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Worker's management and skills development in a temporary team

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Abstract. The current communication is part of the results of the PhD thesis in Ergonomics related to a fire forest coordination and control center in Chile [1] which despite working in a complex and risky dynamic environment, is handled by a temporary team. The aim is to reveal the strategies mobilized by the manager against time to develop individual and collective operators' skills in order to become an operational team. But also, to identify the leadership style suitable for a temporary team that has to handle a dynamic complex system.
Based on the theories of situated action [2], distributed cognition [3] and distributed social cognition [4], systematic observations were carried out at the control center for six months (2010 and 2011) in order to analyse both the actions and the verbal learning exchanges among team members.

It was observed that the manager articulate situated learning activities by a flexible, dynamic, opportunistic and constructive strategy; encouraging active participation and interaction, the reflexive action on their own practices, mutual knowledge, self-training initiatives, mutual assistance, epistemo-vigilance and collaboration at learning. As a consequence, team members create opportunities, both formal and informal, by mobilizing individual or collective action modalities to learn and develop their skills.

There is scientific support in the sense that leadership style shown by the manager at combining different leadership approaches is more effective for temporary work environments.

Keywords: leadership, risky dynamic systems, temporary workers.

1 Introduction

Forest fires cause serious environmental damage due to the destruction of the ecosystem, in terms of flora and fauna, the deterioration of soil quality and environmental pollution, but they also have a significant socio-economic cost due to damage to the environment, property, productive processes and public health in general [5]. Chile's patrimony possesses regions with a high density of forest resources that are protected by two operating systems: the first being private, controlling the fire of the heritage

of large forest companies and in their immediate environment; the second, is a private-law entity that depends on the Ministry of Agriculture, identified as the National Forest Corporation (CONAF) whose mission is the protection of the heritage of the state, small and medium-sized enterprises and national reserves [6].

The Fire Forest Department of CONAF has one operational unit identified as Fire Forest Coordination and Control Center (Control Center) which aims to prevent forest fires and reduce damage caused by forest fires but also in monitoring the rational and controlled use of fire by companies, contractors and forest owners registered in the protection system [7].

The activity of control center's operators is directly related to the control activity of dynamic environments characterized by a loop of tasks such as: information gathering, diagnosis / prognosis, action planning and possibly the means of action, decision, execution and control [8]. But also, coping with fire forest in a risk-averse dynamic system involves dealing with unexpected events, hazards and unforeseen events, under heavy temporal pressure and where the operator only has partial control of operations and may require the participation of other actors outside of CONAF.
Taking into account the complexity of work demands at the CONAF, it is paradoxical that, except for the chief coordinator, all the operators have a temporary contract in between October and April, leaving their job at the end of the summer season and they expect the return of some former workers to the following season. In that case, there is a concrete problem for field work is the loss of the human capital, the experienced knowledge and the organizational know-how. This condition is identified as a clear weakness for the system and implies an important investment every year both in training and guiding the new heterogeneous team.

2 Method

Based on the theories of situated action [2], distributed cognition [3] and distributed social cognition [4], the researcher observed the work at the control center for an extended period (six months in between 2009 and 2010) and collected data during the initial training process and throughout the peak season, in the operational setting. Data collection was supported by audio and video recordings in order to analyse both the actions and the content of the trainer’s interventions and the spontaneous verbal exchanges among members of the control center (5 experienced operators, 3 trainee operators). Systematic observations were supplemented with individual interviews with each member of the team.

3 Results and discussion

According to the situational analysis of the activity in progress, the manager demonstrate several sociotechnical strategies which conduct in coordination with the training

department team with an particularly dynamic situational style during the formal training process at the beginning of the forest-fire season as well as during the season.

3.1 Sociotechnical strategies conducted by the manager during the formal training process

Each season starts with a formal training period, planned and organized by the manager in coordination with the team of the CONAF training and development unit. Despite having a previously defined program in terms of topics and approximate duration, the truth is that this period can never be guaranteed according to plan. In fact, during that period external constraints, such as adverse climatic conditions could cause forest fires of variable complexity affecting the training period. These environmental changing conditions well known by the training team influence the sociotechnical strategies aimed to quickly train novice operators, to update the knowledge of the experienced and to make each other operational.

During the formal training period they receive technical knowledge in order to be able to identify a number of parameters useful to the management of forest fires. They also learn the normative aspects of the task, pre-established conventions, and strategic and tactical operation procedures with other actors in joint operation plans when activating alerts in the region. But, the skills to link certain key variables that leads operators decisions related with fire fighters allocation, the treatment of calls and also the operators coordinated actions requires other learning activities such as: a) practicing the job with the tasks of the center, where the novices are assisted by more experienced colleagues, b) episodic events, c) the evaluation of knowledge, d) simulations, e) visits to the field as well as brigades allocation decision-making exercises towards fire. Those learning activities that are chosen to develop people's skills directed towards the mobilization of intelligence in situation, towards autonomy and cooperation by the confrontation of people with real work situations will help to enrich them [9]. Both, the training team and the responsible of the control center, choose those learning activities due to their field knowledge, because it is not possible to rely on previously defined behaviors based on a prescribed tasks or rules. In fact, adaptation and success at work depends on the mobilization of people collectively committed, with initiative and responsibility, to cope with the situations they face, through the exploitation of experienced events as sources of learning for the future.

It is so that the training team based their practices with the idea that people learn through social development which evokes the Vygotsky's theory of social constructivism [10] and the situated learning theory developed by Lave & Wenger [11] that emphasized that knowledge needs to be presented in authentic contexts with the social interaction and active collaboration.

It was observed that the training team and the responsible of the control center articulate these situated learning activities by a flexible, opportunistic and constructive educational strategy in considering the dynamism of the current activity, nourished by the active participation of the members of the team of the control center and by the reflexive action on their own practices or experiences. This participation is functional (enriched exchanges resulting from the training sessions), but also meta-functional because the responsible of control center encourages experienced operators to reflect on their own practice of the profession and on experiences to help improve the training process.

This style of management feeds their mutual knowledge to develop spontaneous self-training initiatives. In fact, the manager encourages the team towards constant interaction, mutual assistance and collaboration at learning their job. But also, in considering the situation of the environment and the emerging demands made by the team members, he makes arrangements in order to gradually adapt the training modalities of future. In addition the manager transmits some key work rules for both experienced and novices team members. Some of those key work rules are related to encourage novices to ask the experienced and the latter to support the novices in their training, to share ideas in order to improve training process, and also to share what they know and what they still need to learn.

But also, the manager insists on transmitting the idea of mutual vigilance and support. This working rule contributes to the development of a collective competence, named as *"épistèmo-vigilance"*[1], a kind of mutual learning in which team members exploit both the constructive and productive dimension of the activity, in order to prevent mistakes; guiding, correcting and reinforcing their behaviors and their knowledge aimed to improve their performance as a team.

3.2 Sociotechnical strategies conducted by the manager during the season

All of those training modalities set up by the manager during the training period designed to promote a cooperative, mutual aid and assistance mode of operation and skills development, result in a certain collective behavior, a particular way of working together during the functional period. During the operational period it was observed from the beginning an active participation of team members, self-organization, and mutual support not only in order to fulfill the task, but also in order to exploit opportunities for learning from experience.

It is possible to confirm that functionally the system works, in spite of the seasonal condition of the operators. In fact, beyond the initial formal training: the team members exploit the situations to interact with the goal of building knowledge during the action. These opportunities have been identified as learning interaction situations

(LISs) in which team members create opportunities, both formal and informal, by mobilizing individual or collective action modalities to learn and develop their skills.

During the systematic observations all along the season it was noticed that the novices were the team members that took the initiative, most of the time, in setting up the LIS, and the interactions were more oriented to the experienced team member than the manager (see Fig.1). This dynamics of the exchanges contribute to the construction of self-confidence and confidence between colleagues, not only as part of the development of the action skills, but also as part of the collective functioning in the operational management of forest fires.

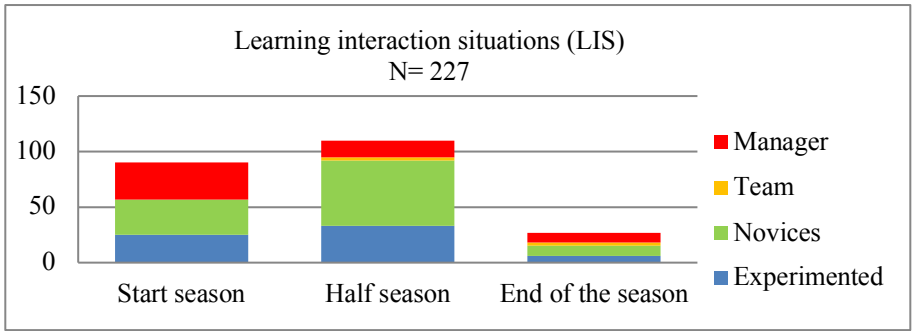

Fig. 1. Learning interactions situations activated by the team members during the fire forest season, region Biobio, Chile, 2010 -2011.

It is also expected to see that at the beginning of the season the LISs are more frequent because team members and particularly the novices, are getting familiar with work demands in situation. But in the middle of the season when the workload increases both in number and complexity, it might be expected that all team members should be focused on operational interactions, leaving the formative interactions only occur during off-peak periods. However, team members take advantage particularly of the fire forest coordination and control activity as a training exercise to help themselves and to reinforce knowledge and develop their skills. The purpose of training is not moved to quiet moments or breaks; on the contrary, the group constructively exploits the current activity so that the regulation seeks both the continuation of the current action and an opportunistic exploitation to reinforce, stabilize and update the knowledge and skills of the collective action.

In contrast, towards the end of the season, there is a significant decrease in the need for learning interactions as shown in Figure 1. So, it might be possible that the need for assistance and training are fewer as operators are already trained and have developed the necessary skills. In any case, even though the number of LISs is lower, it is not expected to have none of the LISs because they are constantly facing dynamic environment that may changes any moment so they are in a systematic learning dy-

namic. So they learn how to cope with different types of strategies or training modalities that are put in place during the season.

Within the LIS, different types of informal training modalities take place according to the dynamics of the exchanges and the people involved in these exchanges. These training modalities will be named as organizational accelerators of training, learning and reinforcement of knowledge (OATLR)[1]. This notion that was borrowed from management science referred to training and support programs aimed at promoting innovation and innovative business generation capable of facing competitive environments [12] identifies a set of individual and collective processes that have the property of activate and advance operators in their efforts to learn and enhance their autonomy, but also at pushing them to achieve operability and performance.

Throughout the season, seven OATLR mobilized by the team members were identified both in quiet and in more demanding working periods:
a) Evaluation and enhancement of knowledge and skills: Ask questions and assessment responses to clarifies, accurate or complete missing knowledge and skills.
b) Training situations animation: Set up learning sessions for the acquisition of new concepts, review of themes and clarify incomplete knowledge.
c) Retrospective analysis activity: Reflexive analysis exercise of past actions through the mediation of others colleges to reconstitute the meaning of events
d) Self-learning: an informal initiative towards exploration and exploitation of opportunities for training and to deepen certain themes.
e) Assisting the assistance: Vigilance and chef's intervention to who's guiding the formative interaction novice's actions while working of the process.
f) Direct assistance focused at learning: To guide, assist and support the execution of the activity of an operator in order to train in action and through action.
g) Cooperative learning: Meta-cooperation exercises by knowledge exchange and explanations among the team members while somebody is seeking for advice on any aspect of the job, leading to the co-construction of the response.

The formative interactions in situ, as shown in figure 2, identifies a significant participation of the novices, assisted rather by the experienced ones than by the manager, who take, clearly, more distance in the process of formation and development of the competences. The learning modality most used by both the novice and the experienced operators was the direct and focused learning assistance because they take advantage au maximum by asking their colleagues nearby in situ.

[1] The acronym OATLR it's a translation from the french notion *accélérateurs organisationnels de la formation, de l'apprentissage et du renforcement des savoirs* (AOFAR), that was developed in the PhD. Thesis [1].

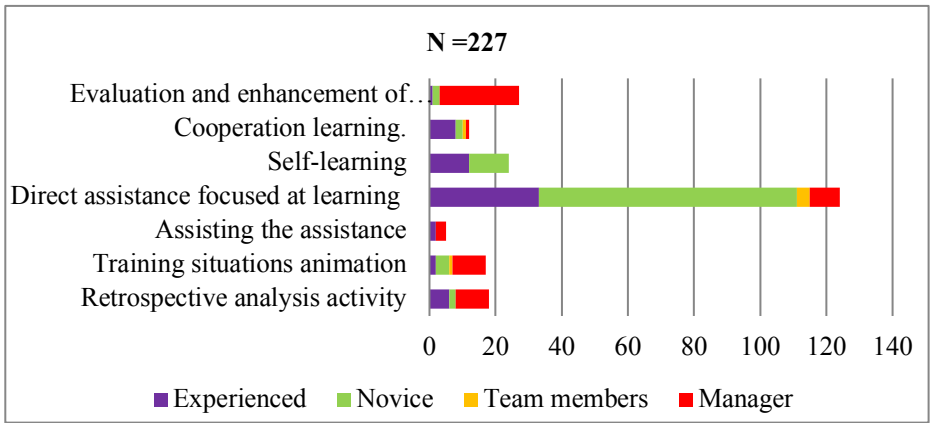

Fig. 2. Organizational accelerators of training, learning and reinforcement of knowledge (OATLR) mobilized by the team members during the fire forest season, region Biobio, Chile, 2010 -2011.

Nevertheless, the manager has preponderance in three accelerators: *assisting the assistance*, *training situations animation* and *retrospective activity analysis*. This finding suggests that those three OATLR are inherent to his leadership role related to the training and skills development process of its members. Thereby, setting up these training modalities, the manager supervises the assistance of the experienced to the novices (assisting the assistance), continues the training on site to deepen the gains on the initial formal training (training situations animation) and monitors the activity of operators in order to exploit opportunities to discuss their performance, in order to getting them used to reflect about their actions as a way of regulating their own performance (retrospective analysis activity).

The manager leadership style identified from the beginning when the fire forest seasons begins and throughout de operative period may be identified as constructive, dynamic, flexible, opportunistic and situated. As a part of a complex dynamic environment, with a heterogeneous team in terms of experience, budget constraints, temporal pressures and unexpected events that can become complex, the leader takes advantage of any functional activity to transform it into a constructive experience for the team members. His leadership strategies can be described as it follows:

- Team member's roles distribution with mechanisms of adjustment, reorganization, and functional restructuring of roles according to context.
- Accurate contextualized operational collective rules emphasizing self-organization, surveillance and mutual assistance, active participation, self-analyses and mutual teammate skill knowledge.
- Setting up favorable conditions for informal learning and maximum use of the time dedicated to training while working.

- Let operators an active participation in the proposal of ideas, real possibilities to contribute freely to improve their work.
- Operators recognition, as stated by Dejours [13], in terms of expressing gratitude, the symbolic retribution to the subjects, even if they are novices, by their contribution in the constructive dimension and productive activity of colleagues by highlighting the knowledge of each of them.
- Opportunistic exploitation of meta-functional dynamics [14] of reflective analysis of operators practices [15], in order to become quickly operational in the collective forest fires management.
- Organization of a proxemics work space conducive to floating listening, multi-addressing, co-presence which allows at sharing circulating information which is functionally efficient for complex dynamic systems [16, 17].

There is a psychological leadership typology for executives that considers that opportunists ones are associated with a performance below average [18]. Nevertheless, it is important to distinguish that in this context the notion "opportunistic" has a positive connotation because comes from a particular type of assistance in situated action of a tutor towards a novice called as Opportunistic Learning[19] where he can accomplish the task and at the same time enrich his knowledge and know-how due to the functional and meta-functional understanding of the system.

This field research has demonstrated that the sociotechnical strategies mobilized by the manager during both, at the training process and the functional period, not only allowed the operators individual skills development but also contributed to the development of a community operator's team. The theory of distributed social cognition helps to explain the development of the collective and the emergence of a community of work and practices with shared values, knowledge and know-how, through interactions and mutual interdependence [20].

Those results aim to identify the role of management style that enhances both individual and collective learning engagement as well as the collective functional configuration, oriented to self-regulation, a key aspect mentioned by De la Garza & Weill-Fassina [21]. But also this leadership allows the construction of the working collective (team building) proposed by Caroly & Clot [22].

This leadership style confirms what Tyssen, Wald and Spieth [23] have established, in the sense that for temporary work environments, is more effective a combination of leadership approaches. The present field research also gives empirical evidence suitable for complex and dynamic risk environments, conducted by temporary team workers than need to learn under severe temporal pressure.

4 Conclusion

The leadership style showed by the manager is possible due to the existence of an organization that let him some autonomy, in terms of margins of maneuver aimed to take advantage of a productive activity to be used as a constructive activity. These operating modes encouraged by the manager create a favorable environmental condition for team members' participation, self-learning, and both informal and autonomic learning through interaction, mutual surveillance and reflective work of their own practices. Team members learn that the management of complex and dynamic risk environments such as the fire forest coordination and control center is rather collective.

Nevertheless, as a reflection, even if this dynamic, flexible, opportunists and situated leadership seems to be effective in this context; depends on the existence of an experienced leader. Consequently, despite all the efforts and the potential success achieved each season, every year the condition of vulnerability in the system persists.

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