Enabling environments, enabling organizations

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1. Fitting work to the Human, or developing work?

Since its early beginnings, ergonomics has set its goal as fitting jobs, environments, and machines to the human. The symposium that led to the creation of the International Ergonomics Association, which took place in 1957 in Leyden, the Netherlands, was entitled "Fitting the job to the worker". Today, this goal certainly remains commendable – but is it enough? Can ergonomics remain content with a limited and static view of adaptation, a view that would restrict its goal to designing systems that are suited to work as it is defined at a certain point in time, to workers as they are at a particular moment, and to organizations as they operate here and now?

This presentation advocates a constructive and developmental view of ergonomics. Individuals as well as teams progress by interacting with the world, and by acting upon it. Human work is always, simultaneously, productive and constructive. It is the constructive and developmental activity of subjects that constitutes the driving force of learning, transformation, and performance. In contrast to a defensive approach to ergonomics, which would view work mostly as a source of constraints, and the role of ergonomics as reducing these constraints, the goal of constructive ergonomics is to eliminate obstacles hindering success and development. Constructive ergonomics aims to maximize opportunities.

The objective of ergonomics must be *development* (Falzon, 2014).

The development of individuals, based on setting up situations of action that lead to increased success and to the acquisition or construction of know-how, knowledge, and skills. The development of organizations, based on integrating, within these very organizations, reflective processes that are open to the workers' own capacity for innovation. Fostering the development of individuals as well as the development of organizations is only possible if individuals have sufficient operational leeway and freedom of action. This freedom of action includes the ability to continuously build and rebuild the rules of work.

Consequently, the stake for ergonomists is to develop the enabling potential of organizations, so that they might contribute simultaneously and sustainably to improving the wellbeing of employees, to encouraging the development of skills, and to improving performance. Any organization has a more or less promising enabling potential. However, this potential is often underused, unknown, or unrecognized. In some cases, it may even be hindered by the organization itself. The goal here is not to create a new "enabling" task that would complement existing tasks, but to organize existing work so that it will enable individuals and organizations to make some progress (Falzon & Mollo, 2009).

2. Development as a fact, a purpose and a means

Development as a fact
Let us begin by considering development as a fact: during and because of professional practice, operators and collectives develop two kinds of skills. On the one hand, they

develop knowledge, know-how, and strategies related to the task itself. On the other hand, they develop knowledge about themselves: which activities they have more or less mastered, what is the maximum workload that can be undertaken safely, what is the comfort zone of their professional practice, what strategies they rely on to make use of themselves, what heuristics are available to make the best use of their own resources, etc. The goal of these skills is twofold, as they aim both for performance and wellbeing. They allow operators to better achieve their goals, and to do so more efficiently, while avoiding hazardous situations and protecting themselves.

Furthermore, over the course of time, operators undergo transformations. This is not just because of aging; it is also because their career path may or may not provide them with opportunities for development. These effects of time may be beneficial or detrimental to various degrees, depending on the concrete conditions in which professional activity is carried out. First, these conditions influence the decline or preservation of people. Second, they may encourage – or conversely, hinder – the acquisition of skills allowing operators to cope with work situations (e.g. know-how related to caution and strategies aiming to conserve resources), as well as the construction of collective practices for preservation and performance. The challenge then becomes this: how can one design work organizations that leave some operational leeway and some room for the development of skills, practices, and methodologies that encourage the expression or the emergence of knowledge and know-how?

Development as a purpose

Therefore, ergonomists cannot remain content with viewing operators in the "here and now". They must take an interest in the conditions of development, and in career and life paths. Hence, development is a purpose of ergonomic interventions. The issue here is to contribute to designing environments that allow human activity to develop in all of its aspects – gestural, cognitive, and social – while constantly aiming for the optimal compromise between the objectives of wellbeing and performance.

The concept of "enabling environment" has been developed following this view, based on the works of A. Sen (2009), particularly on the idea of "capabilities" he proposes. Ergonomists aim to put operators in situations where they will be capable of action, by acting on the conditions in which their activity is to be deployed. An enabling environment can be understood following three different points of view: preventive, universal, and developmental.

From the *preventive* point of view, an enabling environment is an environment that does not have detrimental effects on individuals and preserves their future abilities for action. From the *universal* point of view, an enabling environment is one that takes into account differences between individuals and that aims to compensate for individual deficiencies related to aging, illness, or disability. From the *developmental* point of view, an enabling environment is an environment that allows individuals and collectives:

– To succeed, i.e. to apply their abilities in an effective and fruitful manner. It is not just an environment that does not hinder abilities, but one which makes people capable.

– To develop new know-how and new knowledge, to broaden their opportunities for action, and to strengthen their control over their tasks and the ways in which these are carried out. An enabling environment is an environment for continuous learning.

Development as a means

Finally, development is a means for ergonomic interventions. Project management and innovation rely on stakeholders to take a step back from their own work practices in order

to design the future. This can be aided by the use of simulations, confrontations of practices, or training methods. Ergonomic action then becomes an opportunity to begin a process of development and learning, whether this process serves the design of organizations or that of artifacts. From this point of view, the objective is both to foster processes of development throughout the ergonomic intervention itself, and to design work systems that will promote development themselves. Hence, development viewed as a means serves development viewed as a purpose.

The latter point has one methodological consequence. Ergonomists cannot promote development as a goal of the discipline without advocating, in turn, methodologies of ergonomic intervention that encourage development themselves. Active involvement of operators in processes of organizational change and design is not an "additional" or "optional" feature of ergonomic interventions. It is a necessity, in order to ensure the consistency of a constructive approach.

3. HFE and organizational design

What do we mean by "organization" ?
How can the above framework be applied to organizational design? This requires to define what an organization is. There are two ways in which one can envision organizations.

One way is to see organizations as structures, imposing rules, norms, procedures, and processes, enforcing and controlling them through human supervision and/or technical devices (e.g. workflow systems). Organizations seen as structures also offer resources, human or not, in order to facilitate the fulfillment of tasks. Under this view, work is seen as determined by the organization and workers have little leeway.

Another way is to see organizations as a permanent process of regulation between various actors defending various interests. Weick (1977), notably, sees the organization as the product resulting from the interaction between its members: organizations are "self-designing systems". In this view, a very important role is given to "insiders" (members of the organization), since they create the organization.

The two viewpoints can be articulated. Organizations can be thought of as the result of constant trade-offs between explicit, official rules that emanate from prescribing agents or structures, and the rules constructed on an everyday basis by agents within the organization (Arnoud & Falzon, 2014). These rules appear in reaction to prescriptions, and are dependent upon these agents' own needs for action, the events which they must face, and the lack of effectiveness of prescriptions.

Under this view, organizations have two faces: a static, formal one, embodied in rules, processes, etc., and a dynamic, living one, made of the social dynamics of their members, who permanently redesign the organization. Organizations exist both "in the world" and in the interplay of their members.

The instrumental model
It is useful here to present the instrumental model (Rabardel & Bourmaud, 2005; Bourmaud, 2014), before applying it to organizations. According to this model, an "instrument" is a hybrid entity, composed on one hand of an artifact, i.e. a man-made object of the world, and on the other hand of schemas of use, i.e. specific knowledge allowing one to operate the artifact in order to fulfill specific goals. Goals are difficult or impossible to fulfill without artifacts, artifacts are useless without schemas of use.

It can be noted that, although artifacts are in general intended for a particular use, subjects can invent new uses that suit their needs. A walking stick, for instance, is intended for a specific use and specifically designed in that perspective (adjustable height, molded handle,

strap, pick that at the end, etc.). But its user can also invent/add other uses, depending on the situation encountered. The term 'instrumental genesis" has been coined to refer to two processes involved in these adaptations: instrumentalization and instrumentation.

Instrumentalization consists in adapting the artifact, either by attributing a property or a function to the object or by transforming it. The personalization of an interface is an instrumentalization. But picking a broken branch to use it as a stick is also an instance of instrumentalization.

Instrumentation consists in adapting one's schemas or acquiring new ones. Learning the functionalities of an interface is an instance of instrumentation. Discovering that some constants in the external world can be interpreted in a given way is also an instance of instrumentation.

Organizations and HFE interventions

What happens if one applies to organizations both the instrumental model and the static/dynamic view sketched above? Organizations can be considered as artifacts undergoing a permanent process of redesign of their schemas of use.

Consequently, there are two complementary ways in which an ergonomist, a HF specialist, can think of an organization: as an artifact to be designed, similar to any design object (a technical device, a workplace, an interface), and as a process on which to act in order to influence its continuous design.

This affects the professional position of ergonomists in major ways. Following a (very) traditional view of the field, the ergonomist is involved as an expert in human factors, based on his/her general knowledge about Man. The role of the ergonomist is to advise decision-makers (project managers, designers, managers) and propose solutions. Following a more comprehensively equipped view of ergonomics, ergonomists add to this general knowledge about Man further knowledge derived from activity analysis. The ergonomist then becomes a representative of workers from the point of view of project stakeholders, and a designer amongst designers. In the view promoted here, the ergonomist becomes the linchpin of a participatory design process, which is itself developmental, and aims to achieve several goals at the same time: to transform the representations of all stakeholders – operators, managers, supervisors, staff representatives, etc. – and to achieve a satisfactory result – satisfactory implying here that the situation produced allows development to go on.

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