



PARTICIPATORY ERGONOMICS AND SOCIAL TECHNOLOGY: THEORETICAL APPROACHES FOR BETTER ERGONOMIC PRACTICE

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Abstract

This article proposes to make a theoretical approach between ergonomics, more specifically, participatory ergonomics and the concepts of social technology in order to reflect, contribute and expand the knowledge of ergonomists towards better ergonomic practice in organizations. Participatory ergonomics proposes the participation of workers in all stages of studies, analyzes and ergonomic interventions with the aim of improving working conditions. Social technology is also based on the collective participation of individuals to solve social problems. In this way, building ergonomics in a participatory way, from the perspective of social technology, as a process, is a way to increase workers' margin of action, contributing to their development, in addition to enabling comfort, safety, health and efficient performance at work.

Keywords: participatory ergonomics; social technology; transformation at work.

1. INTRODUCTION

Work, as a relationship between man and nature, allows the individual to produce elements that are indispensable to his life, through the transformation of the natural element and also to transform himself. It is through work that man differentiates himself from other animals, constituting himself as a human race and allowing the production of material goods essential to human reproduction (Gois, 2015). Sociologist Georges Friedmann reinforces that it is through work that man modifies his own environment and can modify himself (Freitas et al, 2020).

Defined as activity, work concerns the confrontation of the subject with reality, being the means by which he can inscribe himself in a collective work and, at the same time, personalize himself. Therefore, any form of impediment to activity induces an immobilization of the subject's internal dynamism, of his vital energy. Deprived of the object in which to invest the latter, the subject empties, withdraws, loses the experience of meaning. In the clinic of

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activity, when this occurs, it is said that the subject has been deprived of his power to act (Clot, 1999 & Lhuilier, 2006 cited by Bendassolli, 2011).

Therefore, work cannot be thought of only through the logic of capital. Work should enable the worker to deal with the difficulties of the real professional activity, to recognize the factors that prevent the action or execution of a job well done, to apply his intelligence to solve problems, thus providing ways of transforming work. In other words, work must have meaning, it must have purpose, it must provide the power to act and it must be a means that contributes to the development of the individual.

From this point of view, ergonomics and social technology can bring significant contributions to the construction of this development path.

2. METHODOLOGY

This article was produced from the discussions and the concept of social technology addressed in the discipline of Technological Change and Social Dynamics, in the Interdisciplinary Master's Degree in Applied Human and Social Sciences, at FCA (Faculty of Applied Sciences), at UNICAMP (State University of Campinas). A non-systematic literature review was also carried out, covering the themes of participatory ergonomics and social technology.

3. RESULTS AND DISCUSSION

3.1. Ergonomics and participatory ergonomics

Ergonomics, traditionally, is divided into two strands: Anglo-Saxon (classical or American) and French (contemporary or French-speaking). Anglo-Saxon ergonomics is the oldest and considers ergonomics as the use of science to improve the conditions of human work. The disciplines of anatomy and physiology, for example, allow the design of chairs, monitors and schedules that are better adapted to the human organism. In short, for this trend, ergonomics is to take into account the general characteristics of man, for the best adaptation of machines and technical devices. French ergonomics, on the other hand, is more recent and considers ergonomics as the specific study of human work to improve it (Dias, 2017).

For Lima (2020), ergonomics, in its most recent definition, appears as a technical discipline that proposes to know the "real work activity" with a view to its transformation.



Noro (1991) states that Participatory Ergonomics is a new technology for the dissemination of ergonomic information, emphasizing that this dissemination is vital for an effective use of ergonomic knowledge throughout the organization, the entire institution, and can also be extended to any educational institutions.

According to Brown (2005), the workers are the specialists; and, with the right knowledge, skills, tools, resources and incentive, they are best placed to identify and analyse problems and to develop and implement solutions that are effective in reducing injury risks and improving productivity.

Thus, a fundamental point in the process of practical application of ergonomics is the participation of the worker in the construction of knowledge. From this point of view, the participation of the worker cannot be seen only as a "source of information" so that one can know the real activity of work, but rather as an actor, an agent of change and that will contribute to the transformation of work and the production of knowledge applied to work.

The need for people's involvement in the development of ergonomics is justified by Imada (1991) through three aspects:

- I. Since ergonomics is an intuitive science, which in many cases simply organizes the knowledge that workers are already using, it can value the accumulated experience of workers;
- II. it is more plausible that people will support and adopt solutions for which they feel responsible; and
- III. Developing and implementing technology empowers workers to modify and correct future problems within the dynamics of their reality.

Also according to Filho & Lima (2015), the production of knowledge about the work activity, coming from the ethnographic perspective – description of the world through the eyes of the other – allows us to understand the use of the body, thought, emotions in work situations, the determinants that weigh on the actions of workers, the strategies used to meet the demands placed on them, In other words, it allows a new logic based on work activity, which is not widespread in companies and institutions and can be used both for prevention and to improve the performance of systems.

3.2. Social technologies



Social Technologies, despite being a recent phenomenon, have been used, in recent years, as a potential for social transformations.

Social Technology is that which aims at social inclusion. It is the result of the action of a social actor on a work process that it controls and that, due to the characteristics of the socioeconomic context, the social agreement, and the productive environment in which it operates, allows a modification in the generated product that can be appropriated according to its interest (Dagnino, 2014).

Also according to Dagnino (2010), Social Technology is a tool for building a more just, egalitarian and environmentally sustainable society.

According to Fraga (2011), in addition to the theoretical debate, solutions that have emerged from the technological needs of popular groups can be called social technology. In this sense, it is not a matter of devaluing the theoretical debate, but rather of trying to connect it to a line of practices of technological resistance. The author cites examples of technological resistance in several aspects:

In this sense, technological resistance can be perceived in the struggle of family farming from the perspective of choosing the way they want to plant, harvest and process food, placing agroecology as an alternative to the green revolution. It can also be seen in the struggle of indigenous people, quilombolas and riverside dwellers protecting their territories from large works such as hydroelectric plants. It can be seen in the struggle for housing combined with participation in the design of the architectural project and in the construction in self-managed collective efforts. It can be seen in the struggle of waste pickers and recyclable material sorting cooperatives to organize work based on self-management, modifying existing technologies.

For Schwab & Freitas (2016), Social Technology presents as an essential condition the individualized construction for each case, that is, one cannot simply look for a ready-made solution and apply it to the problem situation, without a proper adaptation of the technology and consideration of its impact on local values. Social Technology should be understood as a technological solution for social transformation designed for each context. Social Technology, as a priority, must have open innovation, which can incorporate other knowledge.

3.3. Technology and ergonomics

According to Machado (1994), the impact of technological innovations on the mode of production affects both the exchange relations and the production relations themselves. Such innovations alter the forms of cooperation, directly influencing human activity, the raw material



that is applied to work, and the means and instruments used. In this sense, ergonomics has been systematically working on the study of the introduction of these new technologies, demonstrating the transformation of the content and nature of work, as well as the consequences of these changes on the health of subjects and on the effectiveness of organizations.

When we think of technology in ergonomics, the first image that comes to mind is the automation of processes, elimination or optimization of human action in order to increase productivity and efficiency and prevent the appearance of work-related diseases or ergonomic risks in the execution of work activities.

Technologies for the use of virtual reality to simulate work situations in order to predict gestures, movements, postures and possible discomforts and risks related to physical aspects; Development of artifacts such as the exoskeleton in order to "facilitate" critical movements or those that require great efforts or even, the most common automation of processes, completely eliminating human action are common examples of what is meant by technology in ergonomics for the solution of problems arising from the execution of work activities.

In addition, they are examples of how technology is seen only as an artifact, how it can be ambiguous and how it cannot be considered as a neutral science. Therefore, the questions we should ask when thinking about technology associated with ergonomics are: Who is this technology for? What for? For what purpose? Does it solve the "problem"? Does it generate a transformation? What does it make possible for workers? Independence? Emancipation? Empowerment?

In fact, what can be seen is that technology, when understood as an artifact, incorporates the vision of a group, a social class, political and economic interests (in the case of organizations). In some situations, it strengthens individualism, competitiveness and standardization, which are elements that weaken social relations and forms of resistance in the workplace and in society in general.

Technology must contribute to the way workers produce knowledge and develop in a way that strengthens their identity, valuing and recognizing their acquired, tacit and real knowledge of work.

As explained by Dias (2013), in the debate on the One Million Cisterns Program (P1MC - a public policy that materializes living with drought as a view of the problem of the semi-arid region) and some of the actions that emerged from its achievements, the processes of building a social technology are more important than direct products. The desired dynamics of



empowerment and social inclusion are not generated a posteriori by cisterns; they are, rather, the result of the process of construction of these artifacts.

The author also reinforces that perhaps the most interesting aspect associated with this case, in particular, is the indirect results of the program. Evidently, it is of fundamental importance to guarantee access to water in the semi-arid region. However, no less important are the dynamics of social inclusion, empowerment, the creation of bonds of cooperation and the genesis of a local identity and a sense of belonging to the community, which begin and are strengthened in the construction of the cisterns. Such dynamics are the result of the construction processes, and not products of the artifact itself.

Araújo (2016) analyzed work management from the perspective of the activity in a coal mine in struggle for self-management, through a company recovered by workers. The study pointed out important advances in which workers highlighted a relief in the pressure exerted by the hierarchy, resulting in greater freedom at work and, consequently, better health and safety conditions. Better conditions for transporting workers to the mines, significant improvements in the facilities, with better lighting, higher galleries, masonry structures, among other improvements that ensure greater comfort and safety are examples of significant transformations from the point of view of health and safety, which are the result of the participation of workers in the management of the company.

4. CONCLUSION

When comparing participatory ergonomics with social technology, both aim to ensure the participation and inclusion of the individual in the process of building a solution to a problem.

The participation of individuals, whether in the work environment or in the social routine, in decision-making and in the construction of transformation processes, enables the exercise of the skills of the group involved, generating feelings of responsibility, commitment and representativeness.

Inserting the worker as an actor in the ergonomic intervention process generates a deconstruction of beliefs that is still present in many organizations, in which the image of the specialist/ergonomist or even of the person who prescribes the work is sovereign and that workers are seen as simple executors. Combining the knowledge of the worker with the knowledge of the specialist seems to be an intelligent constructivist approach, not yet perceived and valued by most organizations.



In addition, social technology makes us reflect on how technology itself can be thought of as a process, a possible path for the development of workers in their work environment. In addition to the expected final result, which is the transformation in work and the achievement in improving working conditions, the path itself must be recognized for the opportunities it enables and for the value and benefits generated to the participants: empowerment, inclusion, belonging, recognition, dignity and cooperation. The path can be a bridge that makes the development of the worker and the strengthening of his identity viable.

Building ergonomics in a participatory way, from the perspective of social technology, as a process, is to increase the workers' margin of action to enable comfort, safety, health and efficient performance at work (basic objectives of ergonomics). Above all, it is to enable ways to exercise democracy in the workplace and to enable, in fact, that ergonomics plays its social role, which is the transformation of work. Technology cannot and should not be seen only as an evolution of humanity. Our evolution depends on the choices we make as individuals and as beings in the world.

Technology is there, it is part of society, it is the system, it will happen, regardless of any fact. However, it cannot be seen and strengthened as a system of domination. It is up to us, human beings, inserted in society to make effective contributions so that it does not update, maintain and build itself in a way that reinforces and perpetuates economic, racial, gender, sex, status and privilege inequalities.

After all, to paraphrase Dejours: *To work is not only to produce, but also to transform oneself!*

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