POPULAR HOUSING: A HUMANIZED ANALYSIS THROUGH THE 14 BIOPHILIC PATTERNS

HABITAÇÃO POPULAR: UMA ANÁLISE HUMANIZADA ATRAVÉS DOS 14 PADRÕES BIOFÍLICOS

VIVIENDA POPULAR: UN ANÁLISIS HUMANIZADO A TRAVÉS DE LOS 14 PATRONES BIOFÍLICOS

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ABSTRACT
Social housing has been discussed as an object of academic study since the 80s. Few academic proposals were approved by governments and transformed into effective actions. In this context, the objective of this article is to analyze in a humanized way the applicability of Biophilic standards, in social housing in the Imburi complex, located in the city of Pilar -AL. The study is part of an ongoing master's thesis research, with a behavioral, qualitative and analytical approach, with the main tool being semi-structured interviews. The research would initially be with (n)100 participants, but due to limitations the final sample was with (n)30 participants, which generated data tabulated in graphs showing the percentage of satisfaction in the different housing complexes Imburi I, II and III The study brings the careful and unconscious inclusion of the standards applied by residents in the homes, promoting a sense of belonging in the spaces and improving the quality of life.

KEYWORDS
Biophilic Design Patterns; Biophilic Design; Housing.

RESUMO
A habitação de interesse social vem sendo discutida como objeto de estudo acadêmico desde a década de 1980. Poucas propostas acadêmicas foram aprovadas pelos governos e transformadas em ações efetivas. Nesse contexto, o objetivo deste artigo é analisar de forma humanizada a aplicabilidade das normas biofílicas, em moradias populares no complexo Imburi, localizado no município de Pilar-AL. O estudo é parte de uma pesquisa de dissertação de mestrado em andamento, com abordagem comportamental, qualitativa e analítica, tendo como principal ferramenta a entrevista semiestruturada. A pesquisa seria inicialmente com (n)100 participantes, mas devido a limitações a amostra final foi com (n)30 participantes, o que gerou dados tabulados em gráficos mostrando o percentual de satisfação nos diferentes conjuntos habitacionais Imburi I, II e III. O estudo traz inclusão cuidadosa e inconsciente dos padrões aplicados pelos moradores nos domicílios, promovendo o sentimento de pertencimento nos espaços e melhorando a qualidade de vida.

PALAVRAS-CHAVE
Padrões de Design Biofílico; Design Biofílico; Habitação.

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RESUMEN

La vivienda de interés social ha sido discutida como objeto de estudio académico desde la década de 1980. Pocas propuestas académicas fueron aprobadas por los gobiernos y transformadas en acciones efectivas. En este contexto, el objetivo de este artículo es analizar de manera humanizada la aplicabilidad de las normas biofílicas en viviendas populares del complejo Imburi, ubicado en el municipio de Pilar-AL. El estudio es parte de una investigación de tesis de maestría en curso, con un enfoque conductual, cualitativo y analítico, teniendo como principal herramienta la entrevista semiestructurada. La investigación inicialmente contemplaba (n)100 participantes, pero debido a limitaciones, la muestra final fue de (n)30 participantes, lo que generó datos tabulados en gráficos que muestran el porcentaje de satisfacción en los diferentes conjuntos habitacionales Imburi I, II y III. El estudio destaca la inclusión cuidadosa e inconsciente de los patrones aplicados por los residentes en los hogares, promoviendo el sentimiento de pertenencia en los espacios y mejorando la calidad de vida.

PALABRAS CLAVE

Patrones de Diseño Biofílico; Diseño Biofílico; Vivienda.

1. INTRODUCTION

A long time ago, the approach to social housing stopped being just a political discourse and became an object of study in academic institutions. Since the 1980s, several teaching and research institutions have debated this issue. It is surprising to note that over almost three decades, few proposals originating in academia managed to obtain approval from governments at all levels and be transformed into effective actions (Palarme, 2007).

As pointed out by Caselli (2007), the concept of minimum housing originated around the 20th century, emerging after the First World War with the purpose of addressing the economic and social difficulties that emerged as a consequence of this conflict in Europe. However, from the 1990s onwards and, especially, at the beginning of the 21st century, academic institutions emerged as a possible ally of the government in the search for solutions to what has become the country's most significant social challenge: the problem of the housing deficit. Bauer, (2010).

Considering the role of the State in building housing for low-income people, there is no doubt. However, the complexity of this endeavor in keeping up with the increase in demand is also undeniable, especially in metropolises and medium-sized cities in Brazil, which continue to receive a constant influx of individuals in search of better living conditions. This persistent demand is, to a large extent, an outcome of the phenomenon of migration from rural to urban areas, a trend that has persisted in the country since the first half of the 20th century (Santos 2009).

According to Palermo (2007), within the scope of public housing policies in Brazil, the State's main objective is to reduce the housing deficit, often adopting a purely quantitative approach, where the housing issue is treated primarily as a statistical challenge. This results in the neglect of crucial social aspects, such as the sense of ownership of the home, the resident's sense of belonging in relation to their home and the community in which they live, as well as other factors of fundamental importance.

In 1929, a discussion began during the International Architecture Congress (CIAM), about a new housing paradigm aimed at collective use. This debate was influenced by several factors, such as overpopulation, housing deficit, precarious construction and unsanitary conditions, taking into account both economic and constructive aspects. This context motivated the search for the rationalization of buildings, which began to be planned according to the concept of the existential minimum. This involved not only the size of the buildings, but also the consideration of the psychological and biological needs of users in housing projects (Kapitzky, Muniz and Cunha 2019).

Boueri (1989), states that social and psychological factors influence the "organic actions of the body" and people's well-being. Therefore, there are certain "psychosomatic" demands that must also be incorporated and considered as criteria in defining minimum housing standards, seeking to progress towards the perspective that the minimum housing standard should not depend exclusively on dimensional and physical assessments related to space and domestic activities (Mendonça and Villa, 2018).

Considering housing as a cultural element, it must be capable of appropriation by its resident. This involves the user's ability to be an "agent of the space", as defined by Szücs (2005, apud Palermo, 2007), allowing them to make modifications according to their needs and wishes. This interaction expresses not only their culture, but also their future aspirations, creating a meaningful symbolic connection between the resident and the physical environment of the home, resulting in a deep sense of belonging. Assuming that experiences in space can trigger both positive and negative responses in individuals, affecting their well-being in cognitive, behavioral and physiological aspects, it is important to highlight the challenges faced by families in new public housing. In this context, the objective of this work is to analyze in a humanized way the applications of Biophilic standards, in Popular housing in the Imburi complex, located in the city of Pilar-AL.

Biophilic, standards are increasingly being used as an important tool to make the environment a source of innovation, restoration, change, resilience, and adaptability user in the space that filters and processes information and their assessment of the environment built (Wilson, 1986, Kellert 2012 and Nehme 2008). Furthermore, the research addresses Popular housing, highlighting its importance in the social, cultural and economic context. And with this, the State plays a fundamental role in providing housing as a means of social inclusion. These dwellings not only provide shelter, but also influence residents' identity and participation in society, allowing the expression of their culture and values.

2. THEORETICAL FOUNDATION

Based on the understanding of the relevance of knowledge not only in the cultural, social and economic context, but also in the expressive interaction between housing and the resident's future appreciations, a symbolic and meaningful connection emerges between the user and the physical environment. According to Malard (2002), housing, when considered as a human habitat, encompasses concepts that largely transcend the idea of simple shelter. Reducing housing to mere protection against climatic conditions is limiting humanity to its biological dimension, thus neglecting its social dimension. Housing represents for human beings an anchor point in the world, where they build their dreams for the future and to which they always return. Being at home is more than being protected; It's being in your own environment and, at the same time, at the center of the universe.

Faced with disorganized migration from rural to urban areas, Brazil's housing policy emerged, the purpose of which is to mitigate the shortage of housing. This approach often prioritized the quantity of housing units over quality, adopting a cost reduction strategy that manifested itself in a reduction in the size of housing. Furthermore, this policy has often neglected the social and cultural aspects that contribute to residents' sense of belonging in relation to the space of their homes and communities (Bonduki, 1998).

Considering the challenges associated with public housing, one of which refers to the limited internal space that prevents a positive experience on the part of residents, Pereira (2007) highlights the importance of empowering residents to meet their natural needs and to take ownership of the environment in which they live. This would provide security and the ability to become active agents of the space they inhabit.

Thus, through research on biophilia, biophilic design was identified that focuses on the integration of biophilic patterns, with the connection between natural elements and nature in the built environment. Which present a variety of applications for interior design professionals who design built spaces, both indoors and outdoors. These standards must be versatile and adjustable, allowing for adequate integration into projects. Therefore, biophilic design can be seen as a crucial tool in creating restorative environments (Kellert, Calabresa, 2015).

Contributing to solving the challenge in the family context in the built environment, which is finding the balance between an environment that offers a wealth of interesting and restorative information, and an environment that contains an excess of information, leading to feelings of overload and stress (Browning, 2014).

Reeve (2012), states that with the positive effects extremely useful caused by biophilia in the field of medicine, the construction industry has agreed to promote the use of it in the built environment, considering the quality in life as fundamental experience, because when it's applied, it promotes feelings of positive emotions, such as connection to the place, the environmental identity, perception from the restoration, sustainable behavior, or taking it as a hypothesis, it works as a trigger for a direct or indirect positive effect, whether on an emotional, cognitive, aesthetic or spiritual level.

However, the emotional bond (bond or affinity) established between an individual and an environment, considering their environmental care and history Kalvaitis, Monhardt and Nisbet (2015), compared to any other place, whether natural or urban, when it is positive, encourages commitment to adopting pro-environmental behaviors. This benefits both the environment and the person, as the person is able to recognize the restorative qualities that result in greater psychological restoration. Appreciation or connection with the local environment can be seen as a manifestation of biophilia, and this positive relationship has a beneficial effect on psychological restoration (Berto 2018 and Hartig, 2001).

Therefore, to understand biophilic design, it is important to recognize that the standards are grouped into three distinct categories, represented below in figure 1 (Biophilic Patterns), each with its fundamental concepts that play a crucial role in application in environments, internal or external:

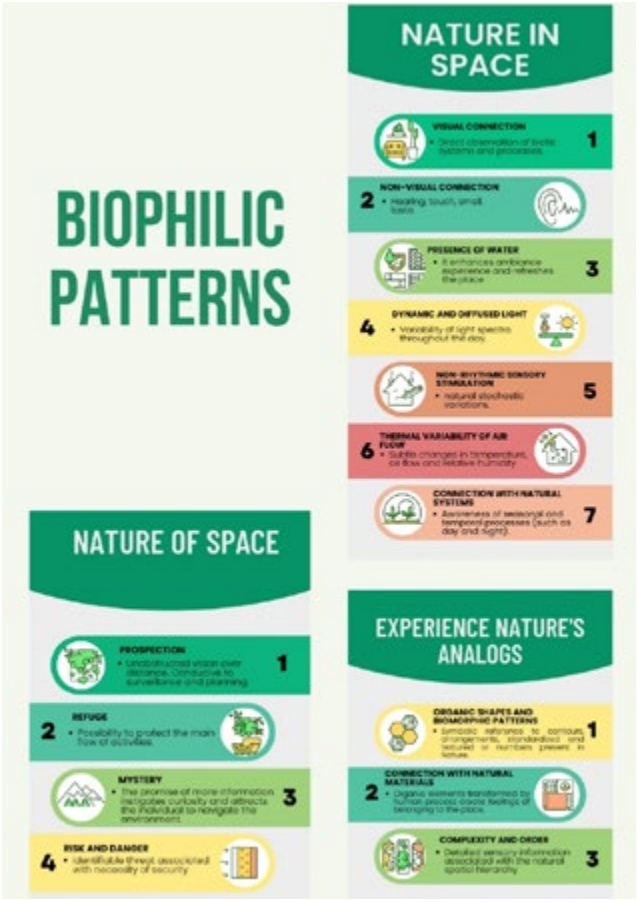


Figure 1: Infographic Table.
Source: prepared by the Authors (2023)

According to Browning (2014), patterns in nature are supported by developed empirical interdisciplinary research which highlight works from Christopher Alexander, Judith Heerwagen, Rachel and Stephen Kaplan, Stephen Kellert, Roger Ulrich and many others. From these studies on biophilia, 14 biophilic patterns were extracted that have a variety of applications in the built environment, internal or external, enabling the implementation making flexible and adaptable at the space focused on psychological, physiological and cognitive benefits.

To create a restorative environment, it is important to consider the principles of biophilic design, as described by Edward Wilson (1984). When examined in isolation, these principles reveal emotional, psychophysiological, and cognitive connections to the built environment. It is essential to take care of how these principles can be applied and used for deeper understanding. Table 1 follows to assist figure 1 above.

Biophilic Patterns	
Description	
Natural in Space	- Addresses the direct, physical and ephemeral presence of nature in a space or place. This includes plant life, water, and animals, as well as breezes, sounds, scents, and other natural elements.
Natural Analogs	- The edge is the direct, indirect presence of nature. such as colors, shapes, sequences and patterns found in nature, manifest as works of art, ornamentation, furniture, decoration and textiles in the built environment.
Nature of Space	- Addresses spatial configurations in nature. This includes our innate desire and learning to be able to see beyond our immediate surroundings, our fascination with the slightly dangerous or unknown; obscured visions and revealing moments; and sometimes even phobia-inducing properties when they include a reliable element of security.

Table 1: Category Classification.
Source: prepared by the Authors (2023)

As highlighted by Browning (2014), the principles of nature are supported by extensive interdisciplinary empirical research, which includes work by renowned scholars such as Christopher Alexander, Judith Heerwagen, Rachel and Stephen Kaplan, Stephen Kellert, Roger Ulrich, among others. From these investigations into biophilia, 14 biophilic patterns were identified, with diverse applications in the built environment, both indoors and outdoors. These standards allow for a versatile, adaptable implementation focused on psychological, physiological and cognitive benefits, thus contributing to the improvement of the built environment.

This article represents ongoing master's research that seeks to revisit the concepts within the scope of biophilia and identify biophilic patterns that can be applied in the built environment, specifically in popular housing. Its objective is to provide a relevant contribution to the field of Interior Design, through substantial reflections related to improve the resident's experience with their homes.

The focus of the research is to analyze living spaces that are safe from both physical and emotional point of view, allowing the performance of various activities. The goal is for these spaces to provide positive responses based on the user's experiences in the environment.

3. METHODOLOGICAL PROCEDURES

This article is part of ongoing master's thesis research, which adopts a behavioral, qualitative and analytical approach, with its main focus being semi-structured interviews, using the questionnaire developed by Henry Sanoff (1995), Wish Poem (wish poem), starting from the sentence to be completed, "I would like my environment...", with a sample of participants of (n) 100 participants, (n) 20 per family, considering 5 Individuals per residence , with the inclusion and exclusion criteria, residents aged 18 years or over (inclusion) "participants", residents aged under 18 years. (exclusion) "non-participants".

To make the results regarding the applicability of biophilic standards to the object of study, social habitation in the Imburi housing complex in Pilar-AL, it was necessary to guarantee the reliability and safety of the participants, since one of the stages of the research involves interviewing human beings. It was necessary to submit the research project to the CEP-Ethics and Research Committee, Involving Human Beings at the Federal University of Pernambuco.

Thus, after positive evaluation and approval by the CEP, it was possible the beginning of the research, enabling the interview and the physical survey of the environment, located in the Imburi housing complex in Pilar, Alagoas. These housing complexes, which have an area of 211,800 m^2, shelter popular housing for low-income families.

The research was supported by the guidance of Professor Ph.D. Amilton José de Vieira Arruda (Advisor) and Prof. Dr. Antônio Roberto Miranda de Oliveira (Co-advisor).

For the recruitment of participants, the first approach was the presentation of the researcher, who introduced himself as a student of (PPGD), Postgraduate Program in Design at UFPE, Federal University of Pernambuco and shortly afterwards presented the research in a summarized and informal way, so that they were comfortable participating voluntarily. After the presentation, they were asked if he/she or they could voluntarily answer a questionnaire, making it clear that the research would not take more than 10 to 15 minutes.

To collect the data, a semi-structured interview was used with the application of the questionnaire, taking photographs of the physical environment and measurements of the physical space, audio recording and filming.

We also take the risks and benefits of the research for the participants as possible embarrassment in the face of some questions about the quality of housing, satisfaction and understanding of daily dynamics. However, as absolute confidentiality and preservation of the interviewees' personal information will be maintained, this risk is minimized, without losses for the interviewees. It is up to the researcher to have the sensibility to understand and the delicacy to talk around the situation leaving the participant free to make their contribution to the studies.

Regarding the participant's exposure to the pandemic caused by Covid-19 and possible fatigue from a daily routine, the tool applied was only ask beforehand if there would be availability to be interviewed. The use of mask and gloves was also taken into account, both for the participant and for the interviewer/researcher if they felt safer and more comfortable using it.

As for the benefits of this research, these were indirect. The study sought to encourage the interviewee to talk about their home, aiming to materialize a project that matches their wants, desires and needs in the space in which they live. Mainly, because the housing complexes are developed in a specific "mold", therefore, made in accordance with the requirements of the state government program.

These families are not assisted or heard, according to their needs, according to regional specificities, cultural and family peculiarities and the user's subjectivity are not respected, as there is no interaction with the process of construction of the physical space capable of establishing order and rules, so that you must have knowledge of the actions and usability, providing the user with appropriation based on a look at the use. Therefore, listening to and watching them generates positive emotions and feelings that are important for their well-being.

However, the participants' responses were analyzed and interpreted, based on interviews, physical and photographic surveys, video and audio recordings and observation exercises, using graphs and tables.

4. LIMITATION OF THE SEARCH

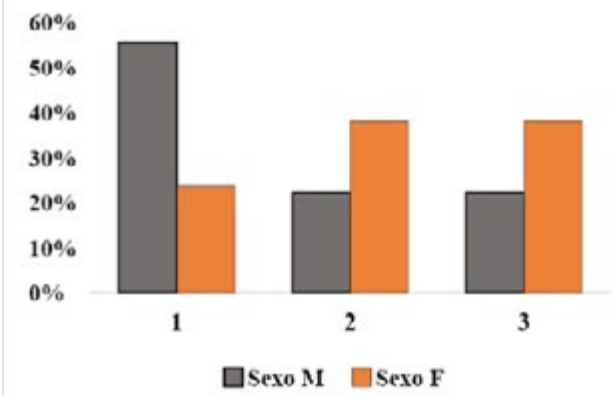
It is necessary to comment on the limitations of the research, the first concerns the number of participants that would have as a sample (n) 100 participants, considering (n) 20 families, (n) 5 Individuals per house. But due to unavailability and the freedom to choose whether or not to voluntarily participate in the research, we had as a sample (n) 30 participants, (n) 1 per family, considering (n) 5 Individuals per household.

Another limitation of this study was the division of the Imburi housing complex in Pilar-AL appointed by Imburi I, Imburi II and Imburi III, this division was chosen (n) 30 residences, with (n) 10 for each Imburi considering that each housing complex has around (n) 600 houses.

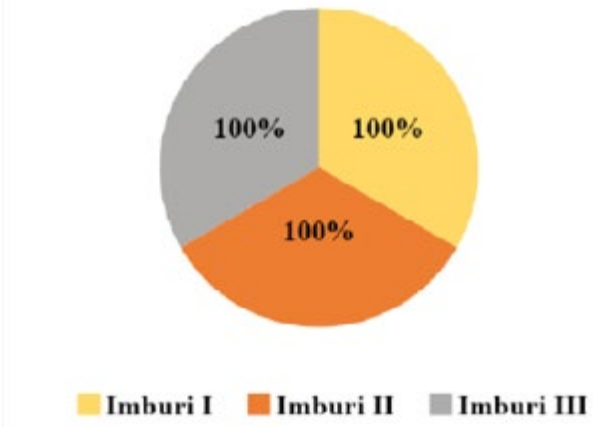
5. RESULTS ANALYSIS

The first analysis was interviews which the percentage number of male and female participants presented in graph 1 was tabulated. It had a significant percentage for the answers given during the interview, with 56% of male participants in Imburi I, 22% of participants of the Imburi II and III. On the other hand, 24% of participants were female in Imburi I and 38% of participants were female in Imburi II and III.

In graph 2, the percentage of user satisfaction in Imburi I, II and III for the residences was 100%, based on the question "do you like the house you live in?" Yes or no"… everyone answered (yes).

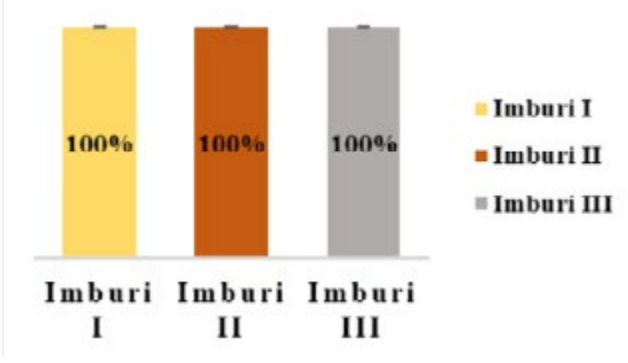


Graph 1: Percentage of participants by gender.
Source: prepared by the Authors.

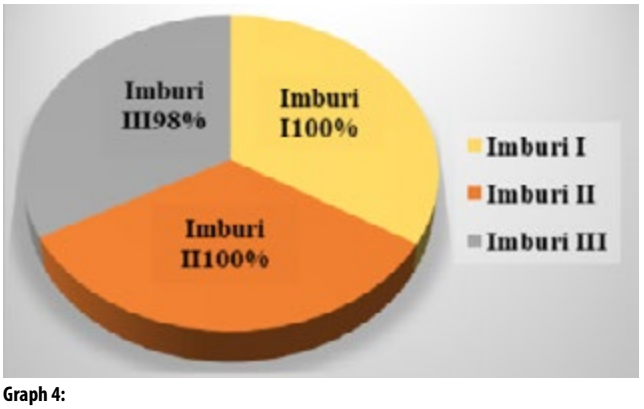


Graph 2: Percentage of user satisfaction nwith homes.
Source: prepared by the Authors.

In graph 3, the percentage of user satisfaction in relation to the living room, kitchen and bathroom in Imburi I, II and III were 100% with observations, given the location of the room and the physical size. In graph 4, percentage of user satisfaction in relation to the rooms was 100% in Imburi I and II, in Imburi III it was 98%.



Graph 3: Percentage of user satisfaction in relation to the living room, kitchen and bathroom.
Source: prepared by the Authors.



Graph 4:
Source: prepared by the Authors.

Table 2. Below presents relevant information about the changes made to the houses, offering a comprehensive and organized view of the data related to this topic. This table was created with the aim of simplifying the understanding of residents' needs for social housing, allowing a clearer and faster coverage of the elements involved. Based on the information provided about the changes made to the houses of Imburi I, Imburi II and Imburi III, a series of modifications that occur in each of them can be observed. These changes cover different areas and purposes, making each house unique in terms of adaptations and use of space. Below, we highlight the main changes made to each of the houses:

Changes that were made to the houses	
Description	
Imburi I	- Expansion of the kitchen; - Use of the front space to open shops: workshop and grocery store - Expansion of the backyard – service area.
Imburi II	- Expansion of the kitchen, - Use of the front space for a garage and opening of shops: sale of construction materials. - Use of the (alley) next to the house as a pantry for workers' meals.
Imburi III	- Expansion of the kitchen and opening of its window. - Use of the yard for animal production, - Use of the living room wall to install an aquarium; - Added a wall throughout the house.

Table 2: Participant changes.
Source: prepared by the Authors (2023).

Table 3. Presents a compilation of suggestions from participants for the development of popular housing in the possible Imburi IV project. Offering a comprehensive and well-equipped view of data related to possible desires regarding a home consulted and designed for families that accommodate an average of (n) 5 individuals per residence.

These proposals aim to create more accessible, functional and attractive spaces for future residents of an imaginable Imburi IV, taking into account different needs and preferences. Below is an overview of the opnions for each housing category: Imburi I, Imburi II and Imburi III.

Possible future popular housing - Imburi IV	
Description	
Imburi I	- Accessible space for disabled users; - Larger kitchen and bedrooms plus another bedroom; - Bathroom close to the bedrooms, but far from the living room; - Smaller wooden windows
Imburi II	- Larger kitchen; - American kitchen; - Bathroom close to the bedrooms, but far from the living room; - Front with wall space for garage; - Colors in the house; - Smaller glass windows;
Imburi III	- Larger kitchen and bedrooms plus another bedroom; - Bathroom close to the bedrooms, but far from the living room; - Front and backyard with wall; - Colors in the house.

Table 2: Suggestions from Participants.
Source: prepared by the Authors (2023).

The house is much more than just a physical place to live, it is the stage of our lives, the refuge where we share moments of joy, love, and even reflection on the influence it has on us Dietz (2021). Each house has its own story, its own charm and personality. It is a space where the individual finds his identity and intimacy; where the decoration reflects the tastes and values of its inhabitants. The images, figure 2, 3 and 4, captured are a diverse universe, a variety of desires and stories these houses can tell and the reality of the inhabitants' needs, it is important to highlight that 15 images were chosen to represent the three Imburi housing complexes.

Figure 2: Imburi I housing.
Source: prepared by the Authors (2023).

Figure 3: Imburi II housing.
Source: prepared by the Authors (2023).

Figure 4: Imburi III housing.
Source: prepared by the Authors (2023).

It is possible to find biophilic design standards applied even if unconsciously due to the user's need and the relationships the resident has with home. For this reason, the observation, capturing images and the interviews was necessary to understand how the applicability of biophilic design standards were carried out. Based on the categories of biophilic patterns: nature of Space, Nature in Space and Nature Analogs, they will be represented by the letter **(P)** of pattern in table 4 below.

Application of biophilic design standards in housing I, II, III			
Description	**Nature in Space**	**Nature Analogs**	**Nature of Space**
Imburi I Housing	P1, P2, P4, P6	P2, P3	P1, P2, P4
Imburi II Housing	P1, P2, P4, P6	P2, P3	P1, P2, P4
Imburi III Housing	P1, P2, P4, P5, P6, P7	P2, P3	P1, P2, P4

Table 4: Participant applications.
Source: prepared by the Authors (2023).

The data above confirms men's need for nature and the benefits it can bring to users in the built environment, social housing. It is understood that even without understanding and professional knowledge in the field, in this case interior design, it is clear that men in their essence need the relationship with nature in his habitat. Therefore, the Biophilic Design encourages an emotional connection to settings and particular places, promoting positive interactions between people and nature.

6. FINAL CONSIDERATIONS

In conclusion, the incorporation of biophilic design standards in residences, social housing, generates a significant impact on the user's needs such as well-being and quality of life. Salingaros (2019), Kellet and Calabrese (2015) and Browing, et al. (2014) state that it is essential to incorporate natural elements and nature connections in the design of living spaces.

Therefore, it was observed that even without the residential project and without the guidelines of biophilic design standards, there was applicability of these patterns in the residence, due to the need of men, as their essence seeks this relationship with nature through its natural

elements, the research brings as an example in homes: natural light by window openings, which provide natural ventilation; contact with water and animals through a simple aquarium in the living room; the plants that make up a garden in the flower bed by the door , the colors green and blue printed on the walls of the living room, kitchen and balcony, providing a feeling of tranquility and connection with the natural world; the use of gates and walls around the house brings a feeling of privacy and security.

Importantly, biophilic standards not only improve the aesthetics of homes, but also promote emotional and physical balance of inhabitants, making them a fundamental approach to the interior design and architecture of residential environments.

Furthermore, the examples presented in the research demonstrated that the careful and unconscious integration of biophilic design patterns made by residents promotes a sense of belonging and calm; it contributes to well- being and improved quality of life, strengthening interpersonal relationships, helping to reduce stress and increase concentration, covering physical, emotional, cognitive and social aspects. Therefore, as we move forward in the search for more sustainable and healthy ambiance, the conscious application of these standards is a priority in interior design and home construction, bringing more balanced and harmonious environments.

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