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# AUTO- AND ALLO-CONFRONTATION AS TOOLS FOR REFLECTIVE ACTIVITIES

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# Auto- and allo-confrontation as tools for reflective activities

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## Abstract

This paper presents a methodology of assistance to reflective activity, based on confronting subjects with the video recording of their own activity or of that of others. A typology of the various forms of use of confrontation is proposed and illustrated from a study based on the construction of technical procedures. Two categories of results are highlighted. On the one hand, individual auto-confrontation (confronting subjects to their own activity) reveals the cognitive processes underlying the activity. On the other hand, individual allo-confrontation (confronting subjects to an activity they practice but which is performed by someone else, without the latter being present) allows subjects to develop their knowledge by getting aware of other types of representations.

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### 1. Introduction

This study deals with the acquisition of knowledge, more precisely with the abstraction and the capitalization of operational knowledge during its active construction. In

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particular, it aims to highlight the central role of reflective activity in the construction and evolution of technical knowledge. Reflective activity is defined as the “activity by which subjects (or a group of subjects) take work itself as an object of reflection” (Falzon et al, 1997).

This question will be examined through a study on the revival of saffron production. This attempt of revival gave rise to many difficulties involving knowledge management of an organization (in this particular case : an association of saffron growers). On the one hand, subjects had to build up, by themselves, the procedures of saffron production. Indeed, currently available references are not adapted to saffron production in this area (mainly for climatic reasons). Moreover, no know-how can be transmitted (saffron production is extinct in this area since the XVIIIth century). On the other hand, the producers are “ locked up ” in an individual practical knowledge that they develop up through the seasons, and which is never (or very little) shared with colleagues : a first analysis has shown the absence of knowledge spreading within the professional community (Mollo, 2002).

Therefore, the main objective of this study is to propose concrete helpful tools of reflective activity allowing farmers to accelerate the construction, the explanation and the spreading of technical knowledge based on practice. To do this, a methodology based on the confrontation of subjects to the video record of their activity or of that of others has been devised and used. In the ergonomics literature, it is referred to as "auto-confrontation" (Carboni et Al, 2001 ; Clot and Faïta, 2000 ; Clot et al, 2000 ; Faïta, 1997 ; Pinsky, 1992 ; Pinsky and Theureau, 1987 ; Theureau, 1992).

This methodology is not intended to replace some other analysis tools. It could also be done with other aids that audio-visual ones (audio recordings, organisation's traces like accidents reports…). However, video recordings have characteristics which make them better cues. This paper focuses on the comparison of the various confrontation methods using video cues.

First, a typology of various existing methods will be presented. Then, a specific form of application of the confrontation of practices will be developed and discussed. It is centered on the confrontation of subjects to the activity of a colleague, without the latter being present.

## 2. Definitions and field of application of the confrontation of practices

The methods presented here give rise to a metafunctional activity, defined by Falzon et al (1997) as the "activity by which subjects (or a group of subjects) take work itself as an object of reflection". The "meta" character of such an activity is precisely linked to the distance between work and workers that is induced by the method. It has been shown that these metafunctional activities give rise to the elaboration of cognitive or external tools, intended for a potential future use (Falzon et al, 1997 ; Falzon et al, 1996). Metafunctional activities can be carried out simultaneously to the functional activity or a posteriori, as is the case here. They can then lead to improvements of the existing tool, of the knowledge on the existing tool, or to the elaboration of a new tool (Falzon et al, 1996).

## 2.1. Characteristics of the confrontation methods

The general principle of the confrontation methods consists in providing subjects with the recording of their work activity, so that they can comment on it. It is thus a form of "consecutive verbal report assisted by the traces of the activity " (Leplat and Hoc, 1981; Hoc and Leplat, 1983), in this case video traces. There are two important benefits in using this type of method : ecological validity and reflective efficiency.

1- Recorded traces as natural data

If observation constitutes the principal tool in analyzing human work activity, it raises questions on the validity and reliability of the data collected. The use of video recording allows some methodological difficulties to be avoided, thanks to three main characteristics :

1- a truth criterion : recording avoids some distortions relating to the taking of notes, mainly due to the fact that the analysts "filter" the activity according to their representations (tendency to preserve elements which only seem significant to them but not necessarily to the subjects), to the meanings they give to actions (which are likely to be different from the subjects's) and to the impossibility of noting everything (filtering is unavoidable).

2- an exhaustiveness criterion : activity (verbal and/or gestural) is captured as accurately as possible. Recording avoids omissions.

3- a fidelity criterion : recording avoids activity distorsions induced by simultaneous verbal reports like changes of the task or of the way in which the task is done, omissions of facts because of temporal pressure (Bainbridge, 1974, 1990, 1999), as

well as omissions or reconstructions induced by consecutive verbal reports (for a review comparing the three types of verbalization, see also Hoc & Leplat, 1983) .

To sum up, recording constitutes a more reliable technique, avoiding the distortions related to the subjective character of the eyes and ears of the analyst or to inaccurate reports by the worker. Moreover, it allows the analysis of the activity from another point of view : that of the subjects themselves.

2- Self activity confrontation develops awareness

Methods using verbal reports assisted by recordings all have a common attempt : the reflection generated by the confrontation of subjects to their work activity, or to those of others. This reflection supplied by action (filmed activity), on action (self-analysis) and for action (development of new or improved procedures) leads subjects to become aware of their work activity thanks to three main factors :

1- subjects are temporally and physically away from the direct environment of the task. This allows them to concentrate on what they do and on the knowledge they use during the activity ;

2- subjects become analysts of their own activity. Actions that are actually carried out during the activity are discussed not only for the analyst (description and explication) but also for themselves (evaluation and elaboration of new procedures).

3- the explanation of the procedures that they carry out during the task brings subjects to externalize their knowledge (Leplat, 1990). Subjects not only state what they know, but also discover their own implicit knowledge.

The subjects are thus considered both as operators and as analysts. This is the starting point of the reflective activity. Obviously this is nothing new in the history of

ergonomics (Teiger, 1993; Teiger and Laville, 1991). The three characteristics above constitute the core of the confrontation methods.

## 2.2. Existing methods

Various methods using video recording to confront subjects to their work activity have been developed (table 1).

| USING FORMS | | DEFINITIONS |
|---|---|---|
| Individual Auto-confrontation | A [A] | The subject (A) verbalizes about the recording of his own activity ([A]) |
| Allo-confrontation | A [B] | The subject (A) verbalizes about the activity of a colleague ([B]) |
| Collective Confrontation | G [A+n] | A group of subjects (G) verbalize about the recording of one or several subjects ([A+n]) |

*Table 1. Typology of use of recordings*

### 2.2.a. Individual auto-confrontation

Individual auto-confrontation is a means to reveal cognitive processes underlying the description of a work activity. It constitutes the fundamental theoretical and methodological base, which mainly aims to induce subjects :

- to become aware of the procedures they use to fulfil their tasks thanks to the description of their work activity.
- to clarify these procedures in order to decipher the cognitive processes involved in the work activity, which are not necessarily conscious, but which can become so thanks to the process of externalization of knowledge.

Generally, individual auto-confrontation constitutes a first step to which new forms of confrontation can be added.

### 2.2.b. Allo-confrontation

During allo-confrontation, subjects are asked to verbalize about an activity they practice but which is not theirs (a colleague has been video-recorded). The expected benefits of this method are as follows :

- a change of representation which results in the fact that subjects are voluntarily kept at distance from their own activity.
- an awareness of other forms of knowledge which leads subjects to become aware of their own activity with regard to that of others.
- the evaluation and the justification of their procedures compared to those of others.
- the building of new knowledge.

There are two forms of use of allo-confrontation, namely individual allo-confrontation and crossed allo-confrontation. The former consists in confronting subjects with the activity of colleagues, in their absence (but with their agreement). In the second one, two subjects respectively verbalize about the recording of their colleague. For the one who verbalizes, the characteristics are similar to those described for individual allo-confrontation. However, the subject about whom the activity is commented, is confronted with the representation that a colleague has of their own activity : this leads to a higher level of awareness, which brings the subjects to better justify their knowledge and to make explicit some aspects of action that they would not have explained otherwise. The fact of verbalizing to a colleague, i.e. a peer, deeply modifies the situation.

Crossed allo-confrontation is a particular form of allo-confrontation, which generally ends with an exchange between the two protagonists. Consequently, it can bring an additional benefit to the method, namely the construction of new and shared procedures. According to studies, crossed allo-confrontation is referred to as " crossed auto-confrontation " (Clot and Faïta, 2000 ; Clot et Al, 2000). The prefix " allo " seems however better adapted because the specificity of this method is to confront subjects with an activity which is not theirs.

### 2.2.c. Collective allo-confrontation

Collective allo-confrontation constitutes a form of collective reflective activity (Mhamdi, 1998) during which a group of subjects verbalizes about a video record of the activity of a member of the group. This leads to :

- the explanation of the representations of group members;
- the construction of shared knowledge and representations ("shared cognitive environment", Sperber and Wilson, 1995 ; "cognitive frame of reference", Hoc et al, 2000). This construction is made by sharing individual experiences, mutual teaching and return of experience ;
- the evaluation of the various procedures of action and of the solutions resulting from the construction.

Collective allo-confrontation may concern a group made up only of operators, or of operators and other subjects (for example supervisors or managers).

As stated previously, confrontation methods are not only a tool for understanding subjects'behavior, but also a means for subjects to develop their knowledge. By characterizing the various methods of confrontation used in ergonomics, this

presentation intends to help readers in the choice of the method best suited for their objectives.

### *2.3. Cost-benefit analysis of the methods*

The benefits of confrontation methods may be discussed considering two dimensions (Mollo & Falzon, 2003).

First, the perspectives for which they are used. Confrontation methods may be carried out in a comprehensive or in a developmental perspective. The first one is mainly analyst-oriented : because they encourage spontaneous explanation, confrontation methods lead to a better understanding of the activity, with video being a way to assist the subjects in the description of their activity. The second one is rather subject-oriented : by verbalizing about their own activity, or by being faced to the activity of others, or by having to justify their own activity in front of a colleague or of colleagues, subjects gain a better understanding of their activity, modify their knowledge, adapt their procedures, construct new ones, etc.

Secondly, the type of knowledge they bring to develop. From a developmental point of view, confrontation methods vary in their ability to encourage individual or collective knowledge development (figure 2) :

- by definition, individual auto-confrontation (A) does not give rise to collective knowledge development. Moreover, the development of individual knowledge is minimized because subjects describe their own activity, as opposed to all other methods.
- for all allo-confrontation methods (B, C & D), commenting an activity which is not theirs allows the subjects to modify their representations and to develop

new ones. Crossed allo-confrontation (C) is probably the more efficient method for developing individual knowledge : the method is more challenging for the subject.

- individual allo-confrontation (B) is less efficient than crossed or collective allo-confrontation (C & D) in the development of collective knowledge.
- crossed allo-confrontation and collective allo-confrontation (C & D) are powerful methods for developing collective knowledge, with an advantage to the latter, since crossed allo-confrontation is limited to a couple of subjects.

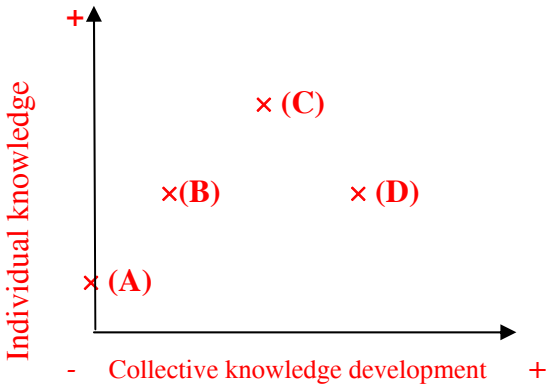


Figure 2 (taken from Mollo & Falzon, 2003). Classification of the methods according to the type of knowledge (individual and collective) they encourage (A : individual auto-confrontation ; B : individual allo-confrontation ; C : crossed allo-confrontation ; D : collective allo-confrontation).

These factors show that, although confrontation methods may be time consuming (video recording and analysis, confrontation phasis and analysis), their costs have to be evaluate in regard of the various objectives they fulfil (processes understanding, access to subjects justification, practices change). However, several constraints may prevent the use of the methods, and particularly allo-confrontation methods. It can be difficult to gather subjects, either because they

work in distance settings, or because they do not have time. Additionally, social or legal factors may make it difficult for them to share knowledge.

## 2.4. Methodological choices

Studies using the methods of confrontation vary in their methodological choices. However, many characteristics of the activity, and more generally of the situation in which a study occurs, constitute constraints which reduce the degree of freedom of the analyst.

### 2.4.a. Issues relating to the use of video

Choices relating to activity recording depend on the objectives of the analyst and on the characteristics of the studied activity.

*Who films?*

The activity may be filmed by the analyst themselves, or by subjects (Mhamdi, 1998). In the latter case, it is necessary to remind the subjects of the objectives of the study, and to give them some basic instructions, like the recording duration, direction of view, etc.

*What is filmed ?*

The analyst may choose to film the entire activity, or parts of it, as it is the case in the example of section III. According to the nature of the activity, the analyst will develop a specific plan for recording the activity, during one or several days, focusing on sub-activities, filtering irrelevant episodes, etc.

*How does one film?*

Recording can be carried out with one or more cameras. This choice depends not only on the preceding factors, but also on the type of activity concerned. Indeed, recording an activity that includes very fine gestures or recording an activity during which subjects move around result in different constraints.

*Design of video material*

The analyst may show the whole film, or some sequences. In this case, the choice of sequences can be made by the analyst themselves, or in collaboration with subjects.

## 2.4.b. Issues relating to the confrontation phase

As far as the confrontation phase is concerned, four type of choices have to be made :

*Moment of confrontation*

This is an essential criterion insofar as it will considerably influence the nature of collected verbal reports, in particular with regard to individual auto-confrontation. Indeed, if auto-confrontation takes place with a short delay (Bisseret et al, 1999), i.e. little time after observations, the recording can be used as a probe (in the psychological sense of the term), i.e. as a tool of assistance to memory recall. On the contrary, if the recording is used a long time after the observations, it does not act as a recall but as an aid for rebuilding the activity. This effect of delay is irrelevant with allo- and collective confrontation since the subjects verbalize about an activity performed by someone else. Also, even if the activity of others leads

subjects to evoke what they would have done (indirect probe), it is above all a construction of what their own activity would have been.

*Instructions :*

Instructions generally aim to lead subjects to elicit their knowledge. They are more or less demanding according the level of awareness they require. For example, instructions like : " Comment on what you see " (Mollo, 2002) or " Speak out what you said to yourself when you carried the task out" (Leplat and Hoc, 1981; Hoc and Leplat, 1983) are less demanding than an instruction like : " Explain and justify the activity ".

*The role of the analyst*

The analyst can increase or decrease the level of demand of the instructions. Three levels of intervention can be identified. At a first level, the analyst intervenes only to remind the instructions when silence occurs. At a second level, interventions are intended to pinpoint precise elements that subjects have not mentioned. At a third level, the analyst intervenes to ask subjects to clarify what they have said or to provide additional data ("auto-confrontation interview", Pinsky and Theureau, 1987 ; Theureau, 1992 ).

*The type of viewing*

The viewing of the film by subjects may be free (freedom to go on, to make pauses, etc) : it then allows subjects to highlight events that are significant for them. Viewing may also be managed by the analyst, in order to separate the moments of description, of explanation and eventually of exchange between protagonists.

Methodological choices must be well-defined since they determine the subjects behavior and the nature of collected data.

## 3. An example of implementation of the methodology

This section aims to present a study related to the revival of saffron culture. It involved many difficulties due to the lack of knowledge relating to culture. The subjects are in a situation of learning by practice, the only resource they have being the activity itself. The means of exchange and collective construction are limited, and knowledge is not capitalized. These elements stress the necessity to elicit existing knowledge and to provide the subjects with tools for developing and diffusing their knowledge. As it will be seen, there is a discrepancy between the initial objective which aimed the construction of collective knowledge, and the objective achieved, namely the explanation of the diversity of knowledge. Individual allo-confrontation is perhaps a first stage of collective knowledge construction given that there was no partnership at the time of the study.

After having presented the methodology used to observe activity, two forms of confrontation will be presented and discussed : individual auto- and allo-confrontation.

### 3.1. Activity observation

#### 3.1.a. Methodology

The saffron producers activity implies seven tasks : bulbs plantation, field maintenance, flowers gathering, stigma pruning, stigma drying, saffron packaging and preserving, and bulbs lifting.

This study will focus on two of these seven tasks, namely flowers gathering and stigma pruning (operation that consists in removing the three flower's stigma which constitute saffron). This choice of activity is explained by the fact that :

- the temporal constraints of the study did not allow us to analyze all the activities involved in the culture ;
- gathering and pruning constitute an essential quality factor of the saffron, because they guarantee the transformation, the marketing and the future quality labelling of the saffron.

The observation consisted in visiting five producers in order to film their gathering and pruning activities. This number is explained by the fact that for others, flowering was already made up or had not taken place, due to a non-existent production. Gathering and pruning being manual activities and implying very precises gestures, subjects were filmed face on, using alternatively close-up planes and distant planes (in order to highlight the fine gestures or the postures used). These activities being quite repetitive, only a sample of each activity was filmed.

The film duration varies according to the quantity of flowers to gather, from approximately 10 to 40 minutes.

### 3.1.b. Films analysis

For each activity, recorded data were classified in two main categories, namely gestures (example: "cut the stem of the flower with the thumbnail and the index ", "tears the stem of the flower off the ground", etc.) and strategies used (example: "picking three lines at the same time", "picking line by line", etc). This first analysis revealed a strong inter-individual variance. However, if observation highlighted a part of the technical knowledge implemented by the subjects, it is not sufficient because it is limited to a description of activities, and does not account for the rules of action underlying the various observed procedures. It was then necessary to supplement observation by a round of confrontations of practices.

### 3.2. Choice and methodology of the methods of confrontation

The choice of confrontation methods was carried out by mapping the benefits of the various methods (quoted in 2.2) with the objectives of the study, namely :

- eliciting the various existing knowledge from their description.
- providing the subjects with the means to build new representations.
- supporting practices spreading within the professional community.

Two types of confrontation were then considered, namely individual auto-confrontation, in order to specify the observed procedures from their explanation by subjects themselves, and crossed allo-confrontation. The latter was however not adapted to the situation because it was too difficult to gather the subjects, even in pairs. They live relatively far from each other, and saffron culture is not their only work activity (for more detail see Mollo, 2002). Individual allo-confrontation

was thus chosen, not only for its awareness virtues, but also for its social effects, with video being a means to spread practices between the subjects.

The combination of several methods (here : individuals auto- and allo-confrontation) is not always necessarily. However, it seemed interesting in this study to start with individual auto-confrontation, for many reasons :

- it allows the subjects to recall their activity, in particular when the confrontation takes place a long time after observation ;
- the justification given by the subjects of their own activity contributes not only to a better understanding of the activity (comprehensive perspective), but also to a higher level of explanation during the individual allo-confrontation phase: in being faced to the activity of their colleagues, the subjects will have to comment what they see in regard with what they have said for themselves.

### 3.2.a. Methodology

Confrontation phases could not be carried out shortly after observations, for two main reasons. On the one hand, flowering does not take place at the same time for all producers, so the observations could not be grouped. On the other hand, the analysis of the films prolonged the time interval between observations and confrontations.

However, the difficulty of using video as a probe was not an obstacle, not only because studied activities are mainly manual and repetitive, but also because the objectives were more to specify and to confront the knowledge used by the subjects than to analyze the specific cognitive processes peculiar to a task carried out at a given time.

As table 3 shows, each producer was confronted to the video recording of their own activity, then that of a colleague. It was supplemented by five individual allo-confrontations of two subjects who were not filmed.

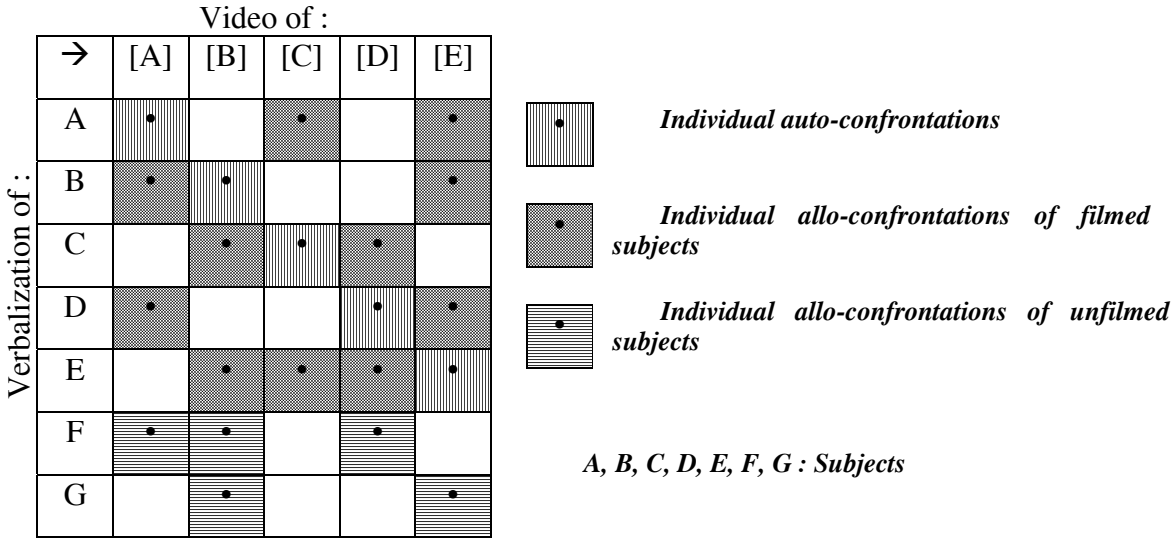


***Table 3. Types of confrontation carried out (Example : " A → [C] " corresponds to the verbalizations of subject A about the recording of subject C)***

Video recordings were presented in their entirety. The subjects viewed one or more films of their colleagues, according to the time they could devote. They were asked to verbalize about what they saw, and were free to manage the video equipment (pauses, backward motion, etc). The analyst intervened to pinpoint precise elements, mainly the differences in the procedures used (example: "You see there, your colleague does not act like you"). The whole session was audio recorded and transcribed verbatim.

### 3.2.b. Data processing

Data resulting from the confrontation phases were classified according to the origin and nature of knowledge involved in the gathering and pruning activities (table 4). They were coded according to the type of method used (individual auto- or allo-confrontation).

<table>
<tr><th></th><th>GATHERING</th><th>PRUNING</th></tr>
<tr><td rowspan="4">NATURE OF KNOWLEDGE</td><td>Gestures and tools used</td><td>Gestures and tools used</td></tr>
<tr><td>Strategies implemented</td><td></td></tr>
<tr><td>Moment of gathering</td><td>Moment of pruning</td></tr>
<tr><td>Influence of the upstream phases</td><td>Hygiene and quality criteria</td></tr>
<tr><td>ORIGIN OF KNOWLEDGE</td><td colspan="2">Documents (archives, review)<br>Other cultures<br>Interpersonal relations<br>Self-learning</td></tr>
</table>

Table 4. Nature and origin of knowledge implied in gathering and pruning activities

The nature of knowledge refers to the whole knowledge involved in the recorded activities. They can be particular to the activity (gestures, tools, strategies...), or intended to respond to several objectives relating to the subsequent phase of activity. For example, bulbs plantation can be done to make gathering easier (influence of upstream phases) ; or, the type of gestures used during gathering and pruning can result from the will to obtain a saffron of quality (hygiene and quality criteria). The origin of knowledge refers to all the sources used by subjects to build or develop their knowledge.

Confrontation data were then coded according to the nature of subjects reports : (positive or negative) evaluation of colleagues actions, justification of their own actions in regard to that of others, proposition of change of practices. The

following extract gives an example of implementation of reports coding. S1[S2] corresponds to S1 reports during the viewing of S2's film. Moreover, when it was necessary, the data of the observation were indexed to the reports (see the last line of the following extract). The analyst is coded A.

S1 [ S2 ] : "Each one proceeds differently, I think. Perhaps S3 does not made pruning in the same way ?" [Interindividual differences]

A : " S3 takes a stigma and makes it fall on the side, S4 here opens the flower at once, makes the stigma fall and cut them ".

S1 : "Ah yes so do I : I draw it aside from the flower, it is easier to cut in my opinion ". [justification of S1 own action]

S1 [ S2 shows how to operate when the flowers are closed ] : "Here it is a little risky nevertheless [negative evaluation of S2's action]. It works but some yellow remains at the bottom of the stigma " [justification of negative evaluation].

### *3.3. Results*

#### 3.3.a. Individual auto-confrontation : a means to explicit their own procedures

Individual auto-confrontations aims not only to understand the differences observed between the films, but more precisely to specify the nature and origin of the technical knowledge implied in gathering and pruning activities. Producers have only very few stabilized knowledge relating to saffron culture. Thus, one of the main objectives of the study consists in eliciting existing knowledge, which is never, or very little shared, within the community. As expected, individual auto-confrontation reveals the " conscious cognitive experiment " implemented by

subjects when carrying out a given act (Von Cranach and Harré, 1982). The concept of conscious cognitive experiment does not only refer to the rules of action which are implemented consciously during activity, but also to the part of the unconscious processes which, thanks to the self-analysis, can become conscious, i.e. relatable by operators. From a general point of view, the " self-learning " class constitutes the major common part for all the subjects. In other words, the knowledge relating to gathering and pruning activities are generally built by the subjects themselves, through :

- a test and error learning, from the effects of the preceding actions ;
- the consultation of technical and/or theoretical documents ;
- the reference to other cultivations they practiced.

This aspect underlines the lack of knowledge spreading within the community, that individual auto-confrontation itself cannot compensate. The confrontation of the subjects to other type of practices was then necessary, not only to enable them to become aware of other ways of proceeding, but also to support the reflection on their own knowledge, and to develop new knowledge.

### 3.3.b. Individual allo-confrontation : a means to make knowledge evolve

Individual allo-confrontation is a form of exchange of practices which, in the present situation, seemed to be the appropriate and necessary means for the evolution and spreading of knowledge for action. It has made it possible to overcome many difficulties such as the lack of instruction and general knowledge about saffron production, the geographical distance between producers and the absence of knowledge spreading within their association.

Individual allo-confrontation as a source of knowledge evolution

As expected, individual allo-confrontation allowed the subjects to become aware of other type of practices relating to saffron culture. This awareness allowed a learning process : in being faced to other types of knowledge, the subjects reflected on their own knowledge and made it evolve. In accordance with the studies of Rumelhart and Norman (1978, 1981), it is a form of learning, namely the adjustment of existing knowledge structures or the evolution of old structures into new ones (“ tuning ”). Indeed, the subjects are brought to evaluate and justify the various observed procedures compared to theirs, thus questioning their knowledge. Two important types of changes could be highlighted :

- the reinforcement of existing representations : the subjects considered colleagues’ practices as being unadapted to their own knowledge structures, and justify it :

  “ He gathers during the afternoon : it means that the sun passed on the flowers, that the flowers opened. The morning, at the first sunbeam, when the temperature is nevertheless a little bit high, they open at once ; and personally, I think that it is the appropriate moment to gather, otherwise you let them all the day under the sun, and some perfumes go away ”.

- the construction of knowledge by the evolution of old knowledge structures into new ones, better adapted :

  “ Until now I did not proceed like this but in the future I will : I will let it (saffron) dry a little longer, because the end of the stigma needs to be quite dry. And if you leave 20, 25 minutes like I do, it is not enough for the end of the stigma ”.

Thus, individual allo-confrontation constitutes an excellent means of knowledge evolution.

Individual allo-confrontation as a source of knowledge spreading

Beyond the effects relating to learning by action, individual allo-confrontation constitutes an excellent means of knowledge spreading between subjects. This result is very interesting since the study situation was not favorable to knowledge spreading, for three main reasons. Firstly, saffron culture is performed in an individual way : this constitutes an obstacle to the direct sharing of knowledge. Secondly, during the meetings, which take place three times a year, and to which we have participated during one year, technical issues like gathering and pruning activities are rarely, if ever, addressed. Thirdly, in addition to the lack of knowledge relating to the culture, knowledge resulting from the first years of production are not capitalized, prohibiting thus the development of a collective memory based on practice.

Witnessing the verbal and gestural activity of their colleagues allows the subjects to grasp a part of their knowledge. But, beyond this role of knowledge spreading, this method played a role of social mediation between the different subjects.

## 4. Conclusion

Individual allo-confrontation is an assistance tool to reflective activity which gives rise to knowledge spreading, construction and explanation. Indeed, the reflection on their own practice and on that of colleagues allowed subjects to develop and share their knowledge. From a methodological point of view, individual allo-confrontation constitutes a new form in the use of recorded traces. On the one hand, it can be viewed as a tool for knowledge evolution. However,

subjects will have to follow by themselves this reflective activity in order to benefit from the methods. After the presentation of the results, the subjects proposed meeting items to focus on pruning in a collective way. It would allow them to support the confrontation and the exchange of technical knowledge. On the other hand, individual allo-confrontation is mainly based on the reflection and not on the exchange between the subjects, as opposed to crossed allo-confrontation. It is also necessary to take into acount the characteristics of each existing method of confrontation, in order to make them better adapted to the objectives of research. Finally, it would be interesting, in the continuity of research supporting reflective activity, to more finely assess the complementarity of the methods of confrontation. For example, after the phase of individual allo-confrontation, it would have been interesting to propose a collective confrontation, in order to give rise to the elaboration of collective shared knowledge.

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