

HISTORICAL LANDMARKS OF FRENCH ERGONOMICS

ANTOINE LAVILLE

Laboratoire d'Ergonomie de l'Ecole Pratique des Hautes Etudes
41 Rue Gay-Lussac - 75005 PARIS –France
ergo.ephe@wanadoo.fr

Abstract

The history of French Ergonomics began with occupational health concerns and the study of human work characteristics and production. The SELF was created after the 2nd World War. The SELF's specificity was its emphasis on the ergonomic analysis of work and the concept of activity. Its development is closely linked to the history of work, including the history of technology, organization, social movements and the workforce. This link explains the evolution of its research themes and interventions in the production system.

Key words: history, French Ergonomics

Preliminary Remark

This text does not pretend to provide a definitive history of French Ergonomics. Indeed, the author is not a historian and his viewpoint is biased, all the more so because he both participated in and was a witness to this history. Lastly, his sources, documents and testimonies are still quite incomplete. This historical account is presented here so that it may be critiqued by his colleagues and, in turn, give rise to other historical accounts.

Introduction

The history of a young discipline such as Ergonomics, that is to say the history of the institutions that have carried it, the people who have created and sculpted it, the concepts, theories and methods that make up its content, the history of a profession that is one of its means of action, all of these "histories" are closely linked to the history of work and social conflicts, which are, at one and the same time, the context, source and object of study of this discipline. We will attempt, in this short exposé, to describe some of its landmarks.

After the 2nd WW, three main currents came together to create French Ergonomics and give rise to its distinguishing characteristics. Two stem from very old concerns which have spanned several centuries up until the current period:

- A concern for the effects of work on health. There are traces of this in certain texts from Antiquity, but it is Ramazzini, an Italian Renaissance doctor, who associated 52 different occupations with varying pathologies. It might be said that he anticipated the role of analyzing activities so as to understand their consequences on health.
- A preoccupation for efficiency in human work, for the most part physical work, that has led, over the centuries, to an attempt to adapt tools, then machines, physical environments and even the organization of work to the capacity of workers.

The third current is recent and is linked to the evolution of the psychology of work between the two world wars. Its first objective was to adapt humans to their work. It developed tests to select personnel according to aptitudes that were supposedly necessary for a given job. However, the desire to better understand the reality of work so as to develop more relevant selection methods gradually arose. Slowly but surely, a current, that began with the analysis

of humans so as to adapt them to their work turned into an analysis that attempted to adapt work to humans.

These three currents united after the 2nd WW to give rise to French Ergonomics and its specific characteristic of understanding work activities by studying them in context.

1945 – 1963: The Conception Leading to the Official Birth

A French Ergonomics project was started after the 2nd WW that culminated with its official birth in 1963 under the name of the Société d'Ergonomie de Langue Française (SELF, French language ergonomics society).

These years were marked by the need to rebuild European countries devastated by the war. Aided by the Marshall Plan (USA), industry began to develop and the search for improvements in productivity became an important concern. Missions were sent to the USA and administrative structures were created to stimulate progress in this field. It was the theories of E. Mayo, Maslow and Herzberg on the motivations and needs of humans that were used in the USA at this time to improve productivity. French-speaking Europeans were not convinced by these theories and even less by their applications. They chose rather to improve work conditions to improve productivity.

At this time, in France in particular, legislation was being enacted for occupational medicine, workers' compensation and worker representation in companies, in particular in health and safety. The State intervened increasingly in company operations, in the area of health and safety among others.

It is in this context, in which work conditions were recognized as an important issue in society, that research and public teaching institutions were created and developed. In industry, Rey developed a research and intervention structure in the clock and watch making industry in Switzerland intended to analyze and reduce occupational risks and production flaws. In France, Cazamian created a mining ergonomics centre, and Wisner, a research centre dedicated to the improvement of vehicle comfort and safety for a major automobile manufacturer.

In the French public sector, at CNAM (national conservatory of industrial arts and crafts; Soula, Scherrer), teachings in work physiology and laboratory research in this field were redefined following a long tradition of industrial hygiene. At CERP (centre for psychotechnical study and research), Ombredanne, Faverge and then Leplat redirected research in selection techniques towards work analysis. In Strasbourg, Metz created a centre for applied work studies, which focused its research on the physical environment and work stations.

In Belgium, Coppée created the centre for ergology in Liège, and Ombredanne, and later Faverge, after having left CERP, continued their work analysis research at the University of Brussels. In Switzerland, Grandjean developed his teachings and research in applied work sciences at the Federal Polytechnical Institute of Zurich.

Some of these centres emphasized one or another of the maternal disciplines of Ergonomics, such as physiology or work psychology, whereas others, from the beginning, were multi-disciplinary. The creation of the SELF, in 1963, resulted from the convergence, in the early 60s, of three main phenomena:

- A change in the approach to work problems occurred. Work and its technical and organizational means were no longer seen solely from an engineering viewpoint, to which

workers had to adapt. Rather, workers were seen to be at the centre of work and, therefore, at the centre of work design.

- Prominent university members, many of whom had humanist values that had been expressed through committed actions during the war, came to play a prominent role.
- The support of administrative and political structures, both national and European (CECA), upheld the idea that workers must be at the base of any production and safety designs and not the other way around.

Following contacts with the English Ergonomic Research Society, created in 1949 by Murrell, and meetings during various international scientific conferences on work, eight university members from France, Belgium and Switzerland and a high-level civil servant from the French Ministry of Work decided to create SELF in 1963 in order to promote Ergonomics in francophone (French-speaking) countries. The first SELF conference was held the same year in Strasbourg.

The Childhood of French Ergonomics (1963 – 1970)

The period from 1963 to 1970 is when Francophone Ergonomics began to develop its specific characteristics as compared to its Anglo-Saxon counterpart. It became an ergonomics centred on activity analysis that is conducted in real work situations, that is in a technical and organizational context that includes the production constraints.

During this period, the industry continued to develop, Taylorian organization continued to spread due to the growth of assembly line plants producing common products (household appliances, cars, clothing...), the relationship between unions and management was tense and antagonistic, and companies were not very open to research into work. Ergonomics was confronted with several problems, namely:

- getting out of the laboratory to conduct research in the field, since, on the one hand, the scientific community wondered about the validity of research in which one can neither manipulate nor control all the variables; and, on the other, company management feared the social conflicts arising from such studies;
- identifying this new discipline, thereby limiting its application to the physiological and psychological processes of work activities, or, on the contrary, asking questions about the social phenomena brought to light by work analysis;
- defining Ergonomics as a science, a technique or an art (like the art of engineering or medicine);
- limiting its interventions to the material improvement of workstations or extending its analysis to work organization;
- maintaining a balance in interventions between protecting workers' health and increasing productivity.

These questions were the object of lively debates and different practices which, moreover, continued in the following periods. The themes of papers presented at the first SELF conferences show that these questions were approached timidly. For the most part, the conference papers dealt with laboratory research that maintained a certain distance with real situations. They sought to determine the physiological indicators of fatigue and physical and sensorial loads (heart rate, critical fusion frequency, electroencephalogram (EEG), electromyogram, etc.).

It is only at the end of the 60s that the first ergonomic studies of workstations were conducted and layout changes proposed. At the same time, teaching was being organized at the CNAM,

under the direction of Wisner, into a professional avenue that led to the creation, in 1970, of an engineering level ergonomics diploma. The teaching of knowledge was complemented by a teaching of company practices that was further enriched in the following decades.

A Development Period (1970 – 1980 – 1990)

In the early 1970s, strong objections to the Taylorian and Fordian organization of work were seen in the fierce O.S. strikes. Management, which was worried about production, looked abroad for other models of work organization (extension, task enrichment, independent work teams...). The growing use of workstations concerned public authorities, which asked Wisner to draw up a report on the question, a report which was contested by management.

The big unions began increasingly taking work conditions into consideration in their policies. The federations that were particularly concerned (metallurgy, chemistry, clothing) organized training in activity analysis and asked public ergonomic laboratories to conduct studies. Work conditions were thus pushed to the front and centre of discussions.

In France, political authorities attempted to respond to these changes by enacting legislation and creating the ANACT (Agence Nationale pour l'Amélioration des Conditions de Travail, the national agency for the improvement of work conditions). However, in the early 80s, our society went from a work crisis to an employment crisis, and work conditions suddenly became less of a priority.

It was during these two decades that various types of training were established:

- The teaching of professional qualifications that generally included both intervention practices and the ergonomic analysis of work were enacted. It is worth noting that mandatory practical training was chosen as one of the criteria needed to obtain the title of European ergonomist, which was created in the 90s by the Ergonomics Societies of France, Belgium, Italy, Germany, England and the Scandinavian countries.
- Short training sessions were organized by companies for their personnel and by the federations of large unions for their hygiene, safety and work condition committee (CHS-CT) delegates as part of their policies concerning work conditions.
- Research training became official with the creation of a Ph.D. in Ergonomics which was open to foreign students. The first two theses were submitted at the end of the 70s by two engineers, one French, the other Québécois.

The Ergonomics profession was thus slowly being developed in companies and through consulting, and, at the same time, making itself known. The research continued to evolve. Workplaces became the main places of study and laboratory experiments became increasingly rare. The themes evolved together with the work, as the use of new technologies, changes to work schedules and organization, and the growing complexity of production systems emerged. Ergonomics specialized in specific socio-economic sectors, including health care, agricultural, education and services. Ergonomic interventions became a subject of study that grew to include design ergonomics.

At the end of the 70s, Wisner began to take an interest in the cultural, social and economic specificities of developing countries that import recent technologies, which posed particular problems for Ergonomics. Working with foreign students who had come to further their training in his lab, they created and developed a new field of ergonomic research that Wisner named "Anthropotechnology".

In its early years and then in the 70s, Ergonomics wondered about how it could contribute and extend its work to include sociological and economic questions in companies. A team of sociologists put together a general analysis grid developed through discussions with ergonomists. Meetings were held that brought together economists, work sociologists and ergonomists. However, there was no follow-up to these attempts. It was only in the 90s that Ergonomics once again asked these questions, as can be seen in the themes of some of its annual conferences (in 1997, Interactions with the Social Context, and Technology and Economics; in 1999, Criteria of Company Management).

At the end of the 70s, contacts and discussions with statisticians from the French Ministry of Work led to the carrying out, in 1978, of the first national survey of work conditions. This survey, which has been repeated at regular intervals and which has even been extended to European countries, has been strongly stamped by the contributions of Francophone Ergonomics.

Conclusion

Francophone Ergonomics has been built using a variety of viewpoints about the field of Ergonomics, its methods, objectives and its use of interventions. This diversity is found, moreover, in its teaching, research and practice.

Above and beyond this diversity, however, there is a specific characteristic shared by all, namely that Francophone Ergonomics is centred on the ergonomic analysis of in-context work and sees workers as active subjects in this analysis. Moreover, it has:

- developed an analysis method to examine the relationship between knowledge and interventions, the latter having become an object of study;
- focused on the needs arising from the evolution of the workforce and work and begun discussions with other work-related disciplines;
- succeeded in being accepted in research and teaching institutions as well as in companies.

Nonetheless, this evolution is continuing and its many causes, in my opinion, pose certain questions about the future of Francophone Ergonomics. For example, the understanding of how to integrate human functions and cognitive processes in a work activity has not generated the interest that it deserves. Furthermore, the contribution of cognitive psychology has come to dominate to the detriment of work physiology and, more particularly, neurophysiology. This might partially explain the difficulties of Francophone Ergonomics to take into account the consequences of work on health.

In the course of our development, numerous, sometimes heated debates have occurred in our community. Some have been epistemological and others have been more concrete, such as the contribution of professional practitioners in a scientific society. However, this story is not finished yet, since workers are evolving and asking new questions.

As Montmollin said in 1978, "Ergonomics cannot be applied, it can only be practised and created in cooperation with the very people who need it." If this is so, Francophone Ergonomics, like all other forms of Ergonomics has, alas, a long future ahead of it.

References

The historical elements proposed in this text are taken from quite varied documents and oral accounts gathered during interviews conducted over the last two years. The list would be too long to be given here.