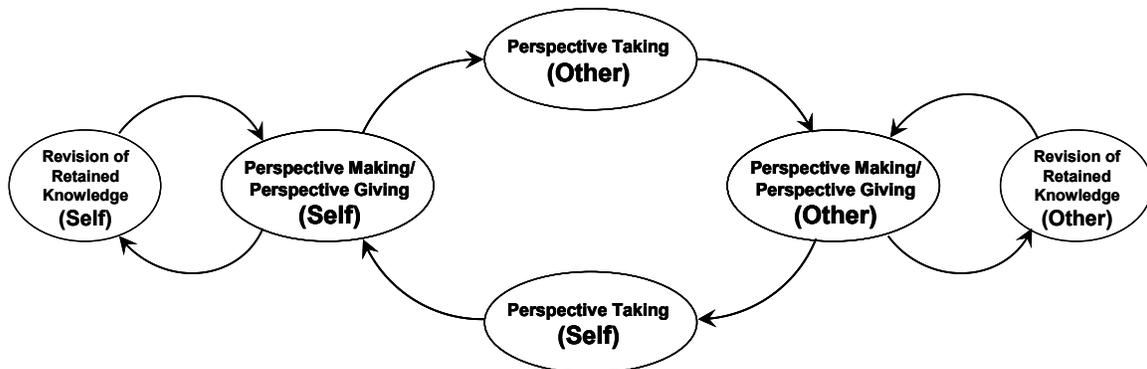


Figure 1: Perspective coordination process between Self and Other.

Finally, figure 2 shows the incorporation of boundary constructions into our previous figure. Perspective-making/giving by the *Self* can involve the aid of a boundary construction, which in turn is taken in (perspective taking) by the *Other*. On the other hand, it is quite possible that it may not involve the aid of a boundary construction (for example, communication via pure verbal articulation) in which

case perspective-making/giving bypasses the boundary construction step and is directly taken in (perspective-taking) by the *Other*. In turn, the *Other* changes roles from a perspective-taker to a perspective-maker/giver and once again begins the same process.

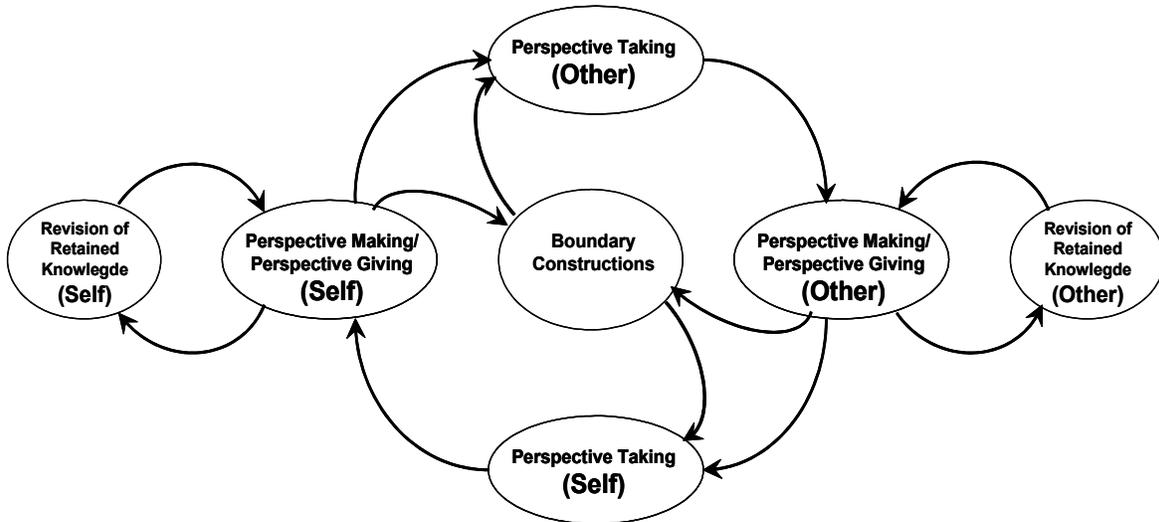


Figure 2: Perspective coordination process between Self and Other incorporating the revision of retained knowledge and boundary constructions.

4.1 Knowledge Complexification as Openness to Antithetical Concepts

As discussed in section 2, dynamic interaction between complementary oppositions, ambiguities or antithetical concepts is an essential ‘feedstock’ towards knowledge complexification. In this sense, numerous dynamic contradictions within our study were seen at work leading towards the expression and transmission of enriched individual perspectives.

The first and most obvious antithetical dyad at work was the co-existence, interaction and conversion of tacit and explicit knowledge. Explicit knowledge was articulated verbally (as perspective-giving) often in the form of metaphors, analogies and stories, thereby confirming Nonaka et al’s (1995, p. 64) externalisation (tacit to explicit conversion) at work, whereby individuals use their discursive consciousness towards articulating interactive dialogue. Furthermore, perspective-taking involved the taking in of others’ perspectives which often implied the beginning of learning-by-listening to others’ narratives, whereby members feel the realism and essence of the story that took place so as to convert it into a tacit mental model (Nonaka *et al*, 2004, p. 64). And finally, when we look closer at the boundary construction aspect of the perspective coordination process, again we can see both explicit codified aspects (existing 2-D drawings, agenda sheet, etc.) as well as more tacit ephemeral aspects, such as hand drawing movements in themselves (which impart a film-like quality); and in this sense transmits a certain degree of tacit knowledge to the perspective-taker.

Other antithetical dyads at work included dialogue vs action as seen across the perspective making complemented by the boundary construction process. In this way, as per Nonaka, Toyama and Konno

(2001, p. 14 and 16), it provides the basis (in dialectical fashion) for further ambiguities or complementary oppositions to interact together, which in turn, further reinforces the tacit/explicit dyad and its respective conversions.

One interesting series of interacting antithetical dyads was seen across the complementary strengths between dialoguing members. Certain members for example, seemed more centred towards technical and practical hands-on knowledge, while others were more centred towards the theoretical aspects of engine design – complementarities which interacted, transformed, entrained and complexified one another. Another similar type of antithetical dyad could be seen across the relative knowledge balance between younger and older members. Often, the older members provided ways in which to solve problems (or avoid them altogether) based on their experience and/or the network of contacts they had amassed over the years. The younger members, on the other hand, tended to be stronger within the realms of information technologies as well as having stronger competencies for numerical modelling activities.

Finally, there was a more basic and primary ambiguity or contradiction at work within the inter-group dynamics which can be directly attributed to the predominance of perspective-taking on the one hand, and perspective-giving on the other: namely the ontological dyad of the individual (as seen across emancipation of self via self-expression (or perspective-giving)) vs the more collective desire of identity towards the other (as seen across genuine listening that attempts to ‘put oneself in another’s shoes’ (or perspective-taking)). Here we can speak of balanced or, as Enriquez (1992) terms it “differentiated”, inter-group dynamics. Furthermore, the urge to express and emancipate oneself on the one hand along with a desire to listen and identify with others within the group on the other hand is what helped ensure members to exchange their complementary views and therefore meld their complementary attributes and competencies with one another. Hence, we can say that this basic or primary ambiguity, in turn, allowed for secondary knowledge-rich antithetical dyads that we described above (e.g. tacit vs explicit knowledge, older vs newer knowledge, practical ‘how-to’ vs theoretical ‘why’ knowledge) to be actively integrated so as to continuously complexify the knowledge being exchanged.

Figure 3 shows a schematic of the numerous specific secondary knowledge rich ambiguities specified in previous paragraphs, in a dialectical relationship of mutual reinforcement with the primary ontological ambiguity. The primary ambiguity of ‘emancipation of self’ vs ‘identity towards the other’ allows for specific knowledge-rich secondary ambiguities to be expressed and integrated within the dialogical perspective coordination process (shown in detail in previous figure 2); The expression or integration of these secondary ambiguities also reinforces the primary ontological ambiguity; and in turn, results in an open dialogue results whereby, individuals are open to others’ viewpoints as well as towards revision of their own retained knowledge; all of this resulting in knowledge being continuously complexified and shared.

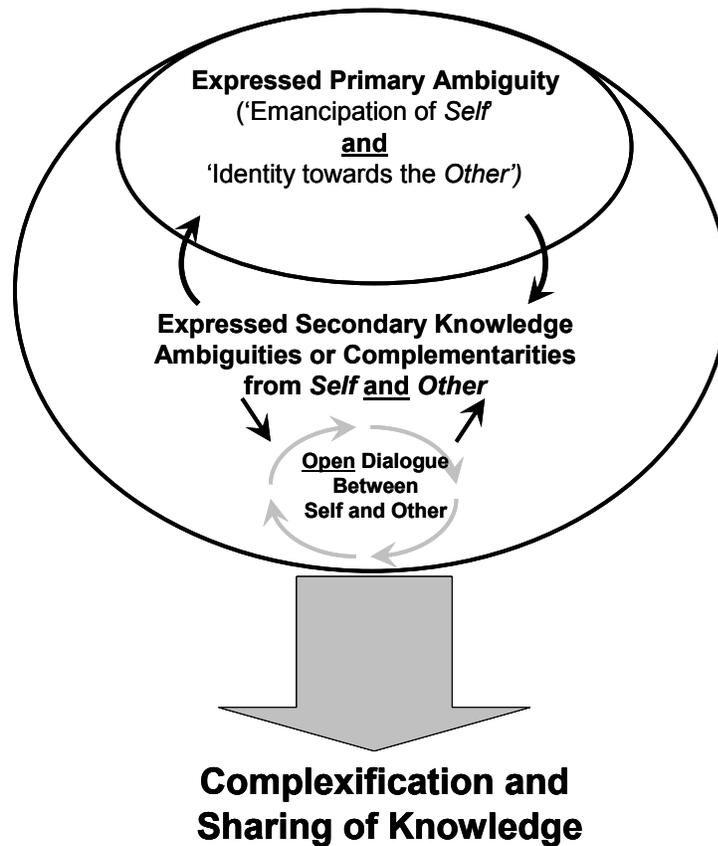


Figure 3: Expression of the primary ontological and secondary knowledge ambiguities (in dialectical reinforcement) within the dialogue process; leading to knowledge complexification.

5. Management’s patient and ‘parental’ (but not paternalistic) role

Authors such as Chanlat and Bédard (1990), Crozier (1989), Girin (1990) and Clegg (1990) have examined the place and the role of dialogue, the relation between language and work, on the human being as a being of speech, the possibility for self-expression, and on the pathologies of communication caused by violence to *Homo loquens* within the industrial world. Across Chanlat and Bédard’s (1990) synthesis, we can argue that the specificity of Man manifests itself across his capability to speak. Across speech or dialogue, Man constructs his identity and ego by interacting with others; for alone, Man is much less than himself. Each time a person speaks, he seeks to both express himself as well as communicate an image of himself with the aim of it being accepted and validated by others. Such dialogue, as described in the previous sub-sections, integrates contradiction in the form of complementary ambiguities, and thus forms complexified knowledge. It is perhaps no coincidence that knowledge, being a result of *human interpretation*, approaches its fullest potential when complementary ambiguities are fully embraced; since the most abundant ‘source’ of such complementary ambiguities lies within the human being himself (Chanlat, 1990). By first embracing Man’s ambiguity at the level of his being, that is the primary ontological ambiguity of ‘emancipation of *Self*’ vs ‘identity towards the *Other*’, we enable the dynamics towards generating enriched knowledge.

But what is the role of management in all of this? Certain managers had indicated through their actions and words on the importance of developing a sense of self-confidence amongst the members. Furthermore, as one manager explained, this self-confidence can be gradually developed with time by providing a psychological “safety net”, whereby people feel comfortable in learning and trying new ideas. Here we are reminded of Bateson’s (1978, p. 498) words:

“During the period when the acrobat is learning to move his arms in an appropriate way, it is necessary to have a safety net under him, i.e., precisely to give him the freedom to fall off the wire. Freedom and flexibility in regards to the most basic variables may be necessary during the process of learning...”

Within this environment, mistakes or errors are not condemned but rather seen as opportunities to learn, improve oneself and improve the group collectively across the sharing of ‘lesson’s learned’. The importance of developing self-confidence amongst the group members reminds us of Khan (preface in Winnicott (1971)) with respect to mother-child relationships in regards to child development. It is like the nurturing and supportive action of a mother which gives the child self-confidence to further discover his environment and face and adapt to conflicts – conflicts which will help him evolve. This parental approach requires a judicious balance between encouraging a gradual transition towards autonomy as members gain confidence and knowledge on the one hand, and always being present in the background so as to provide needed support when members face particularly daunting issues and problems on the other hand. The parental or psychological “safety net” provides a shared belief amongst the members that the group “is safe for interpersonal risk-taking” (Edmonson’s, 1999, p. 351); and thereby encourages the willingness to learn, share and create new knowledge (Bogenrieder and Nooteboom, 2004). The term ‘parental’ should not be misconstrued with the term ‘paternalistic’ (as referenced by various authors such as Crener and Monteil (1981), etc.) whereby management does not allow members to take the initiative towards making their own decisions, thereby severely limiting autonomy. The lack of such a “safety net” tends to prevent individual risk-taking which is necessary in exploring new venues of knowledge, while on the other hand, discourages the learning and sharing of knowledge amongst various members. Here, members can often fall into an individualistic survival mode, whereby, in an attempt to compensate for the absence of a general shared feeling of psychological safety, have recourse towards various psychological defences leading towards a “relational risk” in which members hold back critical knowledge from one another (Bogenrieder and Nooteboom, 2004, p. 293-294).

Another management implication towards achieving a knowledge-complexifying dialogue is *patience*. Enriched and authentic dialogue is a fragile human endeavour which requires time. In many ways, it involves ‘the art of losing time to save time’ (this is not to say that the groups were sheltered from the daily organisational pressures and objectives to ‘meet the schedule’). According to Chanlat and Bédard (1990), a breakdown in the authentic will to listen and be open towards another can in turn provoke within the ‘other’ feelings of mistrust, even hostility; but more importantly can sap another’s self-confidence in regards to the *reliability* of “his own emotional reactions, as well as his own perceptions of his external reality” (translated from Searles, 1977, p. 161). These, in turn, can lead to considerable psychical suffering, which in turn can even lead to repercussions on the physiological level (Dejours, 1980; Chanlat and Bédard, 1990). Hence, the positive paradox of ‘giving so as to receive’ can easily shift towards a negative paradox of ‘selfish taking leads to impoverishment’; in other words, ‘win-win’ changes to ‘lose-lose’ between the individual and the organisation as we shift from the recognition and support of the full human being to a managerial ideology solely based in economic rationality. Which, as Chanlat and Bédard (1990) explain, means all activities are measured in terms of time duration – which reduces all verbal

exchanges to the most elementary expression, and highlights the mantra of ‘be brief’. We eventually find that the so-called ‘efficiency’ gained across the sole and systemic use of e-mails (for example) backfires on us as numerous messages are sent off by everyone, convinced that they have ‘communicated’ across messages that become evermore cryptic and devoid of richness as people become more and more stretched for time – yet, a situation that is not the individuals’ fault, since it has been imposed upon by management; with the implicit indication by management that conduit type communication methods such as e-mails are the preferred ‘tools’ to handle ever-increasing workloads. All of this induces risk (via miscommunications) at various levels and categories, with each feeding into the other in dialectical fashion. Nonaka, Von Krogh and Voelpel (2006, p. 1199) similarly explains what the firm’s outcome becomes when it sacrifices “patience” for “speed”:

“...fast and effective knowledge use becomes the primary justification criterion. The aesthetical dimension of an envisioned future (if we only could...) is lost in everyday work, hindered by short term concerns, and dampened by irreversible operational decisions (we only can, if...). Boredom threatens the motivation of creative talent, their outflow increases, and inflow of newcomers subsides. While firm profits might increase in the short term, the organisation loses foresight...In the long run, it will fail to adapt to a changing environment, and, more importantly, it loses its reason for being.”

And as Chanlat and Bédard (1990) argue, a great deal of this initiative in patience involves management practices that are humanistic and which especially seek to liberate speech and dialogue.

6. Conclusions

The role of dialogue in the complexification of knowledge was first reviewed, whereby a dialogical model towards this end was first proposed: based upon emergent categories within a recent ethnographic case study, it brings forth the notions of perspective-making/giving and perspective-taking at the interpersonal level whereby it describes ‘the how’ in regards to micro-interactions between individuals (as represented across *Self* and *Other*).

In terms of ‘why-it-occurs’ as such was seen across our observations of how knowledge complexification involves a primary ambiguity or antithetical dyad at an ontological level whereby the *Self* and *Other* fully acknowledge and appreciate one another across ‘individual *Self*-emancipation’ vs ‘identity towards the *Other*’. This in turn is nurtured across feelings of mutual trust, mutual respect, mutual support and empathy – all very human traits, which we tend to forget and take for granted as we get caught up in the ‘mechanics’ of the process itself. It is across the presence of these two ontological yet antithetical elements that the *Self* attempts to place himself in the *Other*’s ‘shoes’ and vice-versa; and where individual learning and creation of new knowledge by both the *Self* and the *Other* can potentially occur. It is also a reminder for management that effective knowledge creation, sharing and learning is first and foremost a very human process. It is this ontological relationship between the *Self* and the *Other* which allows for specific secondary antithetical, yet complementary, knowledge to be expressed, integrated and synthesized within the dialogical process. The alternative, that is when one or the other of the two primary ontological antithetical elements is repressed (typically across a lack of mutual respect such as seen across a coercive *Self* or *Other*), renders all requisite variety (represented across personal knowledge complementarities) as inert ‘elements’ that cease to interact with one another. Here, the

dialogical process stops functioning in any authentic manner, thereby leading to a reduction in knowledge complexification; caused by misunderstandings and dialogue breakdowns which, in turn, increase the chances of being unable to react, adapt or exploit a continuously changing and complex environment.

Management plays a key role towards nurturing such a rich dialogical environment by first and foremost appreciating employees as human beings in the fullest sense. Towards this end, management must appreciate that human beings are beings of speech, seeking to express themselves and to construct themselves across their interactions with others. To channel this creates organizational value and prosperity; while to repress this can spell the long term demise of an organization. Channelling and encouraging knowledge rich dialogue requires patience on the part of management in that one must 'take the time to save time'. This goes against our first deductive reflexes of seeking short term or immediate efficiency at all cost. But taking the time to what? Taking the time to dialogue on the one hand; and providing a parental approach with our employees – whereby they feel the complementary yet opposing enabling conditions of encouragement to take initiatives on the one hand, yet also feel the psychological 'safety net' around them that will catch them and support them if they fall.

This case study prevents us from generalizing outside of the firm's context. As such, similar studies in other institutions within the knowledge economy are to be envisaged.

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