

#### RESEARCH ARTICLE



# PROPOSAL OF A MODEL FOR EVALUATING SATISFACTION WITH THE PHYSICAL WORK ENVIRONMENT IN EDUCATIONAL INSTITUTIONS

PROPOSIÇÃO DE UM MODELO DE AVALIAÇÃO DE SATISFAÇÃO COM O AMBIENTE FÍSICO DE TRABALHO EM INSTITUIÇÕES DE ENSINO

#### <sup>1</sup> Rodrigo Tusset

Universidade de Caxias do Sul (UCS), São Paulo (Brazil). **Orcid:** https://orcid.org/0009-0008-2176-5586

<sup>2</sup> Guilherme Bergmann Borges Vieira

Universidade de Caxias do Sul (UCS), São Paulo (Brazil). **Orcid:** https://orcid.org/0000-0001-6463-9987

#### <sup>3</sup> Fernanda Lazzari

Universidade de Caxias do Sul (UCS), São Paulo (Brazil). **Orcid:** https://orcid.org/0000-0002-6480-0547

#### <sup>4</sup> Roberto Birch

Universidade de Caxias do Sul (UCS), São Paulo (Brazil). **Orcid:** https://orcid.org/0000-0002-6451-9034

#### Corresponding Author: Rodrigo Tusset E-mail: <u>rtusset@gmail.com</u>

**Editora chefe** Dra. Eliana A. Severo Universidade Federal de Pernambuco (UFPE), Brazil.

#### How to cite this article:

Tusset, R., Borges Vieira, G. B., Lazzari, F., & Gonçalves, R. B. (2025). Proposal of a model for evaluating satisfaction with the physical work environment in educational institutions. *Journal of Sustainable Competitive Intelligence*, *15*(00), e0467. https://doi.org/10.24883/eagleSustaina ble.v15i.467

# ABSTRACT

**Purpose:** Propose a model for evaluating satisfaction with the physical work environment in educational institutions, emphasizing variables such as lighting, ventilation, color, noise, and indoor plants to identify improvements that enhance worker satisfaction.

**Methodology/approach:** Literature review and theoreticalpropositional development. The research was based on academic articles that explore the impact of the physical environment on employee satisfaction. Identified variables were grouped and analyzed based on their relevance to the environment of educational institutions.

**Originality/Relevance:** Proposal of a model adaptable to public educational institutions, focusing on variables that affect satisfaction and contributing to management with a tool for improving the physical work environment.

**Key findings:** The physical work environment directly affects employee satisfaction. Improvements in lighting, ventilation, color, noise, and indoor plants can increase worker satisfaction, well-being, and productivity. The proposed model provides a foundation for future interventions and adjustments in the physical environment, adapting to the specific needs of each institution.

**Theoretical/methodological contributions:** The study provides a conceptual basis for creating a more favorable physical environment in public educational institutions, contributing to the debate on job satisfaction. It is recommended to apply a quantitative approach using questionnaires in future research to validate the model.

**Keywords:** Physical work environment; Satisfaction; Evaluation model; Educational institutions.

DOI: https://doi.org/10.24883/eagleSustainable.v15i.467





#### RESUMO

**Objetivo:** Propor um modelo de avaliação da satisfação com o ambiente físico de trabalho em instituições de ensino, enfatizando variáveis como iluminação, ventilação, cor, ruído e plantas internas, para identificar melhorias que aumentem a satisfação dos trabalhadores.

**Metodologia/abordagem:** Revisão da literatura e desenvolvimento teóricopropositivo. A pesquisa foi embasada em artigos acadêmicos que exploram o impacto do ambiente físico na satisfação dos colaboradores. Variáveis identificadas foram agrupadas e analisadas em função de sua relevância para o ambiente de instituições de ensino.

**Originalidade/Relevância:** Proposta de um modelo adaptável às instituições públicas de ensino, focando em variáveis que afetam a satisfação e contribuindo para a gestão com uma ferramenta de melhoria do ambiente físico de trabalho.

**Principais conclusões:** O ambiente físico de trabalho afeta a satisfação dos colaboradores. Melhorias nas condições de iluminação, ventilação, cores, ruído e plantas internas podem aumentar a satisfação, o bem-estar e a produtividade dos trabalhadores. O modelo proposto oferece uma base para futuras intervenções e ajustes no ambiente físico, adaptando-se às necessidades específicas de cada instituição.

**Contribuições teóricas/metodológicas:** O estudo oferece uma base conceitual para criar um ambiente físico mais favorável em instituições públicas de ensino, contribuindo para o debate sobre a satisfação no trabalho. Sugere-se a aplicação de uma abordagem quantitativa, utilizando questionários, em futuras pesquisas para validar o modelo.

**Palavras-chave:** Ambiente físico de trabalho; Satisfação; Modelo de Avaliação; Instituições de ensino.

# **1 INTRODUCTION**

The physical work environment of service providers has received increasing attention in recent decades (Schilleci, 2023), and organizations are increasingly recognizing its direct influence on employees' well-being and productivity (Hikmah Perkasa et al., 2023; Saeed & Waghule, 2021). In this context, the physical environment has been considered not only a space for carrying out work activities but also a strategic element to enhance organizational performance.

However, the lack of adequate tools to measure physical environment variables hinders the development of management initiatives aimed at promoting comfortable and productive work environments (Riwukore, 2022). Furthermore, as observed by Schilleci (2023), most studies on the physical environment focus on private spaces, highlighting a relative scarcity of such studies related to the public sector.

In this context, the present study aims to contribute to the literature on the topic by proposing a conceptual model for evaluating the physical work environment in public educational institutions and its relationship with employee satisfaction. The proposed model seeks to provide a practical tool for managers, enabling improvements in the work environment of public educational institutions and, consequently, in employee satisfaction. In this regard, the application of the model can provide valuable insights for work environment management, contributing to employees' well-being and the increase in institutional productivity.

Therefore, the study addresses a relevant issue for both academia and human resources management practice, by proposing a model applicable to educational contexts that can be adapted according to the specificities of each institution. Based on the proposed model, it is expected to contribute to a more in-depth discussion on the influence of the physical work environment on employee satisfaction.

The article is structured into five sections, including the present introduction. Section 2 presents the theoretical framework, which covers the historical evolution of the physical structure of work environments and the key dimensions identified. Section 3, in turn, details the methodology used in the research. In Section 4, the proposed conceptual model is presented. Finally, Section 5 concludes the article with a summary of its main contributions, as well as practical implications, limitations, and suggestions for future research.

# **2 THEORETICAL FRAMEWORK**

This section provides an overview of the historical evolution and characteristics of the physical work environment. Initially, the transformation of the physical structure of work environments over time will be explored. Next, the key dimensions of the environment identified in the literature review of this study are detailed. Finally, job satisfaction is presented, along with its concept and influence.

# 2.1 Physical Structure

Historically, the work environment has evolved from poor and hazardous conditions to an increasing recognition of its importance for workers' health and wellbeing. Since ancient times, work has been essential to human life, often carried out in conditions that compromised the safety and health of workers. Over time, the relationship between diseases and professional activities became more evident, especially after the Industrial Revolution, when workplace risks intensified (Timbó & Eufrásio, 2010).

The first records on the organization of labor, as cited by Ezzamel (2004), can be found in Ancient Egypt (2050–1780 B.C.), where practices of worker control and sanction were already documented. Furthermore, the relationship between environment and health was also highlighted by Hippocrates in his work *On Airs, Waters, and Places* in Ancient Greece, emphasizing the influence of the environment on health (Lawrence; Capon & Siri, 2017). During the Industrial Revolution, Friedrich Engels detailed the poor working conditions and the urgency for improvements, a topic that remains relevant (Engels, 2005). Donkin (2010) provides an overview of the evolution of working conditions since the Industrial Revolution, highlighting the progressive improvement in conditions and the increasing importance attributed to the work environment. In contemporary times, companies' neglect of the work environment is identified as a detrimental factor to employee performance (Spector, 1997). Recent studies, such as that by Nurfaijah and Gumilar (2024), emphasize the need to create favorable conditions to maximize employees' potential. The research by Campos and Carvalho (2022) supports this need by revealing low satisfaction with the physical work environment, highlighting its impact on satisfaction and performance among teachers.

The COVID-19 pandemic highlighted the importance of adapting workplaces to promote well-being and productivity. Innovation in workspace design, including the adaptation to remote and digital work, gained prominence (Kilner, 2020; Bartusevičienė & Valionienė, 2021). Spell and Bezrukova (2023) address the changes in the psychological contract between workers and management, emphasizing the need for continuous adjustments in work environments in response to public health crises.

The physical work environment is understood through various dimensions, including physical, chemical, biological, and socioeconomic aspects (Sunarto & Maulana, 2021). Magee et al. (2019) highlight how environmental stressors affect sleep and, consequently, the productivity and safety of employees. Studies on environmental design, such as those conducted by Dastpaak et al. (2019) and Ayoko and Ashkanasy (2019), show that factors like color, lighting, and ergonomics directly impact employee productivity and well-being. Specifically focusing on educational institutions, Peter et al. (2023) confirm the importance of factors such as ventilation, lighting, and the presence of plants in employee satisfaction.

Sunarto and Maulana (2021) emphasize that an adequate physical work environment is essential for organizational growth and employee well-being. As a result, there is a growing interest in creating environments that promote employee comfort and efficiency (Hikmah Perkasa et al., 2023), reinforcing the importance of continuously adapting workplaces to meet the needs of workers and organizational demands (Bartusevičienė & Valionienė, 2021; Spell & Bezrukova, 2023).

# 2.1.1 Key Dimensions

Table 1 presents the key dimensions of the physical work environment identified in the literature on the topic. The number of dimensions observed aligns with what was highlighted by Riwukore (2022), who emphasized that the variety of dimensions and indicators affecting the impact of the physical work environment can lead to difficulties or discrepancies in the scientific analysis of management initiatives aimed at creating a comfortable and satisfactory work environment. These difficulties or discrepancies, in turn, have significant implications for achieving organizational objectives.

<b>Fable 1</b> - Dimensions of the physical environment identified in the literature		
<b>Dimensions of the Physical Work Environment</b>	Authors	
Ergonomics	Almeida <i>et al.</i> (2019)	
Furniture and equipment design, air quality, temperature, sanitation, lighting, and noise.	Amin e Chakraborty (2022)	
Ergonomics, noise, lighting, design, thermal comfort, and location.	Biderci e Canbaz (2019)	
Environmental conditions (temperature, air quality, noise, music, odor, etc.), space/function (layout, equipment, furniture, etc.), and signs, symbols, and artifacts (signs, personal artifacts, decor style, etc.).	Bitner (1992)	
Hygiene and healthiness of the workplace, environment and physical space of the workplace, workplace lighting, workplace ventilation, and workplace air conditioning.	Campos e Carvalho (2022)	
Office layout, type of work, working hours, level of access to infrastructure and control equipment (windows, lighting, thermostat, etc.).	Chen <i>et al.</i> (2020)	
Biophilia.	Constantino e Amarães (2023)	
Noise.	Dastpaak <i>et al.</i> (2019)	
Physical structure (building design and physical location; furniture comfort, seating arrangements, open/closed offices), physical stimuli (removal of physical stimuli, introduction of physical stimuli, and organization/blocking of physical stimuli), and symbolic artifacts (signs of professional image, status signs, task efficacy signs, and aesthetic signs).	Davis (1985)	
Partitions and barriers in workspaces, adjustable work arrangements, personalized workspaces, and surrounding environments.	Elsbach e Pratt (2007)	
Built environment and technology.	Graciola <i>et al.</i> (2016)	
Office layout, lighting, furniture, and equipment.	Hamidi <i>et al.</i> (2020)	
Lighting, distraction-free space, ergonomic tools and furniture, adequate space, adjustable spaces and furniture, private space, customized space, window view, spaces for stress management, spaces for connection and idea communication, informal social spaces, non-hierarchical spaces, creative space, inspiring places - architectural planning, inspiring places - interior design, and brainstorming spaces.	Hoff e Öberg (2015)	
Poor lighting, cold work environment, hot work environment, low air quality, chemicals, noise, and hazardous tasks.	Magee <i>et al.</i> (2019)	
Color, lack of barriers, and comfort.	Kasuganti (2017)	
Exposure to nature.	Kazlauskaitė <i>et</i> <i>al.</i> (2023)	
Color and design, cleanliness and odor, music, lighting, and layout.	Kearney, Coughlan e Kennedy (2023)	
Workplace design/layout and lighting.	Khogare, Sarambekar e Manvar (2011)	

Space arrangement (layout and open vs. closed), indoor environment (air quality, lighting/natural light, temperature, acoustics, cleanliness, eco-friendly materials, color, and accessories), technological alignment (support technology and ergonomics), accessibility (ease of access, comfort of waiting/service areas), and symbolic characteristics.	Kim (2014)
Exposure to different types of risks (chemical/biological/gases/radioactive/bites).	Nasrallah <i>et al.</i> (2023)
Temperature, lighting, color, noise, and presence of indoor plants.	Peter <i>et al.</i> (2023)
Work equipment/facilities, lighting, air circulation, noise, color, air humidity, technology, mechanical vibrations in the workplace, bad odor at work, workplace decoration, music at work, voice in the workplace, safety agents in the workplace, building(s), a place to rest, worship space (prayer and worship area), transport facilities, pollution/contamination, cleanliness, and availability of facilities to address the spread of the COVID-19 pandemic.	Riwukore (2022)
Color, lighting, cleanliness, and space design	Sumardjono e Adiatama (2019)
Office decor, desk position, sanitation, and other physical conditions.	Taheri, Miah e Kamaruzzama n (2020)

**Source:** Developed by the authors (2024)

The analysis of the various dimensions of the physical work environment, as presented in Table 1, reveals the complexity and variety of elements that affect employees' experience. For example, proper lighting contributes to a more comfortable and productive environment (Hoff & Öberg, 2015), while air quality has a direct impact on employees' health and well-being (Magee et al., 2019). Noise, on the other hand, can serve as a source of distraction and stress, compromising concentration and performance (Dastpaak et al., 2019). The presence of plants, meanwhile, has been associated with increased satisfaction and productivity (Kazlauskaitė et al., 2023), and the use of pleasant colors can positively influence individuals' mood and motivation (Kasuganti, 2017). By considering these dimensions in an integrated manner, it is possible to develop a conceptual model to assess the satisfaction of employees in public educational institutions regarding the physical work environment.

Based on Table 2, the variables of the physical work environment were grouped into categories to consolidate similar or related variables. Among the main variables, lighting was identified with 13 occurrences; temperature with 10 occurrences; noise with 9 occurrences; sanitation/hygiene/cleaning and space design with 7 occurrences each; and ventilation and color with 6 occurrences each. In addition to these, other variables such as odor, indoor plants, technology, music, artifacts, and symbols were also mentioned, but less frequently. In total, 144 occurrences were identified, grouped into 65 physical environment variables, which were categorized into 21 main categories.

No.	Category	Variables	Occurrence
1	Environment and Physical Space	Surrounding environment (1), built environment (1), physical environment (1), adequate space (1), creative space (1), distraction-free space (1), space for connection, communication, and ideas (1), non-hierarchical spaces (1), customized/personalized spaces (2), private spaces (1),	13
2	Color	informal social spaces (1), and building (1) Color (6)	6
3	Design and Decoration	- interior design (7), workplace decoration (3), inspiring places - interior design (1), and inspiring places - architectural planning (1)	12
4	Ergonomics and Comfort	Ergonomics (4), comfort (1), comfort of waiting and service areas (1), and comfort of furniture (1)	7
5	Lighting, Ventilation, and Temperature	Lighting (13), ventilation (6), and temperature (1)	29
6	Acoustics and Noise	Noise/acoustics (9) and Music (3)	12
7	Furniture and Equipment	Furniture and Equipment (4)	4
8	Biophilia and Nature	Biophilia (1), exposure to nature (1), and indoor plants (1)	3
9	Safety and Health	Work safety agents (1), COVID-19 (1), exposure to different types of risks (1), hazardous tasks (1), chemicals (1), and pollution (1)	6
10	Arrangements and Layout	Adjustable work arrangements (2), seating arrangement and layout (2), partitions and barriers (2), layout (5), open/closed offices (2), and desk positioning (1)	14
11	Technology and Others	Technology (3), eco-friendly materials (1), and accessories (1)	5
12	Hygiene and Sanitation	Sanitation/Hygiene/Cleaning (7)	7
13	Physical and Environmental Conditions	Other physical conditions (1)	1
14	Spaces for Specific Activities	Brainstorming spaces (1), stress management spaces (1), worship area (1), and a resting area (1)	4
15	Location	Location (2)	2
16	Artifacts and Symbolism	Artifacts (5), symbols (1), and signs (1)	7
17	Work Hours and Type of Work	Working hours (1) and type of work (1)	2
18	Accessibility and Transportation	Ease of access (1) and transportation facilities (1)	2
19	Odor	Odor (3)	3
20	Visibility and Windows	Windows (1) and window view (1)	2
21	Stimuli and Vibrations	Introduction of physical stimuli (1), removal of physical stimuli (1), and mechanical vibrations (1)	3
21	TOTAL	65	144

**Source:** Developed by the authors (2024)

Specifically analyzing studies conducted in educational institutions, Peter et al. (2023) identified five main dimensions for assessing the physical work environment. These are: i) lighting, which refers to the quality of both natural and artificial lighting in the work environment, considering its adequacy to the tasks performed by the employees; ii) ventilation, which includes air circulation, temperature, and air quality in the environment, factors that directly impact workers' comfort and health; iii) the presence of plants, supported by emerging literature suggesting potential benefits, addressing an identified gap; iv) color, which pertains to the color palette used in the workplace, potentially affecting individuals' emotional state and productivity; and v) noise, which refers to the presence of unwanted sounds in the work environment, which can compromise employees' concentration and well-being.

#### 2.2 Job Satisfaction

Job satisfaction is a complex and subjective concept that varies significantly between individuals and different contexts (Carlotto & Câmara, 2008). In early studies, which emerged during the World Wars, the focus was on emotions, attitudes, and personality (Judge et al., 2017). Since then, the understanding of attitudes toward work and their impact on organizational behavior has deepened (Saner & Eyupoglu, 2015).

Job satisfaction is the emotional evaluation of professional activities, reflecting whether individuals have a positive or negative view of their work and work environment (Pushpakumari, 2008). Locke (1976) defines it as a positive emotional state resulting from work or professional experiences. This evaluation continues to be a key focus of study in organizational behavior, investigating the factors that influence satisfaction and its importance for companies (Schneider & Vaught, 1993; Rao & Karumuri, 2019).

Job satisfaction directly impacts employees' well-being and organizational productivity. Studies show that high levels of satisfaction are associated with a lower intention to leave the job (Kasalak & Dagyar, 2020). Factors such as satisfaction with management, colleagues, physical environment, and benefits play an important role in productivity and organizational success (Kusku, 2001). Job satisfaction goes beyond personal expectations and experiences, encompassing motivation, loyalty, and professional achievement (Monem & Al-Majeed, 2023).

According to Trivellas, Reklitis, and Platis (2013), job satisfaction is essential for service quality, and its dimensions have a significant influence on employees' effectiveness and productivity (Kusku, 2001). Among these dimensions, aspects related to the physical work environment stand out (Kearney, Coughlan & Kennedy, 2023; Riwukore, 2022), which form the focus of the present study.

# **3 METHOD**

This article adopts a theoretical-propositional approach, based on a literature review, with the aim of identifying the main dimensions of the physical work

environment that impact employee satisfaction in educational institutions. Based on this analysis, the study proposes a model to assess the influence of physical environment characteristics on employee satisfaction.

The choice of variables that make up the proposed model is supported by a literature review on the influence of the physical work environment on satisfaction and, more specifically, by the analysis of Peter et al. (2023), who identified the variables lighting, ventilation, color, presence of indoor plants, and noise as essential in an educational institution. The development of the model is based on two key steps: i) identification of the most relevant dimensions of the physical work environment; and ii) the relationship between these dimensions and employee satisfaction.

The first dimension of the model (physical work environment) focuses on the five elements identified by Peter et al. (2023): ventilation, lighting, color, noise, and the presence of indoor plants. The second dimension (employee satisfaction) is based on two variables: i) overall satisfaction with the physical work environment, which measures employees' satisfaction with the various dimensions and factors that make up the physical environment; and ii) satisfaction with working conditions as a whole, which refers to the employees' overall perception of their work, encompassing both physical aspects and other factors influencing satisfaction in the educational context.

#### **4 PROPOSED MODEL**

The proposed model seeks to provide a deeper understanding of how the physical environment affects worker satisfaction in educational contexts, structured into two main dimensions: the physical work environment (divided into five independent variables) and satisfaction (composed of two dependent variables). The analysis of the relationships between the independent and dependent variables will allow for a detailed assessment of the influence that physical aspects have on satisfaction in the work environment.

Figure 1 presents a graphical representation of the proposed model, highlighting the connections between the variables of the two dimensions. The figure illustrates how the variables of the physical work environment (lighting, ventilation, color, indoor plants, and noise) are interconnected with the satisfaction variables (overall satisfaction with the physical work environment and satisfaction with the work as a whole), demonstrating the mediating role of the physical environment in employee satisfaction.



**Figure 1.** Proposed Model **Source:** Developed by the authors (2024)

For the application of the conceptual model by public educational institutions, a quantitative approach is recommended, with data collection being carried out through a structured questionnaire. This questionnaire allows the assessment of employees' perceptions regarding the five variables of the physical work environment (lighting, ventilation, color, presence of indoor plants, and noise) and the two variables related to satisfaction (overall satisfaction with the physical work environment and overall satisfaction with the work as a whole). The collected data can be analyzed using multiple linear regression, allowing the identification of the relationship between the independent and dependent variables. In total, it is suggested to apply seven regression analyses to explore the different relationships between the variables (Table 3).

System / Dependent Variable	Description	Independent Variable
Regression 1 - Lighting	Analyze the relationship between the quality of lighting (natural and artificial), lighting uniformity, and adjustable lighting.	Overall satisfaction with lighting.
Regression 2 - Ventilation	Analyze the relationship between natural ventilation, mechanical ventilation, air circulation, and air quality.	Satisfaction with ventilation.
Regression 3 - Color	Analyze the relationship between wall colors, furniture colors, concentration, and the stimuli generated by colors without causing fatigue.	Satisfaction with color.
Regression 4 - Indoor Plants	Analyze the relationship between the presence of plants, plant care and aesthetics, plant arrangement, and the quantity of plants.	Satisfaction with indoor plants.
Regression 5 - Noise	Analyze the relationship between the silence of the environment, external	Satisfaction with acoustics.

 Table 3 - Multiple linear regression system

	noise, internal noise, and proper	
	acoustics.	
	It will analyze the relationship between	Satisfaction with the
Regression 6 – Overall	the overall satisfaction with each of the	physical work
satisfaction with each of the 5	five physical environment variables and	environment of the
physical environment variables	satisfaction with the physical work	public educational
	environment.	institution.
	It will analyze the relationship between	Satisfaction with the
Pagragion 7 Quarall	the overall satisfaction with each of the	general working
Regression / – Overall	five physical environment variables and	conditions of the
sausraction with the work	satisfaction with the general working	public educational
	conditions.	institution.

Source: Developed by the authors (2024)

These analyses provide insight into how different dimensions of the physical environment affect the satisfaction of workers in a public educational institution. Additionally, the analyses also help identify which physical environment variables are most important for satisfaction.

# **5 FINAL CONSIDERATIONS**

The model proposed in this study has several practical implications for managers and those responsible for the administration of work environments in educational institutions and other types of organizations. Implementing strategies to improve lighting, optimize ventilation, select appropriate colors, incorporate plants, and control noise can lead to a more satisfactory and productive work environment. Additionally, the proposed evaluation model offers a structured approach to identifying and prioritizing necessary interventions, facilitating the creation of a work environment that meets employees' needs, promotes their well-being, and enhances their satisfaction.

However, despite its contributions, it is also important to acknowledge some limitations of this study. The first concerns the literature review, which may have been affected by the specific selection of the Google Scholar database, potentially missing some relevant studies. Additionally, although the proposed conceptual model is comprehensive, it does not encompass all factors that may influence employee satisfaction, such as individual characteristics and organizational culture. These limitations indicate that the results of this study should be interpreted with caution and suggest the need for future applications of the model to ensure its validation.

Although this study has provided a foundation for understanding the variables of the physical work environment, several areas remain open for future research. Additional studies could investigate the interaction between physical environment variables and their combined influence on worker satisfaction and productivity. Furthermore, it would be valuable to explore how different types of work environments (e.g., offices, classrooms, laboratories) may require specific approaches to improving physical conditions. Applying the evaluation model in different contexts and sectors could also provide further insights into its effectiveness and adaptability. Finally, given the wide range of variables associated with the physical work environment, literature reviews are recommended to identify the most important variables in academic settings and their relationship with employee satisfaction.

# REFERENCES

- Almeida, M. A. R. P., et al. (2019). Effects of an ergonomic program on the quality of life and work performance of university staff with physical disabilities: A clinical trial with three-month follow-up. *Disability and Health Journal*, 12(1), 58-64. <u>https://doi.org/10.1016/j.dhjo.2018.07.002</u>
- Amin, M. A., & Chakraborty, A. (2022). Impact of physical factors of workplace environment on workers' performance in industry. *Journal of Engineering Science*, 12(3), 57-66. <u>https://doi.org/10.3329/jes.v12i3.57479</u>
- Ayoko, O. B., & Ashkanasy, N. M. (2019). Introduction: Organizational behaviour and the physical environment. In O. B. Ayoko & N. M. Ashkanasy (Eds.), *Organizational behaviour* and the physical environment (pp. 3-12). Routledge. <u>https://doi.org/10.4324/9781315167237</u>
- Bartusevičienė, I., & Valionienė, E. (2021). Smart workplace: Students' opinion on being prepared to meet digitalization challenges. In *Proceedings of the 25th International Scientific Conference Transport Means* (pp. 61-65).
- Biderci, H., & Canbaz, B. (2019). Ergonomic room selection with intuitive fuzzy TOPSIS Method. *Procedia Computer Science*, 158, 58-67. <u>https://doi.org/10.1016/j.procs.2019.09.153</u>
- Bitner, M. J. (1992). Servicescapes: The impact of physical surroundings on customers and employees. *Journal of Marketing*, 56(2), 57-71. <u>https://doi.org/10.1177/002224299205600205</u>
- Campos, E. V., & Carvalho, A. (2022). Perfil e satisfação no trabalho de professores universitários de uma instituição federal de ensino de Mato Grosso do Sul. *Revista Ibero-Americana de Humanidades, Ciências e Educação: REASE*, 8(5), 1921-1931.
- Carlotto, M. S., & Câmara, S. G. (2008). Propriedades psicométricas do Questionário de Satisfação no Trabalho (S20/23). *Psico-USF*, 13(2), 203-210. <u>https://doi.org/10.1590/S1413-82712008000200007</u>
- Constantino, A. P. T. K., & Amarães, T. K. (2023). Biofilia em ambiente escolar. *Revista de Iniciação Científica da Famma*, 8.
- Chen, C. F., et al. (2020). The impacts of building characteristics, social psychological and cultural factors on indoor environment quality productivity belief. *Building and Environment*, 185, 107189. <u>https://doi.org/10.1016/j.buildenv.2020.107189</u>.
- Dastpaak, H., et al. (2019). Effects of earplug hearing protectors on the intelligibility of Persian words in noisy environments. *Applied Acoustics*, 148, 19-22. <u>https://doi.org/10.1016/j.apacoust.2018.11.017</u>
- Davis, T. R. V. (1985). The influence of the physical environment in offices. Journal of Library

Administration, 5(4), 91-111. https://doi.org/10.1300/J111V05N04\_09

Donkin, R. (2010). The History of work. London: Palgrave Macmillan.

- Engels, F. (2005). The condition of the working class in England. In D. Banks & M. Purdy (Eds.), *The sociology and politics of health* (pp. 22-27). London: Routledge.
- Elsbach, K. D., & Pratt, M. G. (2007). The Physical Environment in Organizations. ANNALS, 1, 181-224. https://doi.org/10.5465/078559809
- Ezzamel, M. (2004). Work organization in the Middle Kingdom, Ancient Egypt. *Organization*, 11(4), 497-537. <u>https://doi.org/10.1177/1350508404044060</u>
- Graciola, A. P., da Silva, A. D. C., & Cândido, C. (2016). Influência do ambiente físico de trabalho na criação do conhecimento nas organizações. *Perspectivas em Ciência da Informação*, 21(1), 66-83. <u>https://doi.org/10.1590/1981-5344/2407</u>
- Hamidi, N. E. B., & Toh, S. C. (2020). The relationship between physical workplace environment and employees' performance. *Journal of Contemporary Social Science Research*, 4(1), 128-2697.
- Hikmah Perkasa, D., Irawan, A. F., & Idris, S. (2023). The influence of the physical work environment, work motivation, and work discipline on employee performance. *KnE Social Sciences*, 2023, 286-295.
- Hoff, E. V., & Öberg, N. K. (2015). The role of the physical work environment for creative employees: A case study of digital artists. *The International Journal of Human Resource Management*, 26(14), 1889-1906. <u>https://doi.org/10.1080/09585192.2014.971842</u>
- Kasalak, G., & Dagyar, M. (2020). The relationship between teacher self-efficacy and teacher job satisfaction: A meta-analysis of the teaching and learning international survey (TALIS). *Educational Sciences: Theory and Practice*, 20(3), 16-33.
- Kasuganti, A. R. (2017). Organizational learning: The role of the physical environment. *Psychological Studies*, 62(4), 357-369. <u>https://doi.org/10.1007/s12646-017-0429-3</u>
- Kazlauskaitė, R., & Ruzgys, A. (2023). The physical office work environment and employee wellbeing: Current state of research and future research agenda. *International Journal of Management Reviews*, 25(3). <u>https://doi.org/10.1111/ijmr.12315</u>
- Kearney, T., Coughlan, J., & Kennedy, A. (2023). The influence of the physical work environment on retail employees. *Journal of Services Marketing*, *37*(6), 719-731. <u>https://doi.org/10.1108/JSM-04-2022-0130</u>
- Khogare, D. T., Sarambekar, H. L., & Manvar, V. S. (2011). Study on office workstation with respect to physical environmental parameters. *Journal of Human Ecology*, *35*(3), 209-212.
- Kilner, K. (2020). Information at work: Information management in the workplace. *Archives and Records*, 41(1), 80-82. <u>https://doi.org/10.1080/23257962.2019.1700489</u>

- Kim, S. E. (2014). Physical workplace as a strategic asset for improving performance in public organizations. *Administration & Society*, 46(5), 496-518. <u>https://doi.org/10.1177/0095399713479104</u>
- Kusku, F. (2001). Dimensions of employee satisfaction: A State University example. *Middle East Technical University Studies in Development*, 28(3-4), 399-430.
- Lawrence, R., Capon, A., & Siri, J. (2017). Lessons from Hippocrates for contemporary urban health challenges. *Cities & Health*, 1(1), 72-82. https://doi.org/10.1080/23748834.2017.1372967
- Locke, E. A. (1976). The nature and causes of job satisfaction. In M. D. Dunnette (Ed.), *Handbook of industrial and organizational psychology* (pp. 1297-1349).
- Magee, C., Gordon, R., Caputi, P., Oades, L., & Reis, S. (2019). The physical work environment and sleep. *Journal of Occupational & Environmental Medicine*, 61(12), 1011-1018. <u>https://doi.org/10.1097/JOM.00000000001725</u>
- Monem, T. M. A., & Al-Majeed, K. H. A. (2023). Job satisfaction of physicians working in primary care centers and family health care centers during COVID-19 pandemic in Al-Rusafa Directorate/Baghdad/Iraq/2022. *Iraqi Journal of Community Medicine*, 36(2), 106-116.
- Nasrallah, I., Farhat, R., Haroun, R., Hage, N., & Eter, A. (2023). Evaluating the academic scientific laboratories' safety by applying failure mode and effect analysis (FMEA) at the public university in Lebanon. *Heliyon*, 9(12), e21145. <u>https://doi.org/10.1016/j.heliyon.2023.e21145</u>
- Nurfaijah, P. D., & Gumilar, D. (2024). The effect of job satisfaction and physical work environment on teacher performance of SMK Angkasa Lanud Husein Sastranegara Bandung. *Dinasti International Journal of Digital Business Management*, 5(2), 233-241.
- Peter, N., Adeyemi, A. O., Oluwole, A. F., & Ibidunni, A. S. (2023). Users' perception of the physical work environment in Covenant University. *Materials Today: Proceedings*. <u>https://doi.org/10.1016/j.matpr.2023.08.079</u>
- Pushpakumari, M. D. (2008). The impact of job satisfaction on job performance: An empirical analysis. *City Forum*, 89-105.
- Rao, K. S., & Karumuri, V. (2019). Job satisfaction: A conceptual framework. *EPRA International Journal of Multidisciplinary Research*, 5(9), 191-198.
- Saeed, O. A., & Waghule, S. N. (2021). Exploring the association between job satisfaction and productivity: Empirical evidence from India. *Studies in Economics and Business Relations*, 2(1). <u>https://doi.org/10.48185/sebr.v2i1.301</u>
- Saner, T., & Eyupoglu, S. Z. (2015). The job satisfaction of bank employees in North Cyprus. *Procedia Economics and Finance*, 23, 1457-1460. <u>https://doi.org/10.1016/S2212-5671(15)00594-8</u>

- Schilleci, P. (2023). Exploring the impact of the physical work environment on service employees: An analysis of literature. *Journal of Facilities Management*, 21(5), 717-732. https://doi.org/10.1108/JFM-09-2021-0099
- Schneider, D. S., & Vaught, B. C. (1993). A comparison of job satisfaction between public and private sector managers. *Public Administration Quarterly*, 17(1), 68-83.
- Spector, P. E. (1997). *Job satisfaction: Application, assessment, causes, and consequences* (Vol. 3). Sage.
- Spell, C., & Bezrukova, K. (2023). What management history can tell us about the postpandemic workplace, and other useful things? *Journal of Management History*, 29(2), 167-178. <u>https://doi.org/10.1108/JMH-06-2022-0017</u>
- Sumardjono, & Adiatama, R. (2019). The influence of job motivation and work environment upon job performance of the employees of trade and industry office in Bogor district. *The Management Journal of Binaniaga*, 4(2), 55-64.
- Sunarto, A., & Maulana, D. (2021). The effect of discipline and physical work environment on employ
- yee productivity at PT. Liebra Permana Gunung Putri Bogor. Kontigensi: Jurnal Ilmiah Manajemen, 9(2), 318-335. <u>https://doi.org/10.56457/jimk.v9i2.168</u>
- Taheri, R. H., Miah, M. S., & Kamaruzzaman, M. (2020). Impact of working environment on job satisfaction. *European Journal of Business and Management Research*, 5(6). <u>https://doi.org/10.24018/ejbmr.2020.5.6.643</u>
- Timbó, M. S. M., & Eufrásio, C. A. F. (2010). O meio ambiente do trabalho saudável e suas repercussões no Brasil e no mundo, a partir de sua evolução histórica. *Pensar: Revista de Ciências Jurídicas*, 14(2), 344-366. <u>https://doi.org/10.5020/23172150.2012.344-366</u>
- Trivellas, P., Reklitis, P., & Platis, C. (2013). The effect of job related stress on employees' satisfaction: A survey in health care. *Procedia Social and Behavioral Sciences*, 73, 718-726. https://doi.org/10.1016/j.sbspro.2013.02.110