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## HEALTHY HABITAT: THE PLACE OF THE BUILT ENVIRONMENT PROMOTING HEALTH - PATHS FOR ARCHITECTURE, URBANISM, DESIGN AND ENGINEERING DURING AND AFTER THE PANDEMIC

Times of change and uncertainty make society's structural problems more apparent, requiring quick decision-making and restructuring daily life at different levels, which may involve living at home, work, study and leisure activities, as well as conditions for use and permanence in the urban environment. On March 11, 2020, the rapid spread of Covid-19 (a respiratory disease caused by the Sars-CoV-2 virus, popularly known as the 'new coronavirus'), led the World Health Organisation (WHO) to recognise a Public Health Emergency of International Concern. The huge number of infected people and the lethality proved that, in the context in which we live, the spatial mobility of Homo Sapiens and the characteristics of the environments we build helped spread diseases and actively participated in the installation process of the viral pandemic. From this point of view, the current crisis has brought different issues to light related to the relationship between health-disease and the environment, problematised at different levels and scales, which include curative and therapeutic environments (such as hospitals), but are not restricted to them, encompassing any and all living spaces. In addition, this finding reinforces the social role of Architecture, Urbanism, Design and Engineering (AUDE), understanding that, as professions intrinsically linked to the production and maintenance of the built environment, these areas of knowledge have, among their duties, the important mission of remaining attentive to changes, needs and aspirations of society.

The influence of the environment on human health has become notable throughout history (RIBEIRO, 2004; MEIRA, CARVALHO, 2010; BITENCOURT, MONZA, 2018). Discussing ways in which viruses and bacteria have affected humanity since ancient times, Ujvari (2012) comments that three flu pandemics occurred in the 20th century alone (the Spanish flu in 1918; the Asian flu in 1957; and the Hong Kong flu in 1968), in addition to minor (but not less worrying) crises such as H1N1 in 2010. In the last hundred years, epidemics related to pneumonia and tuberculosis were also frightening, initially concentrated in the USA and Europe, but which have spread to other countries. In Brazil, for most of the 20th century, cholera, smallpox and yellow fever required a concentrated effort by the population and the State to combat the vectors that spread them. More recently, dengue and Chikungunya have taken on alarming proportions (GAZETA, 2006; GURGEL, 2013; KILLINGRAY, 2009).

Addressing this topic generically, authors such as Figueiredo (2005) and Moser (2018) are emphatic in linking quality of life to environmental quality, clarifying that the latter is responsible for providing opportunities and limitations that facilitate (or hinder) the former.

There is ample empirical evidence that there is a very close relationship between the environment we live in and the quality of life. Today, most of the world's population lives in urban areas. (...) Undoubtedly, there are numerous studies that prove that the physical characteristics of urban environments and the lifestyle that these environments impose on their inhabitants (...) are related to numerous physical health problems (increase in blood pressure, hormonal and gastric disorders, anxiety, allergies, obesity) and psychological (irritability, reduced attention span and concentration, memory loss, stress) - (HIDALGO, 2015, P. 45-50).

Authors such as Aguilar-Luzón (2015), Ribeiro (2005) and Ujvari (2012) demonstrate that, according to their own characteristics and the socioeconomic moment experienced, each of the aforementioned health issues was reflected in specific environmental changes. The required changes ranged from the large urban operations that cut through cities such as Paris and Rio de Janeiro, to the increased concern with the internal health of buildings (to ensure natural sunlight and ventilation to the rooms and/or to avoid the Sick Building Syndrome, associated with environments that predominantly use artificial air conditioning, especially corporate ones), and even specific actions such as keeping free areas clean, avoiding stagnant water and keeping water tanks properly closed. Referring specifically to urban infrastructure, Sperandio, Francisco Filho and Matos (2016) indicate that, among the current measures to fight epidemics (and, consequently to promote health), the guarantee of urban mobility and improvement of the environmental conditions of the city must be understood, the latter linked to factors such as sanitation, drainage, garbage collection/disposal and creating/maintaining green areas.

It is important to mention, however, that environmental issues are not only related to physical health, extending (necessarily) to mental health. When analysing major contemporary themes in the light of Environmental Psychology (and therefore considering the relationship between human beings and the environment as an indissoluble and bidirectional link), Gabriel Moser (2018, p. 272) is emphatic in stating that “environmental issues are not only an integral part of the quality of life, but they also occupy an increasingly important place in it”.

Although extremely current, this debate is not as recent as it may appear at first glance. Almost sixty years ago, Edward Hall already argued that

> (...) man and his extensions constitute an interrelated system. It is a mistake to act as if men were one thing and their home, their cities, their technology, or their language were something different (HALL, 1966, p 166).

Contributing to this argument, Proshanski, Ittelson and Rivlin (1970) emphasised that buildings are “physical and social phenomena”, and explained that human beings “cannot be dissociated from the artifacts they build”. A decade later, Bau and Davis (1980) demonstrated that architecture and urban design have the potential to modify the social environment. Alterations in the physical environment alter possibilities (and even the type) of contact between people, which may change their socio-spatial behaviour (PINHEIRO, ELALI, 2011), meaning expansion or reduction of the conditions of stress, crowding, territoriality and the like.

The role of health (physical and mental) for the quality of life and the growing recognition of the importance of the environment (from the building to the urban environment) in the health/disease process, require careful problematisation of issues related to the promotion of healthy habitats. Access to a healthy environment is considered a fundamental human right (UN, 1992), recognised by more than 150 of the 193 United Nations member states, and whose fulfillment involves economic, social and political interests. Since the 1990s, the World Health Organisation (WHO) uses the terminology "Environmental Health" to indicate actions in the field of public health which are focused on "conditions around the human being, which may exert some influence on their health and well-being" (BRASIL/MS, 1999).

Understanding the environment as an active element in the health/disease relationship encompasses the consideration of aspects related to well-being, safety, maintaining attention, maintaining a sense of reality, recognising oneself and others, a feeling of fatigue, quality of sleep, and a reduced nature deficit, among others. From this point of view, investigations in this area require an inter-, multi-, transdisciplinary approach, as happens in study groups operating in large international organisations, and can be seen in mega-events in the environmental area, such as the World Summit on Sustainable Development (Rio+10, held in Johannesburg, 2002) and the United Nations Conference on Sustainable Development (Rio+20, in Rio de Janeiro, 2012). In this field, the main emerging debates are related to socio-environmental sustainability. They include topics such as: reducing carbon emissions; ensuring biodiversity; respect for diversity; reducing social inequalities; detecting and reducing unhealthy spots (such as pollution rates, water, air and soil quality) and disease vectors; protection for vulnerable groups; security conditions and reducing violence; mobility and environmental navigability (wayfinding); encouraging pro-ecological behaviour and pro-environmental commitment.

Numerous research possibilities have opened up in view of the intention to investigate the environment as a health factor. They include continuously adjusting researchers´ foci to provide new perspectives on the different issues addressed and break vicious circles that affect their understanding. Therefore, it is essential that researchers remain attentive to the contemplation of different environmental scales (ranging from rooms to cities) and fields of investigation (areas and sub-areas of knowledge in the human, applied social, technological and health sciences). In addition, research can use numerous methods/techniques for collecting and analysing information, and they can involve various levels of analysis (individual or community). Aligning with this new paradigm, the contemporary debate on how to design, manage, assess and maintain a healthy habitat has been translated into activities aimed at environmental and social sustainability, reducing the population's stress levels and investing in professional, collaborative and participatory activities. It covers, among other issues: optimising mobility and accessibility conditions; improved habitability; maximizing comfort conditions (ventilation, insolation, lighting, acoustics, air quality, ergonomics); constructive optimisation and use of recycled materials; effective access to nature (direct or indirect contact with green and natural areas).

Demonstrating the emergence of these themes, in July, 2020 we carried out a brief literature review on the Journals at '*Portal de periódicos da CAPES*' Journals Portal from the Coordination for the Improvement of Higher Education Personnel / Brazilian

Ministry of Education - see https://www-periodicos-capes-gov-br.ezl.periodicos.capes.gov.br/, to find the keywords 'built environment', 'physical/mental health' and 'Covid- 19/Coronavirus/pandemic' in articles published from 2010 to 2020. The terms were always grouped two by two (advanced mode) and the search was based on the subject, keywords and abstract fields. We detected 3,274 articles published in journals around the world (the vast majority of them from the northern hemisphere and written in English), and focusing on the reality of countries such as the United Kingdom, Germany, the United States, China/Hong Kong, Italy, Spain, France, Norway, among others. Many of these studies show the need for gaining more knowledge about the relationship between health and the environment, both with regard to changes in: architectural and urban programming; new ways of evaluating the environment; and good design practices - the latter covers several aspects related to the way of designing, executing and using the environment. In urban areas, for example, recent studies that encourage active mobility modes and motivating people to reduce the use of public and mass transport are notable, actions that require the support of a quality environmental framework. Similarly, during the pandemic experienced in the last year, a vast body of literature on these themes and related issues has been made available on the Internet, on web portals such as Archdaily (MARTINO, 2021; OVERSTREET, 2021) and Youtube.

Considering the general picture outlined here, and aiming to bring together works that would promote a debate in terms of Architecture, Urbanism, Design and Engineering (AUDE) during and after the pandemic in August, 2020, the Gestão & Tecnologia de Projetos Journal proposed a special call for the thematic issue HEALTHY HABITAT: THE BUILT ENVIRONMENT PROMOTING HEALTH. In general terms, we were interested in works that investigated, in Brazil and/or internationally, the influence of the current moment on the built environment, encouraging a more humane and healthier habitat. Among the main themes sought were: possible changes in design processes; contributions of environmental perception and assessment in promoting changes in this field; insertion and effects of technologies on the advances that have arisen.

As a result of this initiative, until November, 2020, we received thirty-four (34) article proposals, which gave us the opportunity to publish ten (10) articles today – that is, approximately 30% of the submissions, selected by the journal's evaluation process (double blinded). Before focusing our attention on the publication, it is important to explain how the process took place. Among the main reasons for non-acceptance of texts, we highlight: (i) it is a research plan that has not yet started or has just begun, with no (or few) concrete results to be presented/discussed; (ii) incongruity between the objectives initially indicated and the results finally presented; (iii) little adherence to the profile of the Journal and the special issue; (iv) failure to comply with ethical requirements in research, notably submission to the Brazilian Research Ethics Committee (CEP in Portuguese) in the case of research involving human beings. Thus, the first point may be related to the topicality of the theme, as there was not enough time for developing or maturity of the proposals. In turn, the second and third points are probably linked to the lack of some authors´ experience, which overlaps the objectives of a broader research (master's or doctorate, for example) with the objectives of an article (which is more limited, corresponding to a concise excerpt

from that investigation) or that were unsuccessful in trying to adapt another text to the profile. We draw special attention to the fourth point, linked to the ethical care essential to developing the work performed or intended. We emphasise that currently most of the investigations in the field of AUDE involve human beings, including vulnerable populations, and it is important to carry them out with the approval of the CEP, which is increasingly crucial in defining roles, benefits and risks, rights and duties of participants and researchers.

Finally, the ten (10) articles published establish important links between health, well-being and socio-environmental issues, focusing on themes related to urban vulnerability, domestic, hospital and school environments and mental health. More than providing the reader with a realistic overview of how the pandemic is currently influencing the AUDE fields, the studies contribute to the area at the scales of the room (bedroom, living, office), building and city, and induce new reflections on the topics covered.

The first article of this special issue is entitled 'Designing for health and well-being: various concepts and similar goals' by T. van der Voordt. As stated in the title, the work is based on a broad literature review on the concepts in question, highlighting the role of the environment in a particularly complex equation, whose understanding requires that the theme is investigated from a multidisciplinary approach and with the participation of multiple voices. To this end, the author also emphasises that it is essential to enable the collaboration of all agents involved in the production and use of the built environment, including customers and end users (even when technically untrained).

This is followed by four articles focusing on housing. In 'Critical analysis of housing conditions impacts on the well-being of residents and social costs', EAD Muianga, CCK Kowaltowski , VG da Silva , D. de C. Moreira, A. Granja, CA Oliva and RF da Silva present studies on the social costs of social housing, indicating that the literature considers them limited in terms of living conditions. The article organises the existing information through visual representations, which are essential to advance investigations on the subject.

Afterwards, the third text, 'Reflections on the impacts of the Covid-19 pandemic in the domestic space', was prepared by SB Villa, GP Carneiro, RA Moraes and NL de M. Carvalho, and was based on an online questionnaire conducted with 468 respondents. The results indicate the most impacted aspects of housing during the pandemic: functionality/multifunctionality, ergonomics, privacy, connectivity, flexibility, infrastructure and need for storage.

In the fourth article, entitled 'Technical assistance for in social housing (ATHIS, in Portuguese) for the promotion of healthy habitat', J. Scotton, L. Miron and M. Lersch analyse how the ATHIS process has contributed to the improvement of health and well-being conditions in a community of 68 families in the city of São Leopoldo (Metropolitan Region of Porto Alegre, Rio Grande do Sul), which is an important vector for promoting quality of life in this socio-environmental context. By focusing on the social role of Technical Assistance, the article portrays both its importance for the AUDE fields and the Brazilian reality itself, airing a problem that is widely faced.

Complementing these articles, the fifth article, 'Housing: a healthy habitat for the pandemic?', written by ML Felippe, RW da Fonseca, FM Dill, A. Favaretto , VG Dorneles, AS Correa and FOR Pereira, addresses the physical characteristics of the residential environment in its relationship with environmental satisfaction in the context of quarantine. The article includes results of an online questionnaire that was distributed between April and May 2020 (the peak of social isolation in Brazil) and which involved 1,858 people, mostly from the southern region of Brazil. Participants positively evaluated their own homes, although they recognised that they had some deficiencies, especially regarding aspects related to the offer of indoor space and access to elements that ensure closer proximity to nature (such as vegetation and natural light).

Following on from that, two studies focus on healthcare environments. In the sixth article entitled 'Environmental aspects influencing health treatments: a literature review', F. Goulart and R. Ono describe the results of the literature review of studies that provide scientific evidence on the influence of the physical environment on perception and in the behaviour of people in psychological distress and their caregivers. As a result, the authors synthesise 32 scientific studies, which focus on three situations, namely: the well-being of people undergoing treatment; the well-being of health worker;s and the conflicts of interest between these users.

The seventh article, `Considerations regarding the planning of intensive care units (ICU) upon user´s perspective', by PB Cavalcanti, C. Maçaneiro, I. Postiglione , JMN Palma and JR Eli, discusses the result of the evaluation of the physical environment of three intensive care units (ICUs) of public hospitals in Greater Florianópolis. The investigation used the perspective of health professionals and researchers to identify recurrent problems in ICUs, among which are: undersized environments; insufficiency or inadequacy of furniture and equipment; poorly humanised setting; undesirable overlapping of uses. More than diagnosing these difficulties, the authors contribute to the field under study by reflecting on possible ways of coping with preventing these problems.

The eighth article addresses an educational environment. The work 'Design requirements in the pandemic context: a discussion about educational spaces in public universities, written by RS Faria and PRP Andery, analyses four of the first safety protocols issued by public bodies, in light of which outlines guidelines which can be used to develop requirements with a view to formulating needs programs for architectural designs. The protocol of the Brazilian Ministry of Education, the protocol of the Federal Universities of Minas Gerais and of the State of Campinas (all in Brazil) and the University of Porto (Portugal) were considered. It was found that the measures aim to reduce the risk associated with contact between people and contaminated surfaces, which are mostly behavioural requirements and related to use and occupation. Functional and habitability requirements were also observed that could guide future design decisions.

Concluding this special issue, we present two articles focused on urban planning, which cover a theme and approach that are not frequent in the Gestão & Tecnologia de Projetos Journal, but which are closely associated with the proposal of this special issue. The ninth article, 'Health indicators of smart cities as allies in coping covid-19: an analysis of Passo Fundo/RS`, by L. Müller and TL da Silva, analyses the health

indicators of a city in the south of Brazil, aiming to understand the interrelationship with the epidemiological data arising from COVID-19. The results show that, on the whole, the positive health indicators of Passo Fundo are lower than those of the other cities analysed from the ranking of smart cities. It is also evident that cities that have adequate monitoring of urban health indicators and aim to develop smart city initiatives have shown a better performance in terms of confronting the pandemic faced today.

Finally, the tenth (and last) article, entitled 'Covid-19, health and socio-spatial vulnerability in the city of Vitória, ES', was written by L. de O. Jorge and L. P. de Souza. It analyses the behaviour and consequences of the new coronavirus based on open public data on the disease, from which indicators are extracted and that allow establishing a socio-spatial correlation of the disease by neighbourhood in the capital of Espírito Santo (a state in southwest Brazil). The article evaluates the disease's dissemination process in this place from its initial stage. It also considers the comorbidities of the infected population and characterises the correlation of the data obtained with its geographic location (using georeferenced maps). Demonstrating the social issues correlated to the pandemic with singular clarity, the text allows us to observe the predominance of deaths in the precarious and informal areas of the city, noting that the most affected people are precisely those who are poorer and whose health was previously poor.

In addition to stressing the importance of the built environment (in all its scales, functions and forms) planned in light of requirements linked to the well-being and physical health of those who occupy it, we understand that the ten articles published here help us to reflect on the conditions in which we live today and how we will live in the future. Whether taken in isolation or as a whole, these studies indicate the paradigms that led us to the current human-environmental crisis. New questions arise, which are only partially answered, and therefore, are still far from being concluded. In addition, as professionals of Architecture, Urbanism, Design and Engineering, these articles lead us to (re)think the role of these fields of knowledge in the configuration of multiple realities in which (and with which) we live and, above all, to (re)affirm our responsibility to create a better and more suitable environment for all. From this perspective, we understand that this special issue of the Gestão & Tecnologia de Projetos Journal has the potential to become a starting point for new research, including scientific developments in a post-pandemic world that we hope to be close to and will provide us with a healthier environment.

Happy reading!

**Gleice Azambuja Elali**
Professor at the Department of Architecture at the Federal University of Rio Grande do Norte, productivity scholarship from the National Council for Scientific and Technological Development [Conselho Nacional de Desenvolvimento Científico e Tecnológico – CNPq] – INVITED EDITOR

**Sheila Walbe Ornstein**
Professor at the Faculty of Architecture and Urbanism at the University of São Paulo, productivity scholarship from the National Council for Scientific and Technological Development [Conselho Nacional de Desenvolvimento Científico e Tecnológico – CNPq] – ASSOCIATE EDITOR

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