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## Emerald Article: Towards an architecture of organizational learning: Insights from French military aircrews

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## Article information:

# Towards an architecture of organizational learning
## Insights from French military aircrews

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## Abstract

**Purpose** – This article aims to examine the nature and logics of organizational learning considered as a process by which organizations capitalize on the variety of experiences accumulated by their members.

**Design/methodology/approach** – Complementing the current literature on experiential learning, the authors build on a case study to investigate how organizations benefit from action learning and seek to identify the properties of the architecture supporting it. The case study focuses on how French Air Force fighter and airlift aircrews carry out debriefing sessions in their daily activities.

**Findings** – Within this framework, it can be observed that learning in debriefing sessions ultimately depends on the capacity of the learning agents to integrate individual and collective functions (namely, individual progression and collective performance).

**Originality/value** – Building on the foregoing, the paper elaborates on a conceptual model of the debriefing procedure made up of three components: a learning mode, a learning structure and a learning culture. It follows that the organization is likely to capitalize on individual experiences to improve knowledge and action if it is capable of providing its members with a flexible learning architecture enabling individuals to combine distinctive learning modes along with heterogeneous structures and cultural values.

**Keywords** Organizational learning, Action learning, Learning from experience, Debriefing, France, Armed forces, Learning organizations

**Paper type** Research paper

## 1. Introduction

The organization's capacity to learn is a major source of performance (Bapuji and Crossan, 2004; Boerner *et al.*, 2001; Grant, 1996; Zollo and Winter, 2002). In that view, action learning has attracted special attention from scholars and practitioners (Smith and O'Neil, 2003). The latter describe action learning as a set of structured procedures (e.g. after-action reviews, debriefings, post-action reviews) enabling individuals to evaluate the effectiveness and efficiency of what they do, envision corrective measures if necessary and capitalize on the resulting outcomes (Oliver, 2008). Research efforts have been primarily directed towards identifying the principles and mechanics supporting action learning within both public and private organizations (Baird *et al.*, 1997, 1999; Brock *et al.*, 2009; Darling and Parry, 2001; Felix and Keevill, 2008; Vashdi *et al.*, 2007). Although scholars argued that action learning procedures generate practical improvements of organizations' knowledge and action, the conditions for these specific procedures of organizational learning (OL) to be successfully exploited

by organizations remain unclear: there is a gap in our understanding of how organizations reap the full benefits of action learning procedures.

This article aims at bridging that gap by investigating how organizations manage to create the conditions for individual experiences to develop and, at the same time, capitalize on the latter to improve organizational knowledge and action. In doing so, it seeks to identify the properties of the learning architecture supporting effective action learning. To address the above research questions, we focus on the debriefing procedure employed by almost all Air Forces' squadrons to develop tactical performance while maintaining safety (Ron *et al.*, 2006). In particular, we focus on the way French Air Force (FAF) fighter and airlift aircrews carry out debriefing sessions in their daily work environment. Our unit of analysis therefore is the aircrew, and the question addressed is how its parent organization (e.g. the squadron) manages to benefit from aircrews' daily engagement in action learning procedures.

The rest of the paper is organized as follows. We begin by reviewing the literature on organizational learning and action learning. This literature review shows that we still need to improve our understanding of how organizations promoting action learning realize the full promises that scholars attached to it (e.g. improved performance). Then, we present the methodology and data used to study debriefing procedures as they are conducted within FAF fighter and airlift aircrews. Results are discussed in the next sections. The latter emphasize three findings. First, the major objectives assigned by pilots and navigators to debriefing sessions are twofold: individual progression and collective performance. Second, debriefings are likely to generate and, at the same, are dependent upon a collection of skills, norms and values which can alternatively enable or inhibit individual progression and collective performance. Third, an architecture of organizational learning is introduced which allows us to discuss the conditions affecting the ability of the organization to learn from experience and benefit from it.

## 2. Conceptual background

Organizational learning is a process which consists in capitalizing on the variety of individual and collective experiences accumulated by the members of an organization while engaging in their daily work environment. An organization is likely to capitalize on individual and collective experiences when it becomes capable of making sense of what its individual members do and know. Holmqvist (2009) suggested that "organizational learning is a formally organized individual experiential learning process [...] which yield behavioral outcomes that are reflected in organizational rules encoding the experiences concerned" (Holmqvist, 2009, pp. 278-279). And the author added that interpretation of experiences is "made possible by acts of discriminative attention" (Holmqvist, 2009, p. 280). Elkjaer (2004) suggested that experiences result from two interrelated cognitive processes: inquiry and reflexivity. Inquiry allows individuals to respond to uncertainty by identifying new problems and searching for solutions to be implemented rapidly. Reflexivity enables individuals to learn from the evaluation of actions and verbalization of their consequences (see also, Ramsey, 2005). By engaging in "reflective thinking" (Elkjaer, 2004, p. 420), individuals are likely to become more knowledgeable and competent. This does not mean that action learning is nothing but an individualistic phenomenon located in the individuals' heads and consisting in acquiring conceptual knowledge. Instead, the experience obtained through the combined instrumentation of inquiry and reflexivity (i.e. reflective

thinking) is strongly rooted in action and thus highly context-dependent. Therein, the notion of contextualized experience points to the integration of unique conditions of time and space including the "inescapably social and material character of knowing" (Marshall, 2008, p. 414). In addition, the notional idea of an action is understandable only in connection with the daily practices of individual learners who are individually and collectively engaged in problem-solving activities. Action learning procedures, therefore, essentially rely on the willingness and ability of individual learners to complete the reflective analysis of their action. The capacity of individual actors to evaluate whether or not the objectives assigned to the actions performed have been fully realized and, if not, to understand why it is so and to learn from it, is determinative for the effectiveness of action learning procedures. In that way, one should consider that action learning represents a specific sub-set of OL procedures supporting the accumulation and interpretation of experiences.

Interestingly, the military have a long-established tradition in using action learning procedures as vehicles for improving action and performance. The US Army's methodology called After-Action Reviews (AAR) had been extensively documented in the literature (Baird *et al.*, 1997; Baird *et al.*, 1999; Darling and Parry, 2001; Brock *et al.*, 2009). AAR consists in a continuous learning process made up with four interrelated steps: reviewing operational intents, analyzing actions and their consequences, capturing the lessons learned and their implications for future actions, and applying the lessons immediately after and back into action (Baird *et al.*, 1997, p. 387). To be effective, this four-step cycle should be implemented immediately after a given course of actions has been accomplished by the individuals who participated in its planning and execution (Baird *et al.*, 1999, p. 24). In the same vein, Air Forces' action learning procedures, called post-flight reviews, also attracted attention from scholars (Lipshitz *et al.*, 2002; Ellis and Davidi, 2005; Ron *et al.*, 2006). Investigating how Israeli fighter squadrons manage to learn from experience, Ron *et al.* (2006, p. 1074) indicated that "post-flight reviews fulfilled three basic functions: learning, social control and psychological". Each function points out some specific individual and/or social dimension attached to the learning procedure, discriminating between the mechanics of learning (e.g. learning from others, learning from failures), the value of learning for the organization (e.g. socialization, performance, communication, resilience) and the individual and collective enablers of learning (e.g. rewards, social comparison, discipline).

Extending the previous research streams, Vashdi *et al.* (2007) examined the applicability and implications of military-oriented action learning procedures (e.g. AAR and post-flight reviews) to civilian organizational contexts (i.e. hospital surgical departments). The authors argued that the briefing-debriefing technology inspired by military-oriented AAR procedures is likely to improve surgical teams' performance to the extent that the problems identified during debriefings are translated into improvements in future actions. Vashdi *et al.* (2007, pp. 136-138) further suggested two conditions for action learning to become effective. First, they pointed out that the capacity of the surgical team to question taken-for-granted hypothesis underlying a given problem is determinative for its ability to transform current errors into successful future action. Second, the authors demonstrated that briefing-debriefing technology is likely to enhance performance when individual learners share a common sense of the importance of such attitudinal values as "inquiry, transparency and accountability" (Vashdi *et al.*, 2007, p. 137).

The foregoing literature review displays that scholars rightly addressed the structures, mechanics and logics supporting action learning procedures. In doing so, scholars identified the actors participating in action learning procedures and pointed out the role played by technological artifacts in supporting interactions. They also described participants' attitudinal profiles and social atmosphere that fit the most with the objectives of action learning. They finally explored various organizational contexts in which action learning procedures are likely to be usefully implemented. Without reducing the inherent interests of that research streams, it must be acknowledged that few scholars examined how organizations manage to capitalize on individuals' experiences and improve organizational knowledge and action. The following sections develop a case study that seeks to address this question, investigating how French Air Force aircrews carry out debriefing sessions.

## 3. Methodology

This research is based on an explanatory case study (Yin, 2003) in which actors are involved in action learning process on a regular basis. More precisely, we focused on debriefing sessions systematically organized in air combat squadrons after pilots and/or aircrews landing. To investigate our research question, we examined the objectives pursued by pilots through post-flight reviews and the mechanisms of how these are achieved.

### 3.1 Data collection and analysis

We used a mixture of data collection methods to achieve triangulation. In doing so, we sought both enhancing confidence in our findings and providing an appropriate level of internal validity (Eisenhardt, 1989). We organized data gathering over a one-year period, from September 2008 to December 2009, in the course of which we collected extensive qualitative data in the French Air force. First, we gathered interview data from twelve experienced aircrews, including two fighter aircraft navigators, eight fighter aircraft pilots and two transport aircraft pilots. All interviewees were asked the same set of basic and semi-opened questions. Each interview lasted on average one hour and was tape-recorded and transcribed. In addition, four briefing-debriefing sessions, taking place both in combat and transport squadrons, were observed and notes were taken. In the course of observations, we paid special attention to the way post-flight review was shaped (location, tools – technologies and booklets – and participants – experienced or junior pilots) and managed (communication practices – verbal as well as non verbal – as well as the content and nature of discussions) by aircrews. Finally, we explored archival records such as debriefing brochures and booklets provided by NATO and the French Air Force to combat squadrons. We also studied a dozen of unclassified institutional documents questioning knowledge acquisition through debriefing and the role played by advanced technologies (e.g. Bartone and Adler, 1995; Johansen and Fredborg, 2000; Schvaneveldt *et al.*, 2002).

We transcribed the tape-recorded interviews and field notes gathered through observations. Analysis of these multifaceted data collected was based on a line-by-line coding using the N-Vivo7 software. During the whole coding process, we followed an iterative and comparative approach in order to identify regularities and additional field-bases inquiries (Strauss, 1987; Miles and Huberman, 1994). The process coding was instigated in a top-down perspective, according to the three main themes derived

from the interview guide: the objectives pursued by pilots and navigators through
post-flight review, enablers involved in achieving these objectives, and limits of
debriefing. From these three themes, we produced emerging themes (new nodes "in
vivo" from the words, sentences and/or paragraphs) which included a more refined
categorization of the individual and collective nature of debriefing functions, and
facilitators of debriefing.

### 3.2 Case setting

Working days in a French squadron begin with a 30-minutes general briefing with
pilots and navigators scheduled to fly. The briefing includes weather situation, landing
runway condition, and engine failure considerations (the "question of the day"). Right
after these formal presentations, formation leaders detail training schedules to the
whole squadron. This time represents opportunities for participants to review lessons
learned from similar training missions. They describe a number of problems they faced
during course of action through informal discussions. Junior pilots attend such debates,
encouraged by their formation leaders to participate in discussion, in sharing their own
experiment or questioning senior pilots. Viewed broadly, pilots can take advantage to
this general briefing session in honestly reporting their past actions and reasoning.
When the general briefing is over, people split into patrols to attend dedicated briefing
focused on the preparation of their particular mission. Immediately after the flight,
pilots and navigators formally debrief the mission with a 40/45-minutes post-flight
review. They call such a review "formal" since it follows a chronological and structured
process provided by the NATO Air Forces manual. More precisely, participants use the
NATO briefing guide, following the checklist backwards. In that way, the course of
post-flight review is standardized, codified, and shared by every pilot. In addition,
fighter squadrons are often equipped with a dedicated mission restitution system to
achieve a rigorous analysis of the flight. Reviewing flight films recorded by the
cockpit-mounted system enables pilots to understand what happened during the flight.
They can construct an accurate representation of the patrol formation and evaluate
mission achievement. Each pilot's video record is scrutinized during debriefing, with
particular attention paid to inappropriate actions (errors), cause of errors, and potential
remedies. Critical stages concern targeting point (especially for assault squadrons) and
the way each pilot flew his plane in combat (especially for air defense squadrons). The
atmosphere is safe but tense since each pilot's error and ways of correcting it are
scrutinized and criticized by others. Junior pilots are especially under hierarchical
pressure since their ability to perform their tasks is evaluate by their formation leader.

## 4. Findings

Recalling the research question presented previously, our goal is to gain clearer
understanding of the way French fighter and transport squadrons manage to take
advantage from action learning procedures. From the coding of interviews and field
notes, this section provides comprehensive insights in discussing the individual and
collective functions of debriefing, stressing on its processes and enablers.

### 4.1 Supporting individual progression

Line-by-line coding of the material reveals that the debriefing process is primarily
designed for individual training and learning. Participants are methodically evaluated

by colleagues and hierarchy (for junior pilots) during post-flight reviews, and sanction can be enforced if they fail to succeed. As a result, to the open-ended question "what kind of advantage(s) do you take from debriefing?", respondents spontaneously pointed out that the main function of debriefing is individual improvement in achieving tasks during aerial warfare. As one pilot states:

> The first interest of debriefing is individual improvement. Debriefing allows analyzing what has been done, both good things and failures, and finding solution to get better for the next flight.

Every pilot and navigator acknowledges this basic function of debriefing and considers detection and correction of errors as the better way to complete. If junior pilots are especially involved in such scrutiny practices, seniors and formation leaders are also concerned, reckoning that the most skilled pilot makes errors and can take advantage from others' assessment. Several of our informants told us that the critical examination of what has been done during the flight represents the essence of debriefing. As one of them explains:

> Debriefing allows pilot getting aware of the errors he made during the flight, and determining the stages on which he must pay attention to improve. It's a kind of historian work: you go back over the facts, analyze why things arose and learn lessons to reuse.

That primary focus on error detection and correction is based on a fully internalized mode of analysis: first, observing the errors of others help to correct one's own; second, having colleagues present to the debriefing improve the opportunities to catch the errors and to find appropriate remedies; third, to be accountable for one's own mistakes is the better way to avoid reproducing them the next time around. Following this typical mode of analysis, every participant is involved in a deeper and constructive post-flight review, seeking to enhance its own practices and way of doing from others' criticisms and comments.

Data study stresses the crucial role played by technologies to support such a critical examination process. Indeed, dedicated in-flight recorded systems systematically and objectively face up pilots and navigators to reality: in reviewing the flight film recorded by the cockpit-mounted device, they acquire a precise understanding of what happened and what went wrong during the mission. Facts are showed, transparency is the rule and every participant has to accept full responsibility for its errors. In that sense, technologies created a revolution in the debriefing process since before implementation, senior pilots tended to underrate their mistakes and boast about their "perfect" flight. As one navigator indicates:

> Before, it was really easy for senior pilots to impose their viewpoint in describing their brilliant aerial maneuvers. At the end, even if the youngest remained skeptical, he couldn't say anything. Today, thanks to mission restitution systems, insincerity has disappeared. Every little flight detail appears on the screen and participants are debriefed from unbiased facts.

Since mission restitution systems enable participants to re-examine flight data and question the reason for a particular action, they support individual learning with efficiency. Especially, individual improvement mainly relies on two types of learning mechanisms: learning from failures and confrontation to reality. Considering the interviewees responses, individual learning is primarily driven by failures. As one pilot

explained to us, hierarchy expects from members describing with precision the problem they faced, clarifying why they made an error and considering their implication for future actions. In fact, they are involved in an institutionalized process of learning, which is governed by norm of transparency and recognition of failures:

> We all know that errors are opportunities for lessons learned. The most outstanding events of my professional life are actually those for which I've failed and I've been harshly criticized by hierarchy and colleagues. Since, I've never made the same errors. I still think of these moments, they have been very helpful for my progress.

A large majority of respondents considers that individual improvement relies on personal attitudes. In particular, humbleness and reflexivity are viewed as key enablers of individual learning. Interviewees define humbleness as the ability to acknowledge its errors and to accept full responsibility for them:

> Being able to make a thorough criticism of oneself is quite important if you want to improve. That's mean being humbleness and admitting constructive criticism. Our work is based on humility. Whatever his level of experience, every pilot should be capable to acknowledge that today he failed because he wasn't good enough. And you know, sometimes it's quite hard to listen at your colleagues telling you that if the mission is not a success, it's because of you.

Humbleness is tightly linked to reflexivity. Reflexivity relies on the assumption that debriefing participants have to acquire and reflect upon feedbacks generated by their actions. Lessons always must be learned from errors and the only way of doing is questioning oneself and challenging its current work practices.

### 4.2 Achieving collective performance

The second key function of debriefing stressed by interviewees concerns collective performance. Indeed, pilots and navigators acknowledge that error detection and lessons-learned at the individual level enable them to broadly focus on mission accomplishment and to assess the functioning of formations as a whole. One pilot states:

> Individual improvement affects collective improvement. The goal of debriefing is progress for every participant: pilots, navigators, air traffic controller, and so on. But it's also progress at every level, in particular at the aircrews' level. The objective is getting the machine better for the next time. When I talk about the machine, I mean a complex system of technological and human resources.

In operating in the way of critical examination, each pilot and navigator reckon debriefing as a multilayer learning process which enables them to improve their individual as well as their collective performance. Another pilot insists:

> Lessons learned from debriefing enable nurturing both individual and global knowledge. It's not a stylistic composition; it's for real, for being there at the right time.

A large number of respondents consider debriefing as an opportunity to socialize for seniors and to be recognized as a member of the community for the youngest. They frequently underline the role played by the squadron bar in the debriefing process. Squadron bar is a place where pilots and navigators talk freely about their day, the pressure they felt, the situation they were involved in and the solutions they implemented, the errors they have done, etc. In other word, they debrief their mission

once again, but in a different way, less hierarchical and more informal. In doing that, they gradually build a stock of common knowledge providing them with a shared and accurate understanding of what their work and their roles are within the aircrew and, broadly, the squadron:

> At the end of the day, we get together at the squadron bar and here, people talk much more freely, less formally. Pilots share their experiences with the youngest and they often take advantage of that opportunity to insist on the importance of attitude and collective values.

In that way, formal post-flight review and informal discussions in squadron bar compose a structured and democratic social system through which participants share and spread the core values of the debriefing culture. These cultural values are first learned in flight school and throughout active service afterward until they become second nature for pilots and navigators. In that way, the debriefing process encourages cultural standardization of behaviors and attitudes. Especially, it nurtures collective enablers such as social control and cohesion. Social control refers to public accountability and judgmental environment which promote constructive learning. A pilot explains:

> The basic idea is assessing my own contribution with regard to collective performance: what did I do today which has enhanced or deteriorated aircrew and squadron practices? Of course, formal debriefing is important since it allows evaluating pilots' technical and personal attitude. But squadron bar also plays an essential role in cultivating mutual trust and extra-professional knowledge. And day after day, you participate in creating a cohesive group.

## 5. Discussion: towards an organizational learning architecture
Debriefings fulfill two key functions: individual progression and collective performance. Decomposing these functions, we introduce a model of the debriefing procedure as made up with three components: a learning mode, a learning structure (with its associated artifacts) and a learning culture. We contend that the successful alignment of these components is determinative for the capacity of the organization to learn in capitalizing on the experiences accumulated by its personnel through its daily engagement in action learning initiatives.

### 5.1 Learning mode
Our case study findings suggest that debriefings do not rely on a single learning process but encompass different modes of learning. A mode of learning can be decomposed into two building blocks: a learning mechanism (called type) and a learning outcome (called level). The notion of a learning level designates the nature of the feedback effect associated with a particular learning mechanism. Examples of levels include Argyris and Schön's (1978) single-loop, double-loop and deutero-learning, and March's (1991) concepts of exploitation and exploration. It should be noted that our definition of a learning level differs from Antanocopoulou's (2006) conceptualization which includes five levels of learning: individual, group, organization, industry/sector and society. Antanocopoulou's multilevel typology focuses on the identity of the learning agent while our definition is concerned with the nature of learning outcomes.

Regarding the notion of a learning type, we assume it refers to the mechanism through which knowledge and skills are developed, shared and incorporated into

practices. Examples of learning types are widespread in the literature and encompass learning by imitation, learning by doing, learning from failures, learning from others and learning by using (Boerner *et al.*, 2001). Our case study findings indicate that debriefings rely on three learning mechanisms:

(1) *Learning from experimentation*. This learning type involves the active participation of pilots and aircrews ready to learn from the corrections of personal trials and errors.

(2) *Learning from others*. This learning type introduces a social facet through the connection of distinctive individual experiences (e.g. learning from imitation). By facilitating the sharing of expertise and articulating contingent judgments and opinions on peculiar behaviors, actions and attitudes, learning from others fosters the dissemination of best practices, know-how and other critical knowledge among patrols and squadrons.

(3) *Learning from failures*. This learning type puts particular emphasis on the analysis of observed deviations from expected, planned or desired outcomes (Cannon and Edmondson, 2005). The deviations that the squadrons and/or the individuals experiment are not necessarily large: small failures can also generate essential lessons and trigger vital organizational adaptations.

The integration of these learning mechanisms within debriefing sessions is facilitated because each mechanism is based on a three-step cycle: detection of errors, analysis of their causes, and correction of the resulting deviations through individual and collective experimentation (Cannon and Edmondson, 2005). The ensuing integrity of the cycle is further reinforced since each mechanism is principally incremental or single loop (Argyris and Schön, 1978). Consequently, the alignment of the three learning mechanisms is not likely to alter existing organizational routines and schemes in response to corrective actions undertaken to eliminate detected and potential errors. However, post-flight review procedures might well generate cumulative adaptations that undermine the rules, procedures, models and values which have generated the trial and error sequence under evaluation. Double-loop and radical changes can characterize the nature of the feedback effects attached to debriefings regarding the squadron's routines, tactics and procedures. Eventually, post-flight review might induce deeper modifications of the dominant logics and methods employed by the Air Force to enable its employees to train, learn and educate. The foregoing occurs through the process of time when the accumulation of evidence triggers some radical changes. As a consequence, it is the dynamic interaction between types and levels of learning which are likely to generate different modes of learning (e.g. incremental learning, radical learning).

It should be noted that our definitions of a learning mode and a learning type differs from Gnyawali and Steward's (2003) conceptualization of a mode and a type of learning. Reviewing the literature on OL, the authors identified two modes of learning called "informational" and "interactive" modes (Gnyawali and Steward, 2003, p. 70). According to the authors, the main difference between informational and interactive modes of learning is that the former operates under conditions of relative stability of existing organizational routines, while the latter "is particularly useful when organizations lack shared schemas or the preexisting schemas are inappropriate for use in the change context" (Gnyawali and Steward, 2003, p. 70). Building on the

foregoing definition, Gnyawali and Steward (2003) discriminated between four types of organizational learning, each type being supported by a specific interaction between informational and interactive modes of learning. The four types of learning are called reinventive learning, formative learning, adjustive learning and operative learning. Adopting a contingency perspective, the main contention made by the authors is that each type of organizational learning is appropriate to specific organizational conditions.

## 5.2 Learning structure

We elaborate on the notion of a learning structure because our case study findings provide evidence that pilots and navigators use different modes of interaction and communication channels to acquire, share and disseminate a variety of knowledge about the various dimensions of the mission (e.g. weather situation, tactical environments, and threats). We observed that participants in debriefing sessions utilize distinctive communication technologies and relational structures when particular types of knowledge are to be exchanged. For instance, it has been demonstrated that exchanging personal knowledge is facilitated by allowing individuals to establish informal dialogues. Squadron leaders promote the use of a variety of digitized and non digitized technical systems and documentations which, in turn, improve the capitalization and dissemination of personal expertise as well as collective experiences. Therefore, conducting debriefing sessions entails the deployment of a mixture of communication artifacts dedicated to the articulation, storage and dissemination of both tacit and explicit knowledge. The implications of the foregoing can be summarized as follows. Communication artifacts individuals employ and the nature of the knowledge exchanged need to be aligned with the properties of the relational architecture supporting debriefings. Since debriefings are based on a dual relational structure which combines informal dialogues with hierarchical interactions, designing effective action learning procedures requires coordinating a variety of formal and informal communication technologies with a variety of knowledge. The implementation of a formalized but safe communication atmosphere requires that the organization enable its members to freely select their relational structure so as to cope with the variety of learning situations and knowledge exchanges (Brown and Duguid, 1991). The basic property of the notion of learning structure, therefore, is flexibility and versatility.

## 5.3 Learning culture

A learning culture is made up with a set of values and norms that shape individuals' attitudes when they participate in learning experiences. Ron *et al.* (2006) indicated that critical thinking and reflective analysis is facilitated when specific values are shared by individual learners. Indeed, the sharing of social values enables individuals to manage "the tension between an inquisitive, non-evaluative environment that is conducive to learning and the judgmental environment entailed in determining culpability" (Ron *et al.*, 2006, p. 1078). One should therefore consider that the learning culture is determinative for the ability of individuals to learn and improve through their daily engagement with complex tasks. When individual values and social norms consistently overlap, debriefing sessions, supported by the combination of formal and informal interactions, are likely to generate useful outcomes for individuals and

aircrews but also for their parent organizations (e.g. squadrons). Our data revealed individual values, including responsiveness, humbleness and openness, contribute to the usefulness of debriefing sessions. Responsiveness, humbleness and openness complement each other to guarantee reflexivity and critical thinking to generate individual improvements. In addition, our findings provide evidence that when these values align with social norms then collective performance is likely to be achieved. Social norms shape how individuals interact and communicate during learning sessions. They include mutual trust and objectivity. Mutual trust is critical since it enables individuals to accept exposing themselves to others' inquiry and criticisms. Without mutual trust, the opportunity for individuals to capitalize on reflective thinking and collective inquiry vanishes. Objectivity supports mutual trust whether interactions among individual learners occur within formal or informal contexts. Objectivity means that individuals commit themselves to report their actions truthfully and, at the same time, recognize others' comments, criticisms or suggestions as relevant and useful.

## 6. Conclusion

Investigating how French Air Force aircrews carry out day-to-day debriefing sessions, this article refines existing literature on action learning. Alike after-action and post-flight reviews, debriefing procedures are rooted in the retrospective analysis of actions leading to the detection of errors and implementation of corrective measures. The detection, analysis and correction of errors come along with the development of various ways of interacting and disseminating knowledge. Pilots and aircrews not only convert tacit knowledge into explicit but come to connect skilled performance in new ways through a variety of social interactions. In combining distinctive ways of communicating and sharing knowledge, individuals become capable of seizing many opportunities to develop individual knowledge and skills (individual function of debriefings) and improve collective performance (social function of debriefings).

The model introduced in this contribution assumes that action learning can be beneficial to the organization provided that the latter is capable of designing a flexible learning architecture. By enabling its members to combine distinctive learning modes along with formal and informal learning structures and cultural values, the organization is likely to expand the scope of its potential responses to the current and future demands for adaptation.

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