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Observations between quantitative and qualitative methods : shared contributions from an ergonomist and an occupational psychologist

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Abstract. Dialogue between the activity clinic approach in occupational psychology and the activity ergonomics is part of the common history of our disciplines. We suggest going on feeding it with our singular cross-eyes with the reciprocal objective of deepening, at this stage of our debates, the questions of actions that drive us on how to define observation, its goals, the place it takes in the intervention, modalities, contributions sought for the various actors in the organization of work and its stakes in terms of transformations, efficiency and health at work. Observation is a common method in both our approaches, which are known to place their interventions and research in the co-construction of methodological frameworks with the relevant actors. We will draw attention to the relevance of using quantitative methods and tools to improve preventing problems such as musculoskeletal disorders.

Keywords: Observation, activity clinic approach, activity ergonomics.

1 Introduction

In work analysis, ergonomic intervention and activity clinic intervention in occupational psychology are most often motivated by unresolved questions of work and occupational health, and are constructed in action, with the professionals (operators, managers and conceptors) and with the union representatives. The question of methods is essential in these disciplines and never exhausted in the sense that the efficiency of the intervention depends on it. Although the observations are mobilized differently in these approaches, they are central issue in psychology (Vygotski, 1927/1999; Clot, 1999) and ergonomics (Wisner, 1994; St-Vincent & al., 2011; Guérin & al., 2006/1991). Observation is an instrument that "aims to produce knowledge as well as to guide actions for the transformation of work" (Leplat, 1997, p.91). It is in this dual transformative and explanatory aim that, through repeated observation of concrete work activities, the development of professions and ways of transforming the organization of work are envisaged. Observation is used to develop

individual, collective and organizational effectiveness and improve the health of professionals (Clot & Kostulski, 2010; Saint-Vincent & al, 2011; Simonet & al., 2011; Simonet & Chatigny, 2017).

We will illustrate in this contribution that the ergonomics and activity clinic in occupational psychology build on a different conception of the aims and uses of the observation of the activity of professionals in work situations. But by drawing on two concrete cases of MSD prevention intervention, we will also show that despite these conceptual differences in action, these two disciplines also allow interdisciplinary associations between quantitative and qualitative observation methods when it comes, in particular, to organizing MSD prevention actions (Vézina, 2001; Bourgeois & Hubault, 2005; Daniellou, 2006; Savescu & al., 2010; Kloetzer & al., 2015).

2 Observation in ergonomics: "Understanding the work to transform it" (Guérin et al. 1991).

2.1 To observe is also to talk and make choices with the professionals observed

In addition to the definition of Leplat presented above, it should be noted that observation is a process that allows the observer to gain knowledge of elements of a given situation (Guérin et al., 1991). Careful consideration of the facts is necessary in order to know them better (St-Vincent & al., 2011, p. 23). Several issues are present including the subjectivity of the ergonomist's work (Daniellou, 2006), the social construction of the intervention and the context that lead to the choice of certain units of analysis, the iteration between data collection, analysis and restitution of results, the interdependency of observation and interview methods to bring us closer to the reality of the activity and guide the transformation of situations. Verbalizations can be spontaneous or provoked during activity then self-confrontation interviews to know the intentions that guide the action, the factors that influence it, the regulations, the effects. Simple self-confrontations are generally mobilized, and sometimes crossed, inspired by the clinical approach of the activity (Clot, 2002). Organisational, human, spatio-temporal, technical and material determinants are sought because they are the levers on which intervention can act. Various aspects of the work situation are observed : context, communications, looks, movements, postures, actions including information taking and traces of physical, cognitive and emotional load. However, it is necessary to find trade-off because of the constraints of the community and researchers. These "reduced models" of collection and analysis still make it possible to improve work situations, but the ergonomist never knows in advance what will be indispensable (Daniellou, 2006, p.8).

Various tools can be used to support the observations and their qualitative or quantitative analysis such as: notes, event recorder, audio and video, photos, measurements of space-time, production, effort, movements. These measures can be useful to clarify certain phenomena and, if necessary, convince decision-makers. We

will now evoke the creation of a dynamometric knife in the agri-food sector, which has promoted the explanation of expertise, the interpretation of observations and training in knife sharpening (Vézina, et al., 2003; 2010).

2.2 Observe to question and construct a tool for a dialogue on sharpening work within the meat processing work. An example of an intervention to prevent MSDs

Work in the Quebec agri-food sector to prevent MSD has led to several projects, including one on knife sharpening with six hog slaughterhouse and processing plants (Vézina & al., 2010; Chatigny, Ouellet & Vézina, 2018). Since there are different working, cutting and knife conditions and a great interindividual variability, there are different techniques. The ergonomists worked with 18 expert workers chosen by their peers. Their methods were analysed through individual and group interviews, video supported observations and repeated simple and cross-confrontations. The analyses made it possible to understand, at each stage of sharpening, the operating methods and determining factors, and their effects on the knife, the efforts and the cut. Principles, techniques and strategies as well as possible variations have been identified, some of which should be prohibited or valued. For example, experts agree on the importance of stabilizing the sharpening gun and presenting it to the knife so that the gesture is easy and visual and tactile perceptions facilitated for beginners. Experts no longer need this visual control but tactile perception remains an issue; they can let the gun hang in space and control the pressure they exert by trying not to move it when the knife alternates each side gun.

The process involved a long work with the actors of the companies and the sector, as well as with external stakeholders: an andragogue to support the development of training, trainer's manual and video (Vézina & al, 1999); metallurgical engineers to create a dynamometric knife displaying the frequencies, distances travelled on the sharpening gun and the pressures exerted (Vézina & al., 2003). The use of this tool during observation had the following effects: encouraging verbalization on the differences between tactile perception and the effect on the knife, interpreting these effects with regard to physical and cognitive demands, experimenting with variations in movement and pressure exerted. This tool thus became a learning and training tool for trainers and established itself as a didactic tool for apprentice training. Emerging knowledge has been mobilized in the transformation work with decision-makers to improve the content and training conditions of trainers and learners. The process continued in other companies in the sector.

3 Observation in activity clinic in occupational psychology: "Transforming to understand the development of the activity" (Clot, 2009)

3.1 To observe is always to affect the activity of the professionals observed

On the psychological and social level, it can be asserted that observation is never neutral for the activity of the subject observed. It involves a strong psychosocial mobilization of professionals associated within the intervention framework. To observe the professional's trade gestures is always to enter the intimacy of his personal and interpersonal history; it is also to adopt a look that questions the individual, collective and prescribed rules that organize the "how to do" and the "how to be" in the profession. This is why conditions guaranteeing a secure framework for the professionals involved must be met in the contractualization of social demand with company management. The activity clinic's methodology serves the development of the professionals' power to act within the work organization. Observation can be defined as a methodically organized activity by the intervener whose object is the ordinary work of professionals and the perspective of provoking, between them and for each of them, a reflective self-observation activity and a renewed professional dialogue that is able, beyond them, to question, in a dialogue with their managers, the usual functioning of the prescribed organization of work. Observation is an operation of de-contextualization of the ordinary activity of work as soon as it becomes the object of investigation on which the observer's full attention is focused. This conception of observation is based on the psychological process highlighted by Wallon according to which "the attention that the subject feels fixed on him seems, by a kind of very elementary contagion, to force him to observe himself (Wallon, 1949/1983, p. 287).

3.2 Observe to question and construct the conditions for a renewed dialogue on ordinary work within the organization of work. An example of an intervention to prevent MSDs.

This intervention was initially launched by a department of occupational health in a large French city that wanted to improve its program for sustainable prevention of musculoskeletal disorders (MSD). In that case, the intervention framework has combined ergonomic observations (chronicle of activity) as defined in the previous chapter (Simonet et al., 2011), biomechanical analysis (Savescu & al., 2010; Simonet & al., 2010), and a developmental methodology called Cross Self-Confrontation that characterized activity clinic approach in occupational psychology (Kloetzer & al., 2015). Quantitative data collected during observations of activity became in association with activity clinic frame a tool for observation and reflection by workers that helped them transform their work activity as well as questioned the managers, health practitioners, and the researchers themselves.

The goal of mobilizing such observations methods aimed to help workers and managers reflect on the real work situation and on the possibility of transforming the

work conditions. For example, with the biomechanical association, the data were presented in the form of graphs and diagrams accompanied by the corresponding video recordings in order to motivate professional debates between the gravediggers by conducting:

- simple self-confrontations: the worker comments on the film of his activity while watching it with the researcher

- cross self-confrontations: two workers cross-comment on the film of their peer's activity, with the researcher look for controversies about the work. Each of the gravediggers was confronted not only with his own video but also with those of his co-workers. Comparison between peers was encouraged through the viewing of their video sequences. This early introduction may have encouraged not only the dialogues, but also the gesture controversies realized during the Cross Self-Confrontation stage. Thanks to those kind of interdisciplinary association, this research contributed to setting up a dual dynamic for preventing MSDs:

- between gravediggers, on the ways of doing their gestures while re-thinking how they use their bodies in this activity thanks to quantitative data not used only to observe and quantify the body movement performed in the sense that presentation of the results enabled the gravediggers to observe themselves and expand their knowledge of the gesture studied and, thereby, to discuss it in greater depth;

- and between occupational risk preventers and supervisory staff who proposed and set up training in trade gestures that were better suited to the realities of the trade of gravedigger with a view to preventing MSDs, with the gravediggers taking a more active part in the decision-making and decision-taking process (Savescu & Simonet, 2018).

As has already been demonstrated by other works included in the development perspective of the activity (Engeström & Sannino, 2013) and by other clinic activity works open to interdisciplinarity (Fernandez, 2015; Kloetzer & al., 2015), the experimental quantitative observation context can become a favourable context for the observed subjects to construct new statements stimulating professional dialogue (Kloetzer & al., 2014) and the experimentation of new psychomotor skills as soon as they are invited by researchers to use observations to think about their activity and act differently.

4 Discussion

We will take up here the salient points of discussion (Simonet & Chatigny, 2017) which we think must continue to be worked on between our respective disciplines:

- On the definitions and purposes of activity observation, our definitions do not fully converge: How do these different concerns and aims question the models of action in ergonomics and in the clinic of the activity? What can be the complementarities between these two approaches and where? We can note the borrowing of methods and tools between the two approaches (chronicles, measurements, activity films, simple and cross-confrontations...) but what transformations do they undergo when they are mobilized to achieve different goals?

- On the place of observation in the overall intervention strategy: Is the place and action of the professionals from various hierarchical levels thought identically within both approaches? We believe that it is not so and that this debate should be deepened. Both approaches aim at transforming work situations by engaging different ways: the question of expressing recommendations arises for the ergonomist while it does not arise for the clinician of activity. This long-identified gap would also merit further examination.

5 Conclusion

On all these points it seems important to us to continue the companionship between our two approaches in order to strengthen the understanding of each other in their respective perspectives. A common intervention will be probably be necessary to refine this examination since we feel our approaches enrich other when they are put in contact. We are seeking for the effects of interdisciplinary dialogue that we wish to maintain here: how, based on our differences and similarities in the conception and implementation of the observations of the activity, we can, each in his own specialty, draw on the other to enrich his own way of intervening in the work environments?

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