



Developments in Activity Ergonomics in Brazil and France

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Summary

The objective of this text is to analyze the current stage of Ergonomics in France to reflect on the Brazilian situation. Taking the situation in France as a 'mirror', the aim is to debate ways to rethink and advance Activity Ergonomics in Brazil. To this end, during the post-doctoral internship, 'immersion' in local life, in order to understand the experience lived by professionals and researchers within the discipline, complemented by readings of recent works, formal interviews, participation in events, formal interactions and informal and documentary search to complement the diverse information that makes up the analysis material. Our results show that Activity Ergonomics in France is under the paradigm of intervention construction. The development of the discipline is due to the engagement of several researchers and the institutions that support it, and also stems from the discipline's historical capacity to respond to social demands through its modes of intervention. In the case of Brazil, we find ourselves under the paradigm of application and defense of Ergonomic Work Analysis (AET), which is explained by the characteristics of the training of ergonomists in Brazil and the influence exerted by the mandatory performance of AET in the standard. Overcoming this paradigm depends on mobilizing the professional community, especially Brazilian professors and academic researchers, to re-discuss the training and practice of Ergonomics in Brazil, in light of current social issues. Urgent issue that could be addressed by the Brazilian Ergonomics Association - ABERGO.

Keywords: Ergonomics; work; professional practice; search; intervention.

1. Introduction

This text is part of the activities developed within the project ‘Innovation and transformation for the prevention of occupational risks’ – ITAPAR, whose objective is to propose innovative actions for the prevention of work-related injuries. This is an international project financed by FAPESP (São Paulo State Research Support Foundation), for the Brazilian team of researchers coordinated by Rodolfo Vilela, from the University of São Paulo, and by ANR (Agence Nationale de la Recherche) to the French team, coordinated by Alain Garrigou from the Université de Bordeaux.

The objective of this text is to analyze the current stage of Ergonomics in France to think and debate the situation of Ergonomics in Brazil, given the direct influence of the former in our country and the permanent interactions between researchers from both countries (many Brazilians were trained in France).

However, our purpose is not to transfer or reproduce current methods and perspectives from France in Brazil, but, by having the situation in France as a 'mirror', to reflect on the ways and means to rethink and advance Activity Ergonomics in Brazil.

This concern is closely linked to the criticisms of Activity Ergonomics made by Vilela (2019), for whom the practice of Ergonomic Work Analysis does not lead to actual intervention in the determinants of work, nor is it supported by the protagonism of the workers involved. Now, if such statements may be valid in the case of the practice of Ergonomics in Brazil, it is known that they are not relevant in the French case (Rocha et al., 2022).

But, contrary to Vilela, whose criticism was a strategy to promote the perspective of training intervention based on the Change Laboratory - LM (Virkkunen; Newnham, 2013), our intention is to use such criticism to promote the development of Ergonomics in Brazil.

We will initially present our methodology and methods carried out during a post-doctoral internship at the University of Bordeaux (carried out by two of the authors of this text), from May to July 2023. Then, we will discuss the main results of our reflection on Ergonomics in France, before discussing the perspectives that our findings open, to rethink the Ergonomics practiced in Brazil and finally, to make some final comments.

2. Methodological development

The ethnographic perspective (Elidrissi; Bouguerra; D'Souza, 2020), although subliminal, was present throughout our period in France. Let us explain: to understand the stage of development of a discipline with strong social implications, as is the case of Ergonomics, it is necessary to 'immerse' in local life to understand and describe the experience lived by professionals and researchers within the discipline, accessed through readings of recent works, formal interviews, participation in events, formal and informal interactions and documentary searches to complement the diverse information.

2.1. Interviews

Free interviews were carried out with professional ergonomists and researchers and complemented the reading of books, favoring understanding the professional practice and research of Ergonomics in the current social, political and economic context.

Thus, three professional ergonomists were interviewed - two French, one a consultant and one internal to the large company and one English, internal to the large company -, four researchers and/or teachers - three French and one English.

Initially, contact with professionals from Portugal had been planned. As this was not possible, we chose to learn about the reality of English Ergonomics, its contrasts and similarities with French Ergonomics. Aspects that we will not develop in this text.

2.2. Events and interactions

During the period, we made three presentations, two at the research team seminar, coordinated by Alain Garrigou, (Bordeaux, 05/09/23; 06/07/23) and one at the research seminar of the Ergonomics team at the Center de Recherche sur le Travail et le Développement(CRTD) from the Conservatoire National des Arts et Métiers - CNAM (Paris, 29/06/23), coordinated by Cathérine Degoulet and Flore Barcelinni.

Meeting with researchers working in the 'innovation and transformation for the prevention of occupational risks' project -ITAPAR, from both the Brazilian and French teams (coordinated by Adelaide Nascimento), was held on 06/28/23.

Another activity was participating in a class presenting case studies within the scope of psychosocial risks – RPS, in professional updating training at the University of Aix-Marseille, held on 07/03/23.

Finally, we had the opportunity to participate in the ODAM (Organization Design and Management) Congress in Bordeaux (from 11 to 13/07/23). In a small conference (around one hundred participants), current topics were discussed, such as the global ecological issue and the necessary transitions, as well as the role of Ergonomics in designing work situations to favor them.

The main reflections and considerations regarding the development of French Activity Ergonomics, below, result from the triangulation of readings, interviews and interactions with French colleagues and those from other countries in the spaces we were able to travel during the internship period.

3. Results

3.1. Posing the problem: the situation of Activity Ergonomics in Brazil

Vilela's (2019) criticism refers to the issue that is important to Brazilian Ergonomics, namely, its (in)ability to transform work with the protagonism of workers. Now, if the statement is not valid for all ergonomic actions, it is necessary to recognize that the majority of actions carried out in Brazil are based on diagnoses of work situations without the consequent transformation and redesign of work. In a way, the presence of the method in Regulatory Standard 17 for more than 30 years contributed in part to the situation (Jackson Filho et al., 2021); Furthermore, project methodologies, in most cases, were restricted to university research groups.

In the specific field of activity ergonomics, the specialization courses in ergonomics started at the end of the 90s were based on the formation of the CNAM in the 80s-90s, without its evolution being considered in Brazil. The seduction by 'activity models', by analytical capacity, in a way, kept Brazilian researchers away from the project and transformative engagement typical of the discipline.

Another important fact was its low recognition for dealing with national social and economic demands and issues, its absence in the design and implementation of public policies (except in the case of those inherent to the field of Occupational Safety and Health) despite its originally public character. .

In this way, it can be stated that the paradigm for the development of Activity Ergonomics in Brazil continues to be the application and defense of the Ergonomic Work Analysis (AET) method.

3.2. Institutional factors that favor current development in France

3.2.1. Historical commitment to meeting social and economic demands

The historical analysis of the discipline shows its engagement in understanding and solving problems of a social and political nature, such as the harsh physical working conditions in mining and steel mills in the 1960s in Europe. The creation of the Ergonomic Work Analysis resulted from the need to ‘take researchers out of the laboratory’ to understand the reality of workers and contribute to the transformation of work situations. (Teiger; Lacomblez, 2013)

Topics such as the need to demonstrate the intelligence of workers, the inclusion of workers with disabilities, the training of trade unionists in Ergonomics, participation in projects, the development of IT systems, coping with psychosocial risks, sustainable development, exposure to pesticides and the agroecological transition, industry 4.0, among others, have mobilized the ergonomics community, both in research and practice, to intervene and produce knowledge over the last few decades.

The ‘College des Enseignants Chercheurs en Ergonomie- Ce2’, when defining the contours of training and research, stated that the different research approaches share that all research must be initiated, or answered, from questions related to social or organizational demand. (Ce2, 2012a)

Finally, as Pierre Falzon suggests at the conclusion of his interview with Jean-Claude Sperandio:

‘Organizations, societies, are currently faced with new challenges, due to new demands addressed at work and the seriousness of climate, demographic, political and ethical issues. Ready-made solutions are not appropriate. It is necessary to invent, innovate, and think about ways of

managing organizations and public action that consider the urgency of social demands. Ergonomics has tools that allow it to contribute to this movement' (Falzon; Spérandio, 2023; p. 10-11; free translation by the authors).

3.2.2. A broad institutional framework that lays the foundations of the discipline and profession

The broad development of the discipline, from professional training, scientific research to professional practice, is supported by a wide range of institutions.

Some of them predated the 2000s, but others were instituted to meet the new policies of the French state, after the start of the European Community, for research and education. The reorganization of the French University was influenced by the need to harmonize university education in Europe (Ce2, 2013).

Some institutions deserve to be highlighted, such as: the Société d'Ergonomie de Langue Française – SELF founded in 1963; the 'Association pour la Reconnaissance du Titre d'Ergonome Européen en Exercice – ARTEE' created in 1994, on the initiative of SELF, to recognize diplomas and issue the title of European ergonomist and young ergonomist; the 'College des Enseignants Chercheurs en Ergonomie- Ce2', since 2004, promotes, participates in structuring and protects the teaching of the discipline, as well as promotes and supports research in the field of ergonomics; the association 'Reseau des Jeunes Chercheurs et Chercheuses en Ergonomie – RJCE' was created in 2008 to group young researchers and also support the development of research; not to mention other important institutions, such as professional unions.

The first institution, SELF, which currently has 510 members, has promoted the history and development of the discipline through annual congresses, communication and dissemination activities, surveys about the profession, job offers and scholarships, among other actions.

Ce2, for example, has played a fundamental role in recent years in protecting the discipline from the profusion of training in nearby areas that claim the ergonomist

diploma, since the profession finds a market in companies, on the one hand, but is not regulated, for another.

From a practical point of view, Ce2 (2012) accredits 'masters' in Ergonomics who meet its precepts (consensus by its members) and also works with Higher Education and research evaluation institutions.

In 2012, Ce2 carried out a survey to find out the working and health conditions of research professors in light of the restructuring of French universities (Ce2, 2012b).

It demonstrates concern about the future of journals in the field (Travail Humain, Activités and Pistes) that need to be supported, as they constitute a basis for progress in research and the discipline (Ce2, 2017). In reality, journals are also fundamental institutions for the development of practice and research.

3.2.3. Training and research

University training in Ergonomics focuses on the final years of university education, complementing previous courses ('filières' in French) in various disciplines, such as psychology, physiology or biology, social sciences, engineering, among others. Thirteen ergonomics masters are currently offered in various higher education institutions.

Reference program was proposed by Ce2 containing the diverse knowledge for professional practice; functioning on man at work, on production and organization technologies, methods of analysis and intervention, on regulations associated with ergonomics (Ce2, 2012a). It is important to note that, as currently, masters are offering a separate discipline on the analysis of activity and work, from a discipline aimed at training on the intervention itself.

Furthermore, there are different types of inclusion in masters: whether full-time or so-called alternating training, in which students alternate time in companies and in the classroom. Currently, the second modality has attracted a greater number of students in the discipline who receive a 'salary' while studying and can be hired at the end of the course.

With the regulations of the 2000s in Europe, there was the restructuring of teaching and research at French universities, which conditioned the composition of more numerous research teams and/or the formation of Research Centers, grouping together former laboratories, as was the case with the creation from the CNAM's 'Centre de Recherche sur le Travail et le Développement– CRTD'.

Likewise, some professors, such as Alain Garrigou, are affiliated with a teaching unit (in this case, IUT Hygiène et Sécurité) and a research team (EPICENE - INSERM).

The training of researchers is offered in the doctoral programs of various universities and higher education establishments, and thesis supervision can only be carried out by full professors and professors who have the title of 'Habilitation à Diriger des Recherches – HDR'.

Research depends on public or private funds; which in this case, Ergonomics is not a problem given the ability to contribute to the human, technical and organizational development of companies and institutions (Falzon; Spérandio, 2023).

Method of promoting doctorates, applied since 1988, consists of carrying out the so-called CIFRE thesis ('Conventions Industrielles pour la formation et la Recherche'), which involves the supervision of doctoral candidates, both by professors from a Research Center and by professionals from the industry. The Ministry of National Education and Research offers a subsidy and, in return, the company guarantees the payment of salaries in an employment contract.

3.2.4. Articulation between research, teaching and professional practice

As the majority of Ergonomics professionals are consultants, soon after graduation, the relationship between trainers/researchers and professionals is historically important through both supervision practices and the holding of events focused on practice such as 'les Journées de Bordeaux sur la pratique' (Martin; Baradat, 2003). Furthermore, several of the company's internal professionals hold doctorate degrees (as do several consultants, many working as teachers (part-time)).

The development of the research stream on the practice of Ergonomics in the 90s and 2000s was fundamental to consolidate intervention practices in companies, in

particular, aimed at the participation of ergonomists in industrial projects (Rocha et al., 2022).

Furthermore, as recommended by Ce2, ergonomics research must be linked to social and/or industrial demand, which evidently suggests proximity between the world of research and the 'daily life of companies', which is favored when there are professional ergonomists involved belonging to the company.

The relationship between internal professionals and research is also established with the completion of CIFRE doctorates that favor the treatment of current industrial issues and the production of cutting-edge knowledge. Evidently, if hired, newly professional doctors have already developed relationships with researchers during their thesis writing process at the company, which will have a positive influence on their career at the company and their integration into the professional community.

In some cases, when the relationship between a given research and training center and certain companies is long-lasting, the development of concrete actions, as well as the production of knowledge, are mutually beneficial. The most important example involves CREAPT, whose relationship with the aeronautical company began approximately 30 years ago (Degoulet; Buchman; Gaudart, 2022). This is one of the most relevant 'intervention and research' situations in the field of Ergonomics and Health at Work.

3.3. Shared academic production and conceptual development

The reality of global warming and its direct consequences (forest fires, water crisis, climate change), the energy crisis caused by both the ecological issue and the war in Ukraine, in addition to changes in work, such as digitalization (and the use of intelligence artificial) in production and service systems, the management process of companies and public institutions, among other aspects, have impacted work and workers, and their health, posing concrete questions and demands for ergonomics.

The discipline is, however, capable, or at least mobilized, to intervene and produce knowledge and meet these greater social demands after the conceptual and

methodological developments of the last thirty years, such as the development and organization of spaces for debate (Raoni et al ., 2022), the idea of empowering intervention and organization, participatory design methods, among others (Falzon; Spérandio, 2023).

Likewise, the presence in the debate with nearby disciplines, interested in work, on promoting the development of people and systems (Arnoud et al. 2022), on the democratization of work relations (Clot et al., 2021), about the intervention itself in work situations (Ullman et al. 2017) as well as participation in studies and interventions in multidisciplinary teams, as in the case of combating pesticides (Galey; Garrigou, 2020), enable Activity Ergonomics to understand and intervene in the necessary 'transitions' of production, life, food, protection of the environment and life (Renouard et al. 2020). Therefore, action in the field of management and public policies seems necessary (Falzon; Spérandio, 2023),

3.3.1. Definition of research themes and knowledge production process

Topics such as health and work, safety conditions, democratization of company spaces, exposure to risks, digitalization of systems are evidently associated with Ergonomics, with the main training and research centers and/or the main researchers called upon to participate in public notices or meet the needs of private companies. The research objects articulate traditional questions and concerns about working with current social, economic and environmental issues, referred to above.

Various institutions that promote research, as well as funding agencies, make regular calls on certain topics, and specific issues may be the subject of notices from different ministries. Often, certain researchers, whose work is recognized, are mapped and called upon to carry out research on specific problems.

3.3.2. Organization for thematic production and interdisciplinary debate

The role of public and private agencies and institutions and social actors influences the formulation of thematic demands for research in different areas. A recent example was the agreement between employers and workers, signed in 2013, on the topic

of psychosocial risks and quality of life at work, which mobilized various studies in the field of Ergonomics, psychology and management (Detchassar, 2019; Clot et al., 2021).

We are currently witnessing a debate surrounding the topic involving work and development sciences. In the collection, organized by Arnould et al. (2022), research from ergology, change laboratory, ergonomics, activity clinic and educational sciences is brought together. It is interesting to note that the production of knowledge about a given object does not happen by chance, but results from a process of collective, progressive collaboration.

The organizers of the collection state in the introduction (Cerf et al., 2022): 'The book originates from reflections that took place both in the magazine *Activités* and at the SELF (2015, 2018) or International Ergonomics Association (2015, 2018) congresses.' (Arnould et al., 2021; p. 13). The theme of development resulted from Pierre Falzon's work around the idea of 'empowering organization' and constructive ergonomics, started in the early 2010s (Arnould et al., 2021; Falzon; Sperandio, 2023).

The collection is therefore the result of texts by authors from different universities and the network organization that allows the debate to be encouraged and contribute to the development of the topic at hand. It results, therefore, from the debate between different disciplines, materializing the contributions and differences between the different disciplines in the different chapters. The work is of great value to other researchers, who have a range of conceptual and methodological options.

In the French scenario, experimentation and major research based on multidisciplinary approach can also be observed, as is the case with the topic of exposure to pesticides and carcinogenic substances. Ergotoxicology has contributed to researchers in health, epidemiology, anthropology, psychology, among others (Garrigou; Galey, 2021). The contribution of Ergonomics therefore becomes known to researchers from other areas, contributing to the dissemination of the discipline.

3.3.3. Conceptual and methodological development under a new paradigm

The hegemony of Ergonomic Work Analysis (AET) lasted until the mid-1990s, when the book 'Comprendre le travail...' (Guérin et al., 2001) was published. The

participation of ergonomists in industrial and service projects has highlighted the need to reflect on intervention and the role of ergonomists (Rocha et al., 2022).

The vocabulary used, real work and prescribed work, workload, strategies and regulation, starts to lose space in communications in congresses and texts, being replaced by other terms such as margin of maneuver (or power to act), social and technical construction (Coutarel et al. 2015); other terms, such as demand and construction of the problem, but above all activity, remain. The very expression 'Ergonomic Work Analysis' is out of use, being replaced by 'work analysis' or 'activity analysis'.

Leaving the role of analyst, external to the situations observed, the ergonomists in intervention 'enter the space of the company' engaged in transformation, or in the construction of a process for the transformation of the situation that is reclassified as 'empowering'. Although the centrality of the activity point of view remains inherent to any ergonomic action, the search for greater 'margin of action' is aimed not only at the workers in the work situation under analysis, but also at the company's actors involved in the intervention that can influence the transformation process.

This perspective, whose focus is intervention, is taught in the 'masters d'ergonomie', disseminated in the community and shared among the main researchers in the field. The focus on intervention also calls for new reflection on analytical instruments and techniques and their application in intervention (Nascimento, 2017). Thus, as concepts and theoretical framework, good methods and techniques are those that contribute to the intervention (Rocha et al., 2022).

It can be said, therefore, that the paradigm that organizes ergonomics action in France is no longer that of defending and applying AET, but that of constructing intervention.

3.4. Current Challenges

For some of those interviewed, a lot of energy and effort was spent on protecting the discipline at the highest levels of Education and research, after the reorganization of French Universities. If the performance of Ce2 was fundamental, and many researchers

were engaged in it, there is a certain distance between the community of professional practice and research, and a need for greater involvement of teachers/researchers with SELF.

On the other hand, for a more effective contribution to this scenario of humanity's crisis and the need for societal transitions, it seems necessary to occupy spaces and influence the elaboration and implementation of public policies, normally the responsibility of the intellectual elite at the service of the French State. Research into the relationship between ergonomics and public policy is ongoing under the coordination of Flore Barcelinni du CRTD of CNAM.

4. Discussion

If, initially, Vilela's provocation led us to compare Ergonomics with LM, a mode of formative intervention (which aims at development through the Historical-cultural Activity Theory), the relationship between the practice of ergonomics and methods called 'developmentalists' were already part of the French scene (Arnould et al., 2022).

Therefore, for us, promoting the development of ergonomics in Brazil should not be thought of in comparison with another disciplinary or methodological perspective, such as LM. Having the ergonomics of French activity as a 'mirror' seemed to us to be the best method to create conditions to stimulate and promote reflection on the development of Brazilian Ergonomics. This text did not intend to deepen the analysis of the Brazilian situation, but to stimulate this process later.

Our reflections suggest that Activity Ergonomics in France is under the paradigm of intervention construction, which supports practice, research and academic training.

Likewise, the importance of the discipline, on the one hand, is due to the engagement of several researchers and the institutions that support and enable its development. On the other hand, given the historical capacity of the discipline to respond to social demands through its modes of intervention, companies and institutions are interested in calling it (Falzon; Spérandio, 2023).

In the case of Brazil, we still find ourselves under the paradigm of application and defense of the method, which is explained by the characteristics of the training of ergonomists in Brazil – content of the modules and insertion only in the *latu sensu* postgraduate course. Another factor consists of the development of professional notary practice by professionals, in order to comply with the old NR 17 and the obligation of companies to carry out AET, and to protect companies or seek compensation for damages suffered by workers (Jackson Filho et al., 2021; Rocha et al., 2022).

Furthermore, there is little influence of the discipline on public institutions and companies, given the low capacity for intervention to transform working conditions and participate in tackling other social, economic and environmental issues currently underway.

Overcoming this paradigm depends on strong mobilization of the professional community, especially Brazilian professors and academic researchers, to re-discuss the training and practice of Ergonomics in Brazil, in light of current social issues. Urgent problem that could be led by ABERGO members.

5. Final comments

Analyzing the situation of Activity Ergonomics in France and its developments, through our immersion in French society, was the objective of this collective reflection.

The elements described and analyzed, based on readings, interactions and interviews, from the perspective of the social and economic, institutional, theoretical, methodological and organizational scenario explain the current development of the discipline in France, which can serve as a 'mirror' for ergonomists Brazilians rethink their practices and promote the development of the discipline beyond the paradigm of applying the method.

Such elements can, if put into debate in the ergonomics community and analyzed based on social demand in Brazil, favor the emergence of, perhaps, a new Brazilian Activity Ergonomics.

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