


## TRANSFORMATIONS IN THE WORK ENVIRONMENT: IMPACTS OF REMOTE WORK ON PHYSICAL HEALTH, MENTAL WELL-BEING, AND SOCIAL RELATIONSHIPS

## TRANSFORMAÇÕES NO AMBIENTE DE TRABALHO: IMPACTOS DO TRABALHO REMOTO NA SAÚDE FÍSICA, BEM-ESTAR MENTAL E RELACIONAMENTOS SOCIAIS

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**Abstract:** Introduction: This study analyzed the impacts of remote work across various dimensions, focusing on the experiences of respondents distributed into clusters. Motivated by the growth of remote work driven by the pandemic and technological advancements, the research explored aspects such as interruptions in the domestic environment, adaptation of spaces and equipment, organizational factors, physical and mental health, and the benefits and challenges perceived by workers. Method: The methodology was divided into three phases: (1) the development and application of an online questionnaire based on regulatory norms and ergonomic principles, targeting administrative staff from an educational institution in southern Brazil; (2) data systematization and analysis using the R software, employing clusterization techniques to identify homogeneous profiles among respondents; and (3) interpretation and correlation of results to propose specific improvements and goals. Results: The findings revealed significant heterogeneity in respondent experiences. While some reported improvements in quality of life (57.1%) and family bonds (42.9%), others faced challenges such as stress (36.7%), difficulties maintaining focus (40.8%), and discomfort in their work environment due to issues like inadequate natural lighting (20.4%) and furniture (16.3%). Interruptions caused by family members, external noise, and the combination of domestic and work tasks were identified as major sources of distraction and stress. Conclusions: The study highlights both the benefits and challenges of remote work, suggesting that investments in technology, ergonomics, and clear management policies are essential to maximize gains and mitigate negative impacts. The adoption of hybrid models is proposed as a viable solution to balance productivity and well-being. Future research could explore specific interventions and their long-term impacts, contributing to more inclusive and sustainable practices in the context of remote work.

**Keywords:** Remote work. Ergonomics. Mental health. Infrastructure. Organizational communication.

**Resumo:** Este estudo analisou os impactos do trabalho remoto em diferentes dimensões, com foco nas experiências de respondentes distribuídos em clusters. A pesquisa foi motivada pelo crescimento do trabalho remoto impulsionado pela pandemia e pelos avanços tecnológicos, que possibilitaram a realização de tarefas fora do ambiente corporativo tradicional. O estudo abordou aspectos como interrupções no ambiente doméstico, adaptação de espaços e equipamentos, fatores organizacionais, saúde física e mental, e os benefícios e desafios percebidos pelos trabalhadores. Método: A metodologia foi dividida em três fases. Na primeira fase, foi elaborado um questionário online baseado

em normas regulamentadoras e princípios ergonômicos, aplicado a servidores públicos da área administrativa de uma instituição de ensino na região sul do Brasil. Na segunda fase, os dados coletados foram sistematizados e analisados utilizando o software R, com técnicas de clusterização para identificar perfis homogêneos entre os respondentes. Na terceira fase, os resultados foram interpretados e correlacionados para propor melhorias e metas específicas. Resultados: revelaram uma heterogeneidade significativa nas experiências dos respondentes. Enquanto alguns relataram melhorias na qualidade de vida (57,1%) e vínculos familiares (42,9%), outros enfrentaram desafios como estresse (36,7%), dificuldades para manter o foco (40,8%) e desconforto no ambiente de trabalho, com problemas de iluminação natural (20,4%) e mobiliário inadequado (16,3%). Interrupções causadas por familiares, barulho externo e a combinação de tarefas domésticas e laborais foram apontadas como principais fontes de distração e estresse. Conclusão: o estudo destacou tanto os benefícios quanto os desafios do trabalho remoto, sugerindo que investimentos em tecnologia, ergonomia e políticas claras de gestão são fundamentais para maximizar seus ganhos e mitigar seus impactos negativos. Propõe-se ainda a adoção de modelos híbridos como uma solução viável para equilibrar produtividade e bem-estar. Futuras pesquisas podem explorar intervenções específicas e seu impacto a longo prazo, contribuindo para práticas mais inclusivas e sustentáveis no contexto do trabalho remoto.

**Palavras-chave:** Trabalho remoto. Ergonomia. Saúde mental. Infraestrutura. Comunicação organizacional.

## 1 INTRODUCTION

Remote work, or home working, grew in relation to technological advances that allow various professional tasks to be performed remotely, enabling workers residing in different regions to collaborate without being physically present in the same space. It also generates time savings on commuting and infrastructure costs compared to in-person activities, resulting in significant growth of this labor modality since the 1970s, becoming an option in many professions (Burton *et al.*, 2021).

During the social isolation period, many productive sectors and businesses were forced to adapt and implement remote work as a way to continue operating and providing services. This unplanned alternative aimed to minimize economic impacts on activities and businesses (Oliveira, 2021).

This research conducted a survey on the adaptation of workers in administrative and student support roles at an educational institution in southern Brazil in the remote work modality. The collected information was analyzed based on macroergonomic systems using the System Analysis Tool (SAT) methodology.

Despite the rapid expansion of remote work—and the growing body of literature on its organizational, psychological, and technological dimensions—a significant gap remains in ergonomics research: the lack of studies that combine macroergonomic analysis with multivariate techniques to uncover heterogeneous profiles of remote workers in real domestic settings. Much of the existing work treats remote work as a

uniform experience, relying on aggregated averages or isolated variables (e.g., stress levels, workstation comfort, or productivity). This approach obscures critical differences in how individuals navigate the intersection of workspace adaptation, household dynamics, and organizational support. As Macedo (2020) and Filardi (2020) observe, ergonomic studies on telework remain incipient, and even fewer employ clustering methods to identify distinct subgroups—such as those resilient to interruptions versus those chronically overwhelmed—thereby limiting the development of targeted, context-sensitive interventions. This study addresses that gap by applying cluster analysis to empirical data from administrative staff, revealing how combinations of environmental, psychosocial, and organizational factors shape divergent experiences of remote work—and providing a foundation for differentiated ergonomic recommendations.

The aim of this work was to apply tools capable of assisting and translating the expectations and sensations of remote work users during the pandemic period, propose improvements, seek new objectives, and contribute to the science of ergonomics.

## **2 LITERATURE REVIEW**

Home office is considered the transfer of work tasks to the domestic environment and differs from other types of work with similar characteristics, such as coworking or shared physical spaces between companies, street workers (via apps), or “in-home” work (Bridi *et al.*, 2020). Other characteristics include the use of technologies such as the internet, remote communication, agility, and flexible hours (Gatti *et al.*, 2018).

The relationship involving the agreement between employer and employee regarding the workplace was abruptly severed by the necessary social isolation in the initial pandemic period, which, on an emergency basis, transferred administratively feasible tasks to the employee’s home environment (Platts, Breckon, and Marshall, 2022). According to Gomes (2020) apud Oliveira (2021), when employees work from home, companies usually provide software, systems, and other work tools, but equipment such as computers and accessories are considered personal use, as are chairs, desks, and other furniture. This practice complicates the adaptation process for work.

According to Macedo (2020), research in the field of ergonomics is not yet focused on analyzing working conditions related to remote work. According to Filardi (2020), conclusions were reached regarding the advantages and disadvantages of telework:

Advantages: improvement in quality of life and work-family relationships; increased productivity; flexibility; metric creation; cost and stress reduction; commuting reduction; less exposure to violence; and knowledge of workload.

Disadvantages: adaptation; communication; loss of connection with the company; psychological problems; infrastructure; and control over the teleworker.

The choice of computational tools for data analysis was based on their ability to handle complex variables and provide clear insights into the patterns identified among respondents. For this purpose, specific packages of the R software, widely recognized for its flexibility in statistical analyses and data visualizations, were used.

The *klaR* package (WEIHS *et al.*, 2005) was employed to implement unsupervised classification algorithms, such as the k-modes method, which allowed segmenting respondents into homogeneous clusters based on categorical variables. This method was especially relevant because the data collected in the study were predominantly qualitative, requiring an approach adapted for nominal and ordinal variables. The choice of the ideal number of clusters was guided by the elbow method, adjusted for categorical data, ensuring accurate representation of the respondents' profiles.

The *MASS* package (VENABLES; RIPLEY, 2002) was used to apply advanced statistical methods, such as cluster validation through stability and consistency criteria. This step was crucial to ensure that the formed groups were significant and reliably reflected the differences in participants' experiences in the context of remote work.

For organizing and manipulating the data, the *tidyverse* package (WICKHAM; GROLEMUND, 2017) played a central role. This set of tools facilitated cleaning, transformation, and preparation of the data for analysis, allowing adequate coding of categorical variables and handling missing values. Additionally, *tidyverse* was essential for generating summary tables and performing grouping operations, ensuring that the data were structured clearly and consistently before exploratory analysis.

Finally, the pheatmap package was used to create hierarchical visualizations, such as heatmaps, which allowed exploring complex relationships between clusters and analyzed variables. Cluster averages were calculated and represented in heatmaps with color gradients and dendrograms, facilitating the identification of global patterns and specific differences between groups. This dual visualization approach (hierarchical heatmap and grouped bar chart) was fundamental for interpreting the results intuitively and accessibly.

The combination of computational tools with ergonomic analysis principles and macro-ergonomics provided a solid foundation for data analysis and the proposal of personalized interventions. They demonstrate the importance of using robust quantitative methods and clear visualizations to understand the diversity of experiences in remote work and propose practical solutions to improve working conditions in this format.

### **3 METHODOLOGY**

The methodological procedure applied in this article adopts a qualitative approach, seeking to apply ergonomic work analysis techniques based on data collected from an educational institution. It was established at the time of data collection that personal or local information identifying participants or the establishment would remain confidential.

The research was divided into three distinct phases. The first phase consisted of developing and applying the questionnaire. In the second phase, after collecting responses, the data were systematized into a database. Graphs, tables, and diagrams were then generated to enable visualization and analysis of the results, which were distributed in a factor and problem tree. In the third phase, the results obtained in the previous phase were analyzed, seeking to correlate them in the development of action alternatives to mitigate remote work-related problems.

A search was conducted for potential areas that best aligned with the objective of our research on ergonomic analysis of remote work. Public administrative staff working at a public educational institution were chosen for the study. This institution is located in southern Brazil, focusing on vocational education at the secondary and higher levels.

The literature review on the subject and tools was conducted using the Scopus and Google Scholar databases. This review served as the basis for developing an online questionnaire that was applied to collect data on the working conditions of employees during the pandemic.

The questionnaire was developed on the Google Forms platform and distributed via email to the directors of some campuses, with the help of other volunteer employees who collaborated in making the questionnaire available to colleagues in their unit.

The individual, self-administered questionnaire included questions about the area of work, workplace, working conditions, equipment, safety, work schedule organization, work-life balance, disconnecting from work during rest periods, and psychological and affective influences experienced during the researched period.

To achieve greater reach, an email link to the questionnaire was sent to all directors' offices of the institution's units. As a result of this procedure, 49 respondents answered the questionnaire.

In constructing the questionnaire, it was necessary to follow parameters and guidelines outlined in regulatory standards such as NR-10, NR-15, and NR-17, ABNT standards, and books focused on ergonomics science. In the normative approach, the questionnaire was structured with five response options using the Likert scale.

In developing the questionnaire, an effort was made to mix positive and negative statements, reducing the potential for acquiescence bias. This tendency cited in the literature (Chyung, Barkin, and Shamsy, 2018) involves respondents tending to use the same response option, which is obviously undesirable in data collection.

After systematizing the data into structured databases, statistical and exploratory analysis was performed using R software (R Core Team, 2023), employing *klaR* (Weihs *et al.*, 2005) for unsupervised classification algorithms and *MASS* (Venables and Ripley, 2002) for advanced statistical methods.

The data were prepared for analysis with missing value treatment and appropriate nominal variable coding (Wickham and Grolemund, 2017). Determination of the ideal number of clusters was based on the elbow method, adapted for categorical data, and validated through group stability criteria (Kaufman and Rousseeuw, 1990). Implementation of *k*-modes allowed segmenting respondents into homogeneous

profiles, considering variables such as ergonomic environmental conditions, work-life balance, and psychosocial impacts.

Cluster interpretation was carried out by cross-referencing demographic and qualitative variables, highlighting priority groups for ergonomic interventions. This stage supported the proposal of customized actions, following recommendations from Hair *et al.* (2019) for multivariate analysis.

The resulting data from clustering were divided according to categories defined in the questionnaire and reprocessed in R using tidyverse and pheatmap packages. Original categorical variables (5-point Likert scale) were converted into ordinal values (0 to 4). Cluster means were calculated and subjected to two visualizations: (1) a hierarchical heatmap with color gradients and dendrograms to identify global patterns; and (2) a grouped bar chart (Set1 palette), highlighting specific differences between clusters. This dual approach allowed exploring complex relationships between groups and variables, ensuring clarity in interpreting interruption profiles.

## **4 RESULTS PRESENTATION**

The study analyzed the impacts of remote work on 49 respondents, distributed into four clusters based on their experiences and conditions during the pandemic. Most participants were female (87.8%), predominantly aged between 31 and 45 years (75.5%), working mainly in administrative roles (63.3%). It was observed that a large portion lived in houses with three or more people (83.7%), significantly influencing reported interruptions, such as family noise and household chores.

To capture the diversity of remote work experiences, a k-modes cluster analysis was performed on categorical variables, yielding four distinct profiles among the 49 respondents. Table 1 summarizes these clusters across key dimensions—demographics, workspace type, sources of interruption, focus strategies, infrastructure, organizational perceptions, and well-being outcomes—providing a comparative overview that anchors the subsequent thematic analysis.

**Table 1 - Summary of Cluster Characteristics in the Remote Work Sample**

Categorical Variables		Cluster (Size)			
		1 (14)	2 (9)	3 (17)	4 (9)
Profile	Gender	Female	Female	Male	Female
	Age group	31 to 45 year	46 to 55 years	31 to 45 year	31 to 45 year
	Family members	3 people	2 people	3 people	4 people
	remote work place	Shared	Dedicated	Dedicated	Adapted
Source of interruptions	Household chore	Frequently	Frequently	Occasionally	Very frequently
	Pets	Occasionally	Never	Occasionally	Very frequently
	Family	Frequently	Occasionally	Occasionally	Frequently
	Eating or drinking	Frequently	Occasionally	Frequently	Occasionally
	Neighbors	Occasionally	Never	Occasionally	Rarely
	Traffic	Rarely	Never	Never	Occasionally
	Friends	Rarely	Never	Never	Never
Attempts to Maintain Focus	Wake up earlier	Frequently	Often	Rarely	Frequently
	Set a time limit	Often	Frequently	Often	Sometimes
	Perform tasks simultaneously	Rarely	Never	Sometimes	Frequently
	Use headphones	Often	Never	Rarely	Frequently
	Working on holidays and rest change the household routine	Often	Never	Never	Frequently
		Often	Never	Never	Frequently
Juggling work and home results in:	Anxiety	Often	Never	Sometimes	Frequently
	Exhaustion	Often	Never	Sometimes	Frequently
	Lack of concentration	Often	Never	Sometimes	Often
	Irritability	Often	Never	Sometimes	Often
	Depression	Never	Never	Never	Never
Remote Work Infrastructure	Equipment	Very comfortable	Extremely comfortable	Comfortable	Comfortable
	Environment used	Comfortable	Extremely comfortable	Comfortable	Comfortable
	Table	Comfortable	Extremely comfortable	Comfortable	Slightly uncomfortable
	Chair	Uncomfortable	Extremely comfortable	Comfortable	Slightly uncomfortable
	Natural lighting	Comfortable	Very comfortable	Comfortable	Very comfortable
	Artificial lighting	Comfortable	Comfortable	Comfortable	Comfortable
Organizational Factors	Work time	Improved	Improved	Improved	Increased
	Contact between sectors	No change	Improved	No change	No change
	Team task	No change	Improved	No change	No change
	Contact with management	No change	No change	No change	No change
	Information in the section	No change	No change	No change	Decreased
	Contact with the team	No change	No change	Decreased	Decreased
	Tasks in the sector	Decreased	No change	Decreased	Decreased
	Information between sectors	Decreased	No change	No change	Decreased
Information in the sector	Decreased	No change	Decreased	Worsened	
Cognitive Issues	Motivation for flexible hours	Improved	Increased	Improved	No change
	concentration	Improved	Increased	Improved	Decreased
	Work overload	No change	No change	No change	Increased
	Interference from others	Improved	Decreased	Improved	Decreased
Improvements from Performing Remote Work	Quality of diet	Improved	Increased	Improved	No change
	Family bonds	Improved	Increased	No change	No change
	Quality of life	Improved	Increased	Improved	Decreased
	Physical activities	No change	Increased	Improved	No change
	Relationship with neighbors	No change	No change	No change	No change
	Circles of friends	No change	No change	No change	No change

Source: The authors (2025).

Cluster analysis revealed four distinct profiles among remote workers. The first group, mostly women aged 31 to 45, works in shared spaces and deals with frequent interruptions—particularly from household chores and family members. To stay focused, many wake up earlier or use headphones, yet they still report anxiety,

exhaustion, and irritability more often than others. The second group consists of women aged 46 to 55 who work in dedicated spaces with highly comfortable furniture and lighting. Interruptions are rare, and this group consistently reports improvements in communication, teamwork, and emotional well-being.

The third group is predominantly male, also using a dedicated workspace and living with three people. While they face fewer distractions, some still describe moderate overload and occasional emotional strain. Their experience is balanced: they gain in areas like physical activity and diet, but lose in team contact and sector coordination. And the fourth group, again women aged 31 to 45 but living with four people, stands out for the most challenging conditions. They use adapted, often uncomfortable setups—chairs and desks are only slightly adequate—and interruptions are constant, especially from pets and domestic tasks. This group reports declining concentration, rising workload, deteriorating quality of life, and weaker communication with colleagues. Interestingly, no respondents across any group mentioned depression.

#### **4.1 Cluster Analysis in Remote Work Contexts**

The study analyzed the impacts of remote work on 49 respondents, distributed into four clusters based on variables related to their experiences and working conditions during the pandemic. The majority of participants were female (87.8%), predominantly aged between 31 and 45 years (75.5%), aligning with global trends showing higher remote work adoption among mid-career professionals (Bloom *et al.*, 2015). Administrative roles dominated (63.3%), possibly due to the feasibility of task digitization (Golden & Gajendran, 2019). It was observed that most respondents lived in houses with three or more people (83.7%), which significantly influenced reported interruptions, such as family noise, household chores, and caring for children or elderly individuals. Although many reported improvements in quality of life (57.1%) and increased family ties (42.9%), a significant portion faced challenges such as stress (36.7%) and difficulty maintaining focus at work (40.8%). Data also revealed disparities in workplace comfort, with 44.9% classifying the space as comfortable or very comfortable, while others faced issues with natural lighting (20.4%) and inadequate furniture (16.3%). These findings highlight the heterogeneity of remote work

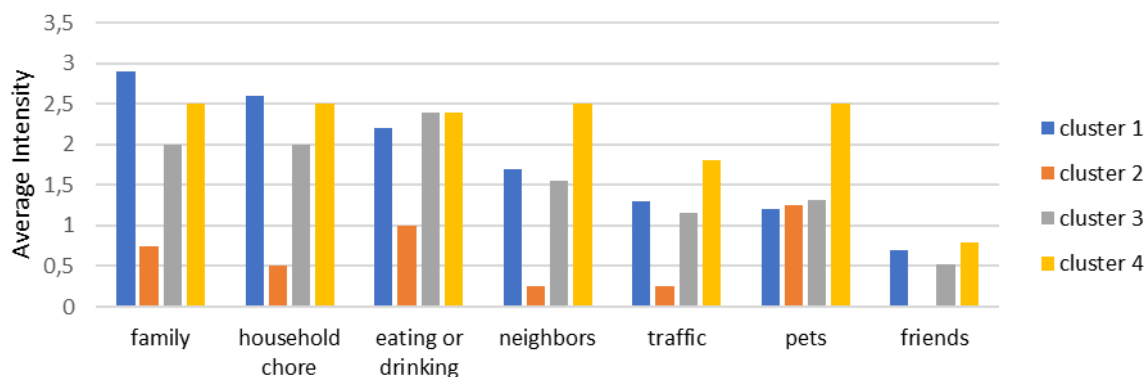
experiences, pointing to both opportunities and challenges to improve working conditions in this format.

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These results highlight the diversity of experiences in remote work, indicating both opportunities and challenges to improve working conditions in this format.

Unlike the corporate work environment, where the space was specifically designed for task execution, starting remote work introduced various situations that could influence performance. Figure 1 sought to analyze situations that might cause interruptions.

**Figure 1 - Average Interruptions by Clusters**



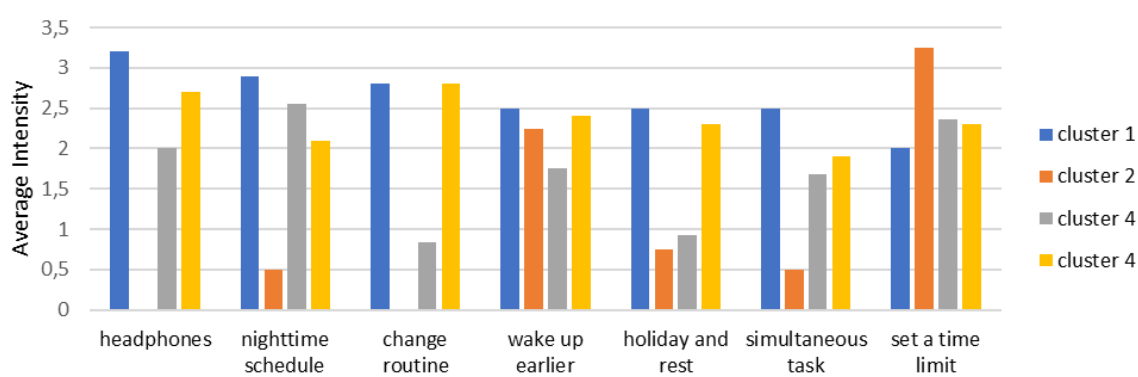
**Source:** The authors (2025).

When asked about the types of interruptions faced while working remotely, respondents identified several situations that could impact concentration. Among the most frequent were interruptions caused by family members and the temptation to perform household tasks or address personal needs (such as eating, drinking, or going shopping), which were cited as the primary sources of distraction. These findings align with those reported by Choudhury *et al.* (2021), who emphasize the challenge of blurred boundaries between work and domestic life in remote settings. Strategies such

as using headphones (Figure 4) reflect recommendations by Filardi *et al.* (2020) to mitigate environmental noise. Additionally, neighbor noise and traffic sounds were also noted as significant factors affecting focus.

Faced with the challenges posed by interruptions in remote work, professionals often adopt measures to minimize the impact of distractions and maintain productivity. Figure 2 presents the most commonly used strategies by respondents to preserve focus during task execution.

**Figure 2 - Average Attempts to Maintain Focus**



**Source:** The authors (2025).

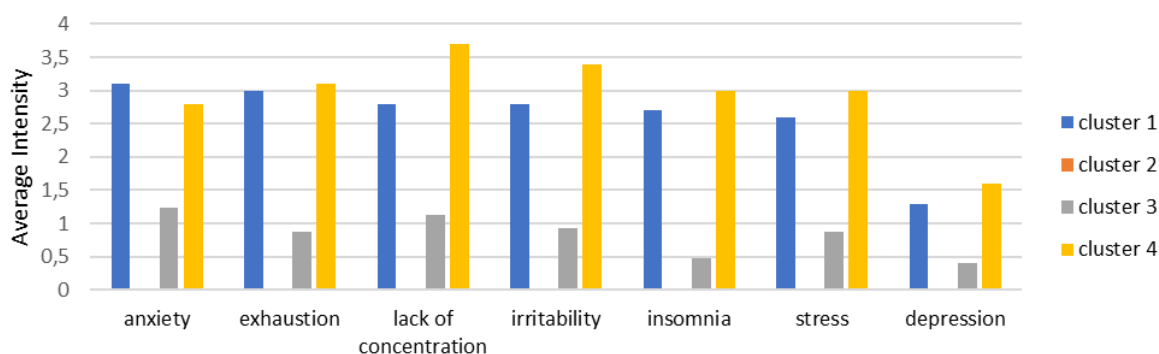
Among the most common measures is the use of headphones, highlighted as a practical solution to isolate external sounds and create a more conducive environment for concentration. Additionally, many professionals reported setting specific hours for their activities, aiming to establish a more organized and efficient routine. Another widely mentioned strategy was starting work earlier, taking advantage of the early hours of the day when the environment tends to be quieter and less prone to interruptions. Working during alternate hours, such as at night, was also practiced by some, especially to avoid distractions caused by other family members or external noises.

Furthermore, there were reports of professionals opting to adjust their household routines, negotiating hours and spaces with other residents to reduce conflicts and ensure longer periods of tranquility for work. In some cases, household and professional tasks were performed simultaneously as a way to optimize available time. Curiously, some respondents admitted to working even on holidays or rest days,

indicating pressure to meet deadlines and maintain productivity amidst remote work adversities.

Performing household and professional tasks simultaneously, a practice adopted by many remote workers, can generate an impact on physical and mental health. Figure 3 addresses the consequences of this overlap of responsibilities, highlighting how the need to reconcile these activities affected their well-being.

**Figure 3 - Results of Combining Household and Professional Tasks**



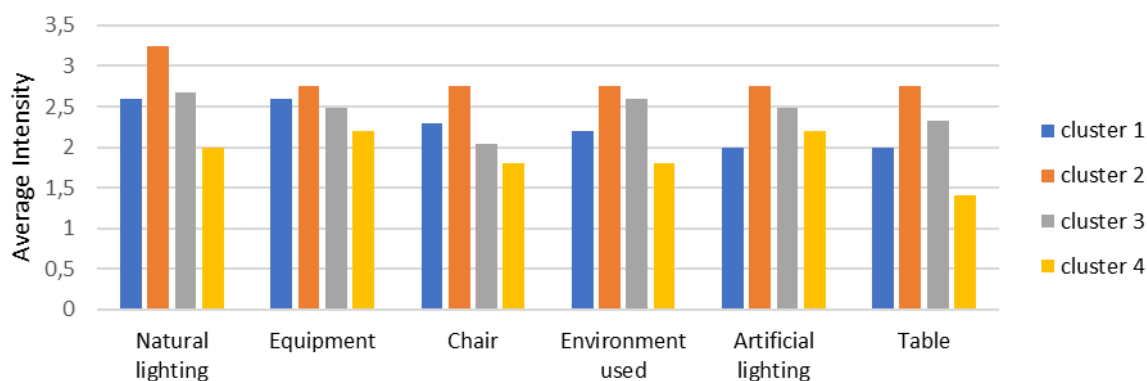
**Source:** The authors (2025).

Stress and exhaustion were frequently reported, echoing concerns raised by Platts *et al.* (2022) about mental health risks in enforced remote work, which emerge as direct consequences of attempting to balance multiple obligations in the same space and timeframe. Additionally, lack of concentration was widely reported, evidencing how this combination impairs focus and work efficiency. Other frequently cited symptoms include irritability, anxiety, and insomnia, potentially linked to increased daily pressures and difficulty separating work and rest periods. In some cases, respondents also reported more severe symptoms, such as depression, indicating that emotional and physical overload may evolve into more serious mental health conditions.

In remote work, it is common for professionals to adapt domestic spaces and equipment for use in their work activities. However, this adaptation does not always result in an ergonomic or suitable environment for efficient task performance. Figure 4 presents a detailed analysis of respondents' perceptions of their remote work infrastructure, considering aspects such as natural lighting, artificial lighting, furniture

(chairs and desks), technological equipment (computers, notebooks, tablets, etc.), and available physical space.

**Figure 4 - Evaluation of Remote Work Infrastructure**



**Source:** The authors (2025).

Figure 4 reveals that the infrastructure of remote workspaces adapted by professionals presents significant challenges. Natural lighting stands out as a positive aspect, with higher evaluations across all clusters, indicating that many individuals can benefit from sufficient sunlight while working. However, artificial lighting receives lower ratings, suggesting that the available artificial lighting is either inadequate or uncomfortable for prolonged work sessions. While natural lighting was widely praised, the inadequacy of artificial lighting reflects broader ergonomic gaps highlighted by Burton *et al.* (2021), who emphasize the need for employer investments in home-office setups to prevent long-term health issues.

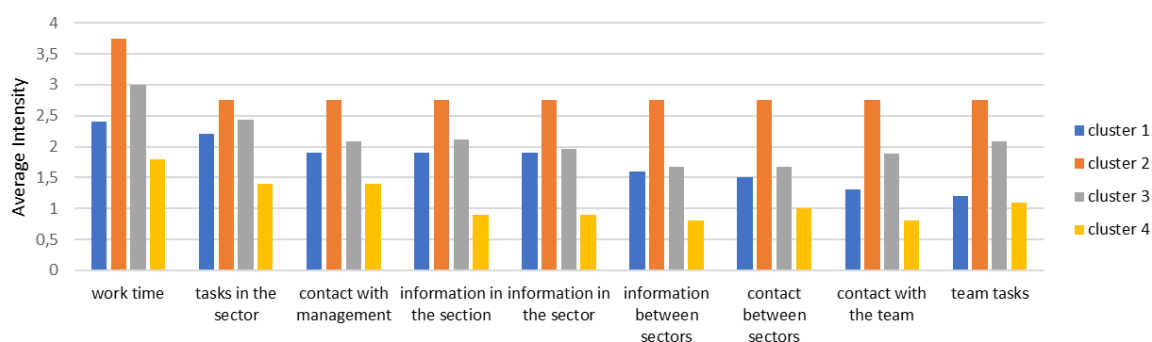
Regarding furniture, chairs and desks receive moderate evaluations, varying between clusters. This indicates that while some may have access to ergonomic chairs and desks, others face difficulties with inadequate equipment, which can lead to physical discomfort and even long-term health issues.

Technological equipment is also evaluated moderately, with some variations between clusters. Although many have access to computers, notebooks, or tablets, the quality and performance of these devices may be insufficient to meet remote work demands, especially when compared to equipment provided by companies in traditional offices.

The physical space used for remote work is another critical aspect. Evaluations vary considerably between clusters, with some reporting reduced or shared environments that limit organization and increase the likelihood of distractions. This lack of a dedicated workspace exclusively for work can hinder concentration and make it difficult to maintain healthy routines.

Organizational factors play a crucial role in the success of remote work, and Figure 5 illustrates how different aspects of organizational structure can impact professional performance. By analyzing the results presented in the figure, it is possible to identify areas requiring special attention to ensure a more efficient and productive remote work experience.

**Figure 5 - Organizational Factors**



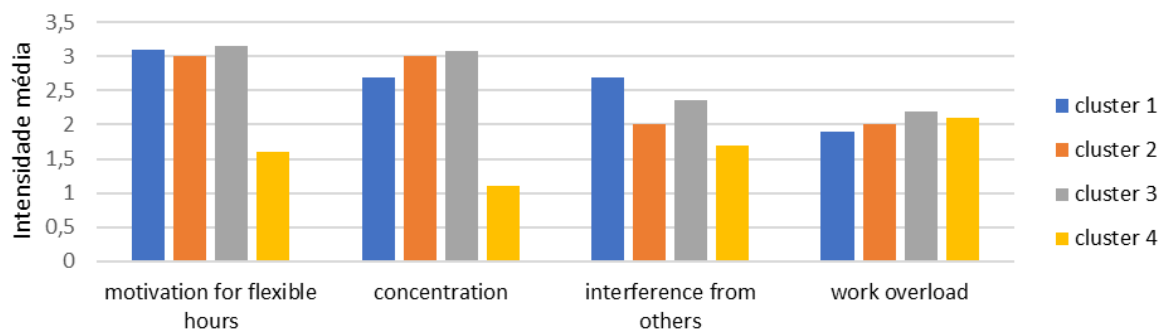
**Source:** The authors (2025).

Communication is a central element, with varied evaluations between clusters. Contact with management and between departments receives low evaluations, indicating barriers in disseminating information and coordinating between different hierarchical levels and departments. This can result in strategic misalignments and decision-making difficulties.

Information exchange within the sector and team is positively evaluated, suggesting that these channels are relatively well-established. However, interdepartmental relations and teamwork tasks require attention, as they present moderate evaluations, indicating possible challenges in collaboration and team integration. Working hours are another relevant aspect, with varied evaluations between clusters. While some professionals benefit from flexibility, others may face difficulties managing time and balancing personal and professional life.

The physical and mental health of team members is fundamental for effective task performance, especially in the context of remote work. Figure 6 explores cognitive aspects that may influence productivity and well-being, focusing on four main areas: task concentration, interference from others, motivation due to flexible hours, and workload.

**Figure 6 - Cognitive Issues**



**Source:** The authors (2025).

Concentration on tasks emerges as a crucial element, with evaluations varying significantly between clusters. While some groups demonstrated a strong ability to maintain focus (Clusters 1, 2, and 3), others reported notable difficulties in this regard (Cluster 4). These challenges can be attributed to environmental factors, such as domestic interruptions or the lack of an adequate workspace, as well as personal issues related to time management and task organization. The struggles with concentration align with studies linking home-office interruptions to cognitive overload (Kowalski & Ślebarska, 2022).

Interference from others also stands out as an important challenge. The results indicate that this issue negatively affects productivity, especially in Clusters 1 and 3. The presence of family members, friends, or even pets can distract professionals, compromising their ability to perform complex tasks that require full attention. Additionally, the lack of clear boundaries between personal and professional life can intensify this problem, making it difficult to establish uninterrupted work periods.

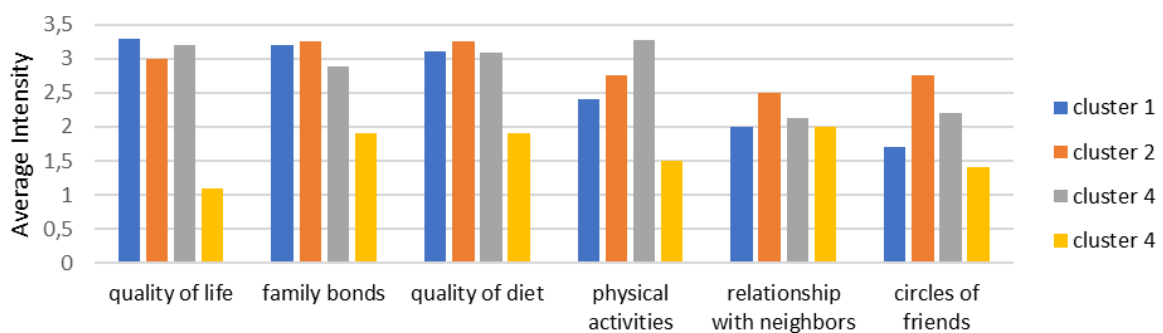
On the other hand, motivation due to flexible hours appears as a positive factor for most respondents. Clusters 1, 2, and 3 demonstrated high satisfaction levels with

the possibility of adapting their work hours, suggesting that this characteristic of remote work contributes to increasing motivation and engagement. However, Cluster 4 showed a lower evaluation, indicating that not everyone benefits equally from this flexibility, possibly due to difficulties in adequately managing free time or additional pressures that nullify expected benefits.

Finally, workload emerges as a critical point requiring special attention. Although Clusters 1 and 2 reported moderate workload levels, Clusters 3 and 4 indicated significantly higher indices. This may be related to inadequate task distribution, excessive expectations from the company, or difficulties in establishing boundaries between work and personal life. Long-term, excessive workload can lead to physical and mental burnout, harming not only productivity but also overall employee health.

The opportunity to perform remote work can bring various improvements for workers, and Figure 7 seeks to understand how this modality impacts different aspects of personal life. By analyzing respondents' answers regarding quality of life, physical activities, relationships with neighbors, dietary quality, family ties, and social circles, it is possible to identify areas that significantly benefit from this change.

**Figure 7 - Improvements from Performing Remote Work**



**Source:** The authors (2025).

The improvements in quality of life illustrated in Figure 9 support the findings of Bloom *et al.* (2015), who associate remote work with reduced commuting stress and increased personal autonomy. However, the moderate evaluations of social circles highlight potential isolation risks, as cautioned by Gomes (2021), despite high

evaluations across all clusters. This suggests that flexible hours and reduced commuting time contribute significantly to an overall sense of well-being and satisfaction. Additionally, dietary quality received positive evaluations, indicating that many professionals are able to adopt healthier eating habits due to greater control over their meals throughout the day.

Family ties are another aspect that significantly benefits from remote work, with elevated evaluations across all clusters. The possibility of spending more time with family and participating in household activities can strengthen these bonds and promote a healthier work-life balance. However, relationships with neighbors did not show significant changes, suggesting that remote work does not significantly affect this type of social interaction.

Physical activities and social circles receive moderate evaluations, varying between clusters. While some professionals report having more time to exercise and stay in touch with friends, others may struggle to establish physical activity routines or feel socially isolated due to the lack of in-person interactions in the workplace.

## **5 FINAL CONSIDERATIONS**

Remote work, from an ergonomic perspective, focuses on areas of knowledge such as satisfaction, emotional aspects, ergonomics, and human factors (Zugliani Bortolan *et al.*, 2021).

The study showed that the implementation of remote work transformed task execution, presenting both positive and negative points. Focusing on the positives can contribute to enhancing organizational resources and work effectiveness (Kowalski and Ślebarska, 2022).

Starting from the principle that change can be a problem for humans, despite this, the study shows a sense of satisfaction, acceptability, or tolerance with the new work relationship imposed by the pandemic, expressed by responses to diverse conditions and variables in the home office environment.

Impacts of remote work were analyzed across different dimensions, from organizational and cognitive aspects to available infrastructure and worker well-being. Data analysis revealed significant heterogeneity in respondent experiences, distributed into four clusters with distinct profiles. While some professionals reported

improvements in quality of life, family ties, and flexible hours, others faced challenges such as excessive workload, difficulty maintaining focus, and discomfort in the work environment. These results reinforce that remote work is not a homogeneous experience and that its implementation requires attention to individual and contextual particularities.

The importance of organizational policies promoting adequate conditions for remote work is emphasized. Efficient communication between managers, teams, and departments was identified as a critical point, especially considering observed strategic misalignments and hierarchical barriers. Additionally, domestic infrastructure adapted for work, often inadequate in terms of furniture, lighting, and physical space, demonstrates the need for company investments to ensure ergonomic and healthy environments. As noted by Golden and Gajendran (2019), the quality of the workspace directly influences productivity and employee well-being, making it essential to mitigate risks associated with prolonged hours in inadequate postures or exposure to poor conditions.

A relevant aspect is the impact of remote work on the physical and mental health of professionals. The combination of household and work tasks, coupled with the lack of clear boundaries between personal and professional life, can result in stress, anxiety, and burnout. This phenomenon aligns with discussions by Choudhury *et al.* (2021), who emphasize the risks of "always-on work" and the need for practices promoting balance between personal and professional spheres. In this sense, flexible hours, although seen as a benefit by most respondents, should be accompanied by guidance on time management and self-care.

Finally, gains related to quality of life, diet, and family ties highlight the potential benefits of remote work when properly implemented. However, areas such as physical activity and social interactions require special attention to prevent isolation and sedentary lifestyles. As suggested by Bloom *et al.* (2015), adopting hybrid models that combine remote and in-office work may be a viable solution to balance productivity and well-being.

In summary, remote work presents both opportunities and challenges that must be strategically addressed. Investing in technology, ergonomics, psychological support, and clear management policies are essential steps to maximize the benefits

of this modality and mitigate its negative impacts. Future research could explore specific interventions and their long-term impacts, contributing to the development of more inclusive and sustainable practices in the context of remote work.

It is hoped that the proposed objectives and goals will be sufficient to achieve the intended improvements in adapting to the home office environment.

This work can be complemented with identifications of new problems, fueled by other questions, and new considerations can be added to these, with the aim of contributing to the remote work tool, which undoubtedly has become a solid work tool for the modern world.

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