Design management in ergonomics team leadership

A gestão de design na liderança de equipes de ergonomia

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ABSTRACT

Documentary research was used to gather and display the skills, approaches, and domains of expertise of the professionals working in Ergonomics field defined by their own professional associations. For such, one table of professional scopes and job descriptions in Ergonomics was assembled. The objective of this research was reached by using this table to correlate and to compare its elements to the characteristics of the designer and to the attributions of Design Management described in the literature review. Lastly, this comparison brought forth the analysis of how they fit in Ergonomics team leadership roles and the recognition of design managers as qualified and unique professionals for leading roles in Ergonomics multidisciplinary teams.

KEYWORDS

Teamwork; ergonomics, multidisciplinary

RESUMO

A partir das definições de competências, abordagens e espaços de atuação determinados pelas diversas associações e conselhos das formações profissionais que atuam com Ergonomia, este artigo realizou uma coleta documental para apresentar estas informações reunidas e organizadas em uma tabela de escopo e atuação dos seus diferentes profissionais. Com base nesta tabela, o objetivo desta pesquisa foi comparar tais definições com as características do perfil do designer e com as atribuições da Gestão de Design descritas pela revisão bibliografia. Por fim, esta comparação possibilitou a análise destes últimos na liderança de equipes de Ergonomia e resultou no reconhecimento dos gestores de design como capacitados e singulares para o papel de líderes destas equipes compostas por diferentes formações profissionais.

PALAVRAS-CHAVE

Trabalho em equipe; ergonomia, multidisciplinar
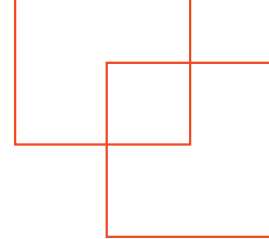
INTRODUCTION

The three major areas of ergonomics: physical, cognitive, and organizational; are interesting fields for professionals with multiple backgrounds at different business units and enterprise levels in diverse sectors of industry.

Design Management spreads over the three levels of management: strategic, tactical, and operational; for the development of products and services. Due to its multidisciplinarity, it provides interesting features for leading multidisciplinary teams for ergonomics projects.

This article analyses Design Management in Ergonomics Team Leadership. Documentary research was used to gather and display skills, approaches, and domains of expertise of the professionals working in Ergonomics defined by their own professional associations. The objective of this research was reached by using professional scopes and job descriptions in Ergonomics to correlate and compare its elements to the characteristics of the design manager and the attributions of Design Management described in the literature review. This correlation and comparison brought forth the analysis of how they fit in Ergonomics team leadership roles and the recognition of design managers as qualified and unique professionals for leading roles in Ergonomics multidisciplinary teams.

Ergonomics is an applied science (Falzon, 2018; Guérin, Laville, et al., 2000; Vidal, 2000), so this research is relevant not only for the study of the application of ergonomics methods used by different professionals but also for the ergonomics management and its team's leadership. This article intends to gather and analyze the backgrounds, competencies, approaches, and domains of expertise of professionals in ergonomics for the improvement of its professionals to lead ergonomists.

2 The multidisciplinary of ergonomics and its teams

Ergonomics deals with different aspects of human work: physical, cognitive, and organizational. It puts together multidisciplinary fields of knowledge in a systemic approach in its scientific research and its
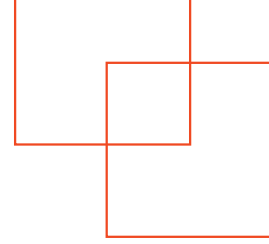
professional application (Iida, 2018). Sznelwar (2015) states that there is no ergonomics without close cooperation with other fields of knowledge.
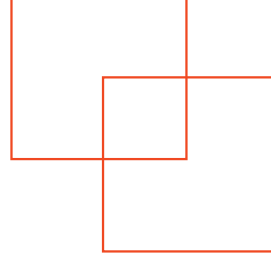
Even though there are no government regulations on the ergonomist profession, the Brazilian Ergonomics Association - ABERGO (2020) supports and develops specialization courses and certifications for ergonomists in the country. As well the Ministry of Labor (2016) recognizes that it is necessary to have specific training and at least undergraduate education on the human systems to work in human factors.

As there are no legal requirements to which professionals are legally qualified to work in Ergonomics; there are professionals with different backgrounds working in the area. The most common professionals working in Ergonomics are designers, architects, industrial engineers, psychologists, physiotherapists, occupational physicians, anthropologists, and sociologists (ABERGO, 2020; Iida, 2015; Sznelwar, 2015). Table 1 presents the definitions of their competencies, as well as their approaches and domains of expertise as defined by their own national or international professional associations.

Table 1. Employment of Ergonomics professionals

Professionals	Competencies	Aproach	Domain of expertise	Source
Industrial Designers	"Industrial Design is a strategic problem-solving process that drives innovation, builds business success, and leads to a better quality of life through innovative products, systems, services, and experiences. [...]It is a trans-disciplinary profession that harnesses creativity to resolve problems and co-create solutions with the intent of making a product, system, service, experience or a business, better. [...]Industrial Designers place the human in the centre of the process." (WDO, 2020)	User centered	User-product and product/service - organization interfaces	WDO – World Design Organiza-tion
Graphic Designers	"Design is a constantly evolving and dynamic discipline. The professionally trained designer applies intent to create the visual, material, spatial and digital	User centered	User-product and product/service - organization	ICO-D - Council of Design

Professionals	Competencies	Aproach	Domain of expertise	Source
	environment, cognizant of the experiential, employing interdisciplinary and hybrid approaches to the theory and practice of design." (ICO-D, 2020)		interfaces	
Architects	"According to their generalist training, architects and urban planners are the qualified professionals to work in several areas concerning the planning and execution of buildings, landscaping, and urbanism." (CAU, 2020)	Spatial	Buildings and other physical structures.	CAU - Brazilian Council of Architec-ture and Urbanism
Production Engineers	"Production Engineering designs, implements, operates, improves, and maintains integrated production systems for goods and services, involving people, materials, technology, information, and energy. It is also up to specify, predict and evaluate the results obtained from these systems for society, and the environment, using specialized knowledge of mathematics, physics, human, and social sciences, together with the principles and methods of analysis and engineering design." (ABEPRO, 2020)	Technical	Production systems of goods and services	ABEPRO - Brazilian Associa-tion of Produc-tion Engineer-ing
Business Administra-tors and Managers	"Business administration and management is a human science based on systems and processes that seek planning, organization, direction, and control of achievements, in both the public and private sectors. [...] Business Administrators and Managers' employment is broad, and it is necessary for all types of companies. It spreads over several areas such as sales, logistics, finance, purchasing, human resources, marketing, etc." (CFA, 2020)	Business	Manage-ment and leadership activities	CFA - Federal Council of Administra tion
Industrial and organiza-tional (I/O) Psycholo-gists	"I/O psychology proceeds in activities related to organization analysis, and development, human behavior in organizations, team development, organizational consulting, selection, monitoring and development of human resources; study and planning of working conditions, and research for formative interventions in workers' health. It develops, analyzes, diagnoses, and guides cases in workers' health, observing levels of prevention, rehabilitation, and health promotion. It participates in programs about health and safety at work, supporting	Social, behavioral or cognitive	Behaviors and mental processes	CFP - Federal Council of Psycology

Professionals	Competencies	Aproach	Domain of expertise	Source
	them in terms of psychosocial aspects to provide better conditions for workers. [...] It plans and develops actions to improve work relationships, the sense of greater productivity and personal fulfillment of individuals and groups in organizations, stimulating creativity, and seeking a better quality of life at work. [...] It cooperates in the company's technical services, such as projects for the construction and adaptation of instruments and equipment for humans, as well as other initiatives related to ergonomics. It conducts research and development of initiatives related to workers' health and their working conditions". (CFP, 2020)			
Physiotherapists	"Physiotherapy is a health science that research, prevents, and treats intercurrent functional kinetic disorders, in organs and systems of the human body, generated by genetic alterations, trauma, and acquired diseases". (COFFITO, 2020)	Physiological	Health promotion, wellness, fitness, disease, and disability prevention, and management	COFFITO - Federal Council of Physiotherapy and Occupational Therapy
Physical education teachers and health specialists	"Physical education teachers and health specialists specialize in physical activities, in their various manifestations - [...] -, providing services for the development of education and health, contributing to the training and/or restoration of adequate levels of physical performance and conditioning of its beneficiaries". (CONFEF, 2020)	Physical motor skills	Health promotion, wellness, fitness, disease, and disability prevention and management	CONFEF - Federal Council of Physical Education
Occupa-tional physicians	"Occupational Medicine is the medical specialty that focuses on the relations between men and women and their work. It seeks not only job-related disease and disability prevention but the promotion of health and wellness. Its objective is to ease and to assure individual, or collective, workers the continuous improvement of their physical and mental health conditions, and of the healthy interactions between them and their social and work environment". (ANAMT, 2020)	Medical	Injury management, and work disability prevention	ANAMT - National Association of Occupational Medicine

| Professionals	Competencies	Aproach	Domain of expertise	Source
Sociologists and anthropologists	"Sociology is the study of social life, social change, and the social causes and consequences of human behavior. Sociologists investigate the structure of groups, organizations, and societies and how people interact within these contexts". (ASA, 2020)	Social	The social life of individuals, and groups	ASA - American Sociological Association

Source: Interview with members of the ENEEI team

After so many backgrounds, competencies, approaches, and domains of expertise of the ergonomics professionals being gathered and displayed in the table above, it is noticeable and necessary that teams with professionals so disparate should be led to successfully achieve the goals of ergonomics. Thus, the following topic presents Design Management competencies in ergonomics team leadership.

3 Ergonomics teams and design management

Vidal (2000) presents the Ergonomics areas in distinct scopes of human-machine-environment relations. For the author, physical ergonomics sets about from the foundations of ergonomics, and the operator and his workstation (physical load) are considered elementary units of the work system; cognitive ergonomics is based on the cognitive approach to work and the operator (mental load) is considered a competent and organized agent in the work system; situated ergonomics focus on work system organization and the workload is described as a response to production requirements; macroergonomics is based on cost-activity assessment and seeks the return on investment provided by ergonomics within the organizational context; and, finally, anthropotechnology seeks to consider the needs of changes carried out by ergonomics in a larger scope of culture and strategy in organizations.

The increase in the complexity of work has made Ergonomics expand its domains (Iida, 2018; Moraes, 2000). Previously what had an "operational" character in corporations has turned into a "managerial" character. Hendrick and Kleiner (2006) point out that changes in work
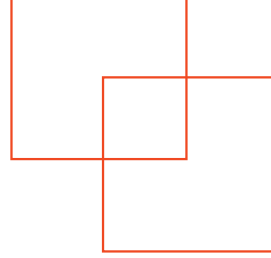
have become more accelerated, levels of professionalism have grown, and work systems have become less formal.

The last decades of century XX presented many changes in both Ergonomics and Design Management. Information technology development, telecommunications and automation technology, demographic change, new personal values concerning work, increased global competition, and legal disputes based on the lack of ergonomics and safety made Ergonomics scope be rearranged to include new problems and possibilities (HENDRIK & KLEINER, 2006). For Iida (2018), ergonomics was expanded to include organizational factors because many work decisions are taken by management.

Design has been considered a strategic activity concerning space, knowledge, and time. This sentence can be understood by design management´s competence in its design coordination for the creation of an organization´s identity and the execution of its organizational duties. Design Management seeks to make design an important organizational tool for competitiveness improvement, business maximization, and performance enhancements in the short, medium, and long term. This research uses the concept of design management defined by Mozota - design management is:

> the implementation of design as a formal program of activity within a corporation by communicating the relevance of design to long-term corporate goals and coordinating design resources at all levels of corporate activity to achieve the objectives of the corporation. (MOZOTA, 2003, p. 71)

These levels of corporate activity are the strategic level (corporate strategy), the tactical level (business unit strategy), and the operational level (operational strategy). Design management must be spread over these three levels to be fully integrated into the strategy. (Best, 2006; Lockwood & Walton, 2008).

Design management reflects three different decision-making processes in the three distinct enterprise levels. The first step for the design project development and the integration of design into the organization is taken in the operational level of the project. The creation of the design department and the management of design with
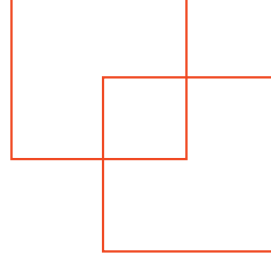
other business units and departments occur at the tactical level of the business unit. And the strategy planning and the transformation of the company's vision by design take place at the strategic level of the corporation. Hence design management makes it possible for design to be in all three levels.

The communication of design within the enterprise happens through its mutual relationship with the other business units of the corporation. For design to carry out its work, expand its relevance within organizations and increase its chances of success, it is necessary to communicate to marketing, engineering, and production, among other business units, so that the entire organization can benefit from design capabilities (Erlhoff & Marshal, 2008; Martins & Merino, 2011).

In the organization Ergonomics application occurs in three stages, according to Guérin, Laville, et al. (2000). First stage is the request for ergonomic analysis, either due to complying with regulations on working conditions or to internal demand (groups, committees, commissions, departments) or audits. The second stage is the ergonomics professionals' investigation of the Ergonomic work analysis to identify which are the specific needs that require ergonomic attention. Finally, the third stage is the formulation of specialized diagnosis for each need, through systematic study methods, and the urgency for ergonomic intervention is measured.

In this practical context pervading the three levels (strategic, tactical, and operational) of systematic action, Design Management, as a promoter of the global and methodical use of ergonomics requires a gradual process (Hendrik and Kleiner, 2006) to be fully embraced by corporations. Ergonomics, therefore, can increase its scope from the micro to the macro yielding positive results for the organization in its application and management.

Ergonomics spreads over all different levels of business activity (Fig. 1) just as Design Management. At the strategic level, top management can determine corporate ergonomics policies as elements of organizational change; at the tactical level, middle management can structure ergonomics into programs applied to business units of the corporation so that ergonomics teams can carry out ergonomic initiatives and interventions at workstations and work systems on the factory floor (MOREIRA et al., 2016).

Figure 1. Organizational Levels of Ergonomics
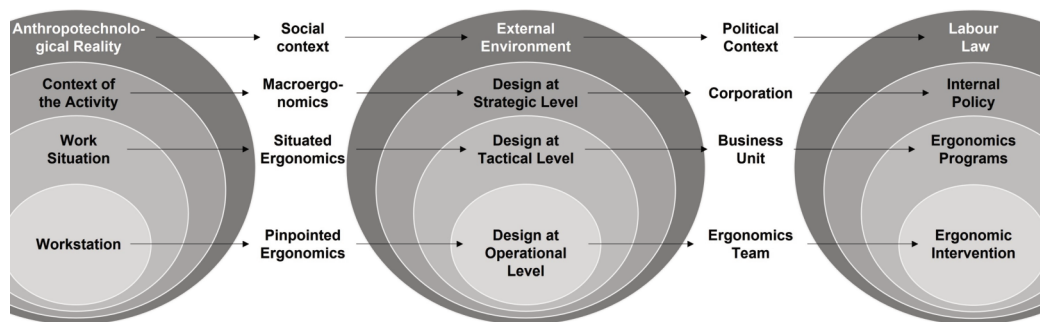
Source: Adapted from Vidal (2000) and Best (2006)

For this to happen, Ergonomics can use Design Management to boost its initiatives at all levels of decision-making. And for the cooperation between both Ergonomics and Design Management to happen it is necessary to know how both relate to each other and to recognize how the latter can endeavor as team leader of the former.

Ergonomics and Design are deeply related. Design Management permeates the entire organization and takes design to all its levels. Thus, a design manager can be as responsible for leading and promoting ergonomics as they are responsible for the design. It is paramount to highlight the fundamental aspect of Ergonomics in the Design program, an essential course that is fully integrated into the design process.

Equally to Design, Ergonomics has a multidisciplinary nature (ABERGO, 2020; Iida, 2018). Ergonomists are not specialists who know everything about every job, nor who perform their activities and make their decisions by themselves. Ergonomics is practiced in teams made up of people with different perspectives so that problems can be better understood, and better solutions can be sought (Sznelwar, 2015).

An efficient team is the result of a manager with good communication skills who sets clear objectives (Morris, 2009) and integrates disparate professionals to obtain different approaches to cooperate for problem-solving (Iida, 2018). To this extent, in addition to promoting Ergonomics at all levels of business activities, it is also necessary to be concerned with the leadership of its team, which can jeopardize the effort of such promotion if it is poorly carried out.

Considering the varied backgrounds, skills, approaches, and areas

of expertise of professionals working in ergonomics, a manager capable of integrating all of them into a collaborative team must have a set of skills and characteristics that can be found in Design Management.

Multidisciplinary problem-solving teams of Ergonomics can be dealt with by multidisciplinary Design Management. Ergonomics teams can lean on the capacity of Design Management to communicate and interact with areas of distinct skills such as social sciences, technology, economics, management, and communications (De Moraes, 2010; Moreira et al., 2016). For Erlhoff & Marshal (2008), designers continually work in teams and collaborate so that their result reflects the different competencies and expertise of all members.

Figure 2. Correlation Design Management and Ergonomics

Design Management

Ergonomics

- User-centered
- Multidisciplinary
- Physical, cognitive, and organizational
- User-product/service-organization interfaces
- Strategic activity
- A formal program of activity within a corporation
- Strategic, Tactical and Operational
- Development and integration in the organization
- Creation of a functional department
- Management in relation to other business units
- Transformation of the company's vision
- Demand, analyses, intervention
- Promotion of ergonomics
- Corporate policies, programs, initiatives
- Integrated to the design process
- Good communication skills
- Clear objectives
- Practiced in teams
- Integrates disparate professionals
- Different approaches for problem solving
- Iterative process

Source: prepared by the authors, 2022

Sznelwar (2015) correlates the design work method and the ergonomics improvements approach. In both, it is necessary to establish an iterative process for projects and interventions to be carried out in the best way. This iterative process is familiar to design and can be compelling in ergonomic interventions with constant and repeated involvement and participation of workers in the development of solutions to work problems.
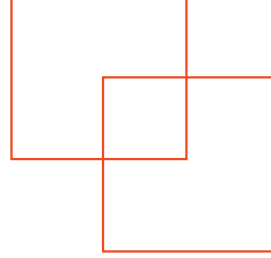
A Venn diagram is displayed (Fig.2) to compare Design Management and Ergonomics by correlating the characteristics both areas possess and showing how they are similar and how they overlap on shared commonalities. Thus, Design Management in Ergonomics team leadership becomes a possibility.

4 Conclusion

The multidisciplinary nature of ergonomics is of utmost importance. Each professional has unique expertise and perspective that must act in synergy with the whole team. The possibility of Design Management in Ergonomics team leadership, as discussed in this article, is one among many possibilities to contribute to Ergonomics so it is applied beyond specific demands, integrating itself more deeply into the strategic actions of organizations.

Within the scope of leadership lies the dynamics of teamwork, the interactions among the business units of organizations, the improvement of work systems and the quality of life of customers and employees, and the people-oriented culture of corporations. These are, among others, current purposes of Design Management appropriately relevant to Ergonomics.

This research is part of a broader investigation. It must be considered its narrow design perspective and there is much to be investigated when it comes to relations between Ergonomics and other professionals' leadership capabilities and possibilities.

This research contributed to the discussion of new possibilities in the application of Ergonomics in corporations by researching Design Management in Ergonomics team leadership. It is the starting point for further studies, experiences, and case studies in ergonomic professional practice. It deserves to be researched in even more depth based on the considerations presented here, which point to the beneficial and promising integration of Design Management into the practice of Ergonomics.
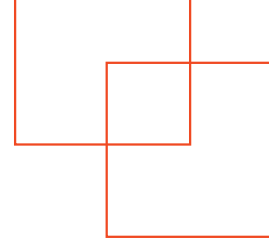
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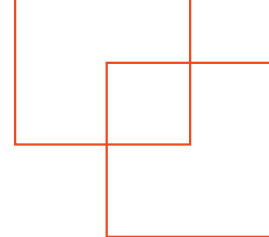
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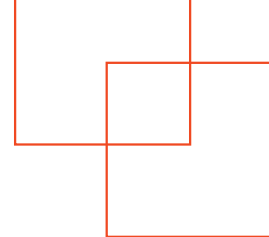
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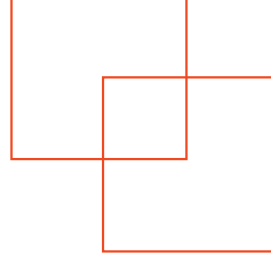
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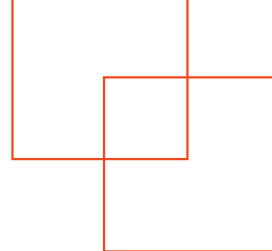
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