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The elderly and environmental perception in collective housing

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Abstract

The interaction of people with physical spaces happens in reciprocal association, where the person-environment system is influenced by and causes an impact on human behavior. Bearing this in mind, this paper sets out to show how elderly residents perceive the environment in collective housing. What is therefore sought is to understand how the elderly perceive their space, in response to their wants and expectations, by applying different techniques for assessing perception in groups of elderly people. The findings in three institutions, in which elderly people reside, have shown a similarity in results, which are seen to be less than enlightening, probably due to the cognitive impairment of the elderly.

*Keywords:*Environmental perception; elderly; built environment.

1. Introduction

Technological advances and their consequences have been huge in very different areas, and have also been recorded where the elderly population is heavily present. Currently, a more participatory role in society is offered to the elderly, in addition to which society has improved their quality of life as proven by longevity rates. This improvement has increasingly entailed that products and services must be designed for this growing sector of the population. In this context, appropriate environments [1] that make it possible for people with such specific characteristics to move around and to feel safe need to be dealt with and evaluated. This means that the principles of ergonomics applied to architecture and universal design should be heeded.

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According to Reis & Lay [2], Rapoport says that environmental perception occurs initially through the human senses, with the obvious predominance of the sense of sight [3].However, it is undeniable there is a relationship with cognitive aspects that comprise the prior knowledge of sociocultural dimensions and emotions [4].

Thus, understanding the physical space occupied by the elderly is critical to their quality of life and safety. This concern is due to the fact that the changes resulting from the aging process, which the elderly are subject to, change their senses and influence the activities of their day-to-day lives (ADLs).

Therefore, understanding how the elderly perceive the space that they experience constitutes a very important task [1], to the extent that the environment interacts in an evident symbiosis with its user, thereby also having a direct impact on human behavior [5].

The Research Group for Ergonomics Applied to the Built Environment – ErgoAmbiente (in Portuguese), which is linked to the Post-Graduate Program in Design at the Federal University of Pernambuco, has conducted studies related to housing for the elderly in order to provide principled underpinning with regard to criteria on physical-spatial suitability.

Thus, environmental perception is transformed into a tool that investigates spaces, its purpose being to be an aid or new projects for homes as well as to make it possible to make existing environments suitable for the elderly.

There are many aspects to be considered in order to make an environment adequate, such as luminous, thermal and acoustic comfort, layout, sizing, use of color and claddings, and so forth. And even if the spaces meet the normative precepts relevant to the nature of their activities, the user has the final say on effectively adapting them. Therefore, besides the legal aspects, physical environments must also meet the subjective criteria of those who use them. These criteria consider people's wants and expectations with regard to spatial quality.

Therefore, qualitative studies of direct observation of human behavior in a physical environment use various techniques. However, the cognitive impairment of elderly users must also be considered as must the reliability of data obtained when using the different assessment tools of environmental perception.

Therefore, this paper presents the results from of three Long-term care institutions for the elderly, by using different techniques of environmental awareness in order to identify how the elderly perceive the spaces to which they relate themselves.

2. The elderly user and perception of the environment

The aging process brings about changes in an elderly person´s physiological and psychological capacities, as well as predisposing them to depression [6; 7], this being evidenced by the decrease in fully carrying out the activities of everyday life. Thus, due to their loss of or reduction in autonomy, the built environment gains in importance because it is involved in the quality of life and security of the elderly.

The influence of the physical environment in aging processes has been evidenced as to the potential of spaces as an element that facilitates life or makes it difficult [8], depending on the physical-spatial conditioning factors and as to the user's perception of this space [9; 10].

Given this scenario, what are required are environments that are better fitted to the limitations imposed by the senescence process and/or senility, in an attempt to mitigate the constraints caused by a very broad range of physical barriers in these spaces.

Bearing this in mind, ergonomics looks to harmonizing the user-environment interaction in its activities, thereby providing improvement in the well-being of people with very singular characteristics, in which integrating the design of the built environment and interdisciplinary gerontology are present in the quest for more suitable environments.

For Pinheiro & Elali [5], people's use of spaces occurs consciously or even unconsciously, and the relations established are subject to biological and cultural influences, whether these do so simultaneously or not. Therefore, human-spatial relations contribute to changes in the behavioral state, such as modifications in mood, in addition to which they represent ownership of portions of space.

Thus, what this shows is the importance of understanding human behavior in accordance with the spatial dimensions and their relationships with users, so as to understand the person-environment system and to identify how this user interacts with the environment, taking his/her wants and expectations into consideration. Thus, based

on the experiences and emotions undergone, spaces, hitherto regarded as intangible start to take a meaning of their own and do so and around the individual [11], thereby reflecting an identity translated by the concept of place. [12]

Therefore, it is essential to have knowledge of how the environment interacts with the user, as well as how feelings are revealed, and how these are translated into perception of the environment in accordance with the stimuli, since these elements have a direct relationship with reactions and human behavior.

Qualitative studies of direct observation of human behavior in a physical environment use various perception techniques: Facet Theory (LOUIS GUTTMAN), Behavior Setting (ROGER BARKER), Multiple Classification Procedure, Card Sorting, Mind or Cognitive Map (KEVIN LYNCH), Wish Poem (HENRY SANOFF), Behavioral Map, Constellation of Attributes (MOLES), Visual Mapping (ROSS THORNE & TURNBULL JA), interviews, questionnaires and so forth.

Among these tools, those selected to investigate the perception of elderly residents in Institutions for the Elderly were the techniques of Constellation of Attributes, a Questionnaire and a Wish Poem in order to identify the wants and desired pretensions of those users as to the environments that surround them.

3. Methodology

The built environment is of fundamental importance to the quality of life of the elderly, particularly those living in institutions, since poorly, or barely adequately, designed space, could lead to adverse effects and constraints directly affecting the safety and well-being of the elderly. Thus, to understand how elderly users feel and experience their spaces is a very important task that contributes to improving the quality of environments in institutions for the elderly.

The investigation of environmental perception demands the researcher should insert certain ideas into studies of environmental psychology, with a view to adopting ancillary techniques that seek to identify variables of a more cognitive and perceptual character. Therefore, this study presents the results of evaluating the perception of spaces experienced by the elderly, as well as expectations about environments, in accordance with three techniques - one for each of the institutions for the elderly under study.

Thus, the analysis was made of the environmental perception of elderly residents in three Long-Term Care Institutions (LTCIs), all located in the city of Recife, in the northeast of Brazil, in order to determine the spatial quality from the perspective of its occupant, thus identifying positive and negative aspects of the physical spaces.

3.1. Constellation of Attributes

Idealized by Moles (1968) and later developed by Ekambi-Schmidt, the experimental technique seeks to extract the perception that the user has of the environment he/she has experienced, thus identifying real attributes of the spaces as well as giving evidence of wants from ideal environments [13].

The research study expresses in graphs, multiple variables obtained from symbolic images produced from spontaneous associations of ideas to the environment, as well as from the users' experiences [10]. Data were obtained by applying a questionnaire consisting of a single question to which any number of answers is allowed, and occurs in two steps: one directed at the real environment and another associated with the ideal environment.

The verbalizations obtained are grouped and stratified according to their nature, thus allowing an evaluation of the behavior of the attributes related to the psychological distance of each attribute to the space analyzed in which the verbalizations most apart from the unit investigated express the phenomenon of least attraction.

3.2. Questionnaire

The questionnaire is an enquiry instrument without a statistical nature, and is a complementary tool in the process for the different techniques for evaluating perception, thus contributing to enriching the results.

It is considered a qualitative method that is applied in complex or strictly particular situations and is much used for obtaining knowledge of aspects related to the object investigated, due to its high efficiency, low cost and ease of application [2].

Unlike the interview research technique where the questions are formulated orally, the questionnaire does not require the active participation of the researcher. It consists of the written presentation of pre-prepared questions, in a systematic and sequential manner, with open, closed and/or multiple choice questions in order to get to know the opinions, wants, experienced situations and expectations of a given object of study [14; 15].

This technique can be used in the various stages of a research study, either at the beginning to help define the problem, or even to collect data. The preparation of the research instrument should contain questions that are clear to the respondent with options that express some degree of freedom, thus avoiding tendentious answers [15]. It is advisable to use a pre-test to ensure that the evaluative tool will measure what actually is to be measured, and thus validate the instrument for data collection.

3.3. Wish Poem

The Wish Poem is a technique developed by Henry Sanoff, that is easy to apply and that seeks to extract the imaginary of users regarding the environment they have experienced. [15]

The instrument is classified as unstructured, which is why it allows respondents to express themselves freely. Although easy to apply, the Wish Poem produces very representative results. Nevertheless, the evidence of findings must be considered besides those relevant to the built environment, such as, for example, of organizational aspects [17].

By investigating "*I would like (the environment studied)to ...*", the interviewee, or group of users, expresses spontaneously a written or graphic record (drawing), resulting in the representation of their aspirations[16]. Standardized forms are distributed to participants so that they may form their poems containing a place to identify with, the research objectives, explanations and instructions for completing it and the sentence given above. There should be a blank space after the sentence so that the participant can complete it, and for which the researcher should make available the materials needed to apply the tool such as a pencil, pen, colored pencils, for example [15].

It is observed that when used with adults, the technique produces verbalized results by means of written records, resulting from aspirations for an ideal environment [15], while children express themselves better by using colorful drawings [16].The interpretation of the answers found should be performed by following careful criteria in order to identify those that most appear. The written wishes should be interpreted and grouped into categories in accordance with the answers found. It is worth emphasizing that the same poem can contain many wishes, and thus be classified in more than one category, and the use of graphics to display responses is recommended because these are clearer and easier to understand [15].

4. Contextualizing the institutions

This article is anchored on the research project "An ergonomic look at the LTCIs - Long-Term Care Institutions for the Elderly", linked to the ErgoAmbiente Research Group. It is in this larger study that the institutions analyzed here are inserted, and briefly described below.

4.1. Institution 1

LTCI 1 is a municipal institution of a public nature, located in the west zone of the city of Recife, which serves elderly people whose family has abandoned them or who are homeless. The home for the elderly has a capacity to house 40 residents, regardless of gender. However, on the day of data collection only 37 elderly (19 men and 18 women) were registered. Of this total, only six (6) elderly people did not have some kind of dependency.

The physical structure of the institution consists of an adapted and extended building with a total built area of 620.90 square meters. The home has a large green area that provides tranquility despite the simplicity of the place, and its bedrooms are occupied by respecting the gender division (4 for males and four for females).

4.2. Institution 2

LTCI 2 is located in Jaboatão Guararapes, in the metropolitan region of Recife, and classified as a Mixed Funded Institution, ie, it receives public and private funding and also from philanthropic sources. The capacity of the home is 175 (one hundred and seventy five) elderly people. However, at the time of the survey, it was occupied by 120 (one hundred and twenty) elderly people. Of these residents, only 36 (thirty-six) subjects had some kind of dependence, and the functions of the others were preserved for activities of daily living (ADLs).

Having quite large spaces, with high ceilings, the home has the architectural feature of old homes of refuge as it dates from the 1940s, and its physical structure is arranged in nine (9) buildings, all interconnected with circulations and covered ramps.

4.3. Institution 3

LTCI 3 is an institution of a private nature, considered of a high standard because of the monthly fee paid by the elderly and/or their family, which is more than (6) times the minimum wage. The institution is located in an upmarket neighborhood of the city of Recife, and is distributed in two areas - an adapted house and a building designed to house the elderly.

With a total capacity for 24 residents, the home has both elderly residents with cognitive and motor impairment (moderate or advanced) as well as elderly people whose ADL functions are preserved. The institution also accepts elderly people on a day-care basis.

5. Results Obtained

The analyses used different techniques to extract environmental perception for each institution. Thus, for Institution 1, the Constellation of Attributes was applied; for Institution 2, the Questionnaire was applied; and for Institution 3, the Wish Poem technique was applied.

5.1. Perception of the environment in Institution 1 – Constellation of Attributes

To investigate the users' perception of the environment about LTCI 1, Constellation of Attributes technique was used, and applied to eleven (11) interviewees - three (3) elderly people and eight (8) employees. Due to the cognitive impairment of the elderly resident in LTCI 1, only three were able to give clear and objective answers, in accordance with the Brazilian version of theMini-Mental State Examination (MMSE), which is a method for screening cognitive performance widely used by professionals who need this assessment. MMSE is easy and quick to use, besides being cheap, and a method in which the researcher must follow an evaluation sheet containing 30 topics ranging between questions and tasks that the participant will do. The participant should achieve a minimum score of correct answers according to their level of schooling so they may or may not be considered apt.

To draw up the constellations of the ideal and real institution, the elderly who were selected after applying the MMSE were asked about what ideas or images came to mind when they thought of any institution, and when they imagined their own institution. Thus, the spontaneous and induced symbolic associations, respectively, were related and listed according to the decreasing frequency of order of citation of verbalized attributes. The graphical representation of the constellation happens by calculating the psychological distance that each attribute has from the nucleus studied.

For institution 1, the attributes collected were grouped according to categories of organizational aspects, physical infrastructure, comfort, materials and equipment, emotional factors and interpersonal relationships for both the ideal (see Fig1) and real constellation.
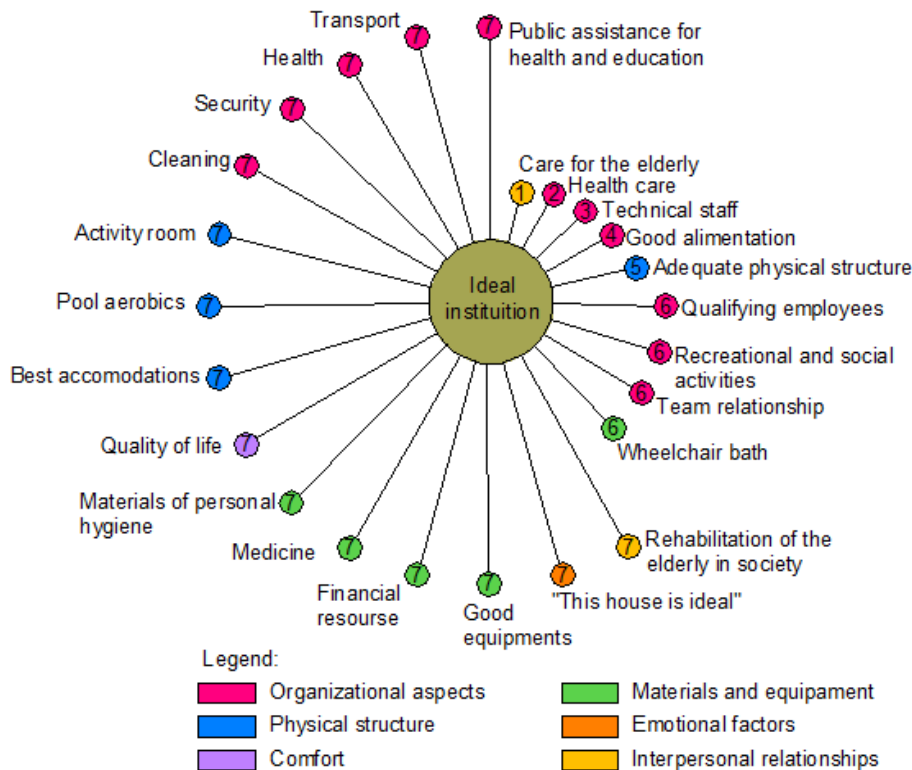
Fig. 1.LTCI 1 – Ideal Constellation of Attributes.

The results showed that the organizational aspects and the physical structure were the most cited in both conditions, which gave evidence of the need for improvements and reforms in LTCI 1, with a view to offering adequate spaces and quality in the services offered to the elderly.

5.2. Perception of the Environment in Institution 2 - Questionnaire

In LTCI 2, the elderly´s perception of the environment was analyzed according to the application of a structured and semi-structured questionnaire, consisting of a scale represented by figures indicative of satisfaction, regular satisfaction and dissatisfaction to better identify the respondent to what was questioned. The instrument was divided into two parts: the first relating to the profile of the interviewee and the second targeted the perception of the environment of the institution in general and of the bedroom unit. Of the interviewees who accepted and/or presented a cognitive level that was satisfactory for participating in the study, there was a total of ten (10) respondents.

Most were satisfied with the individual unit (bedroom) as to the aspects regarding the quality of the space, noises, furniture, sizing of the private unit, colors of walls and flooring, lighting and thermal comfort.

The results of the perception related to the LTCI 2's environments in general showed similar findings to those of the individual unit, thus revealing a high level of satisfaction among the interviewees.

5.3. Perception of the Environment in Institution 3- Wish Poem

Also in institution 3, the Mini-Mental cognitive screening exam was applied to thirteen (13) elderly residents to help identify those who showed response conditions to the evaluation tool, in accordance with the cognitive

impairment they presented. Of the total sample, only six (6) elderly people presented positive results in their test, these being considered able to take part in the research study.

Because of the difficulty some elderly people have in writing, standardized forms recommended by Rheingantz et al. [15] were replaced with oral verbalizations that were recorded and later transcribed in full, where the user completed the sentence proposed by the tool after this had been oralized by the researcher.

Among the elderly who did not present cognitive decline reported by the MMSE, it was found that most respondents of the technique revealed answers related to disorders of a family order, very often relating the built environment in which they live to the concept of home. This aspect can be identified in the following poem obtained: "*It's good, is good. It was good to have a girl to look after me. I'm divorced, but wanted to marry again, because she makes me company*".

In the answers found, three (3) users revealed in their poems that they did not want changes in the institution, stating that for them the house was good. However, one of the elderly people pointed to a management problem, stating that the institution might make more male nurses to care for the elderly: "*There should be more people to attend to us. On the environment is good.Ideal even just our home*".

The other three (3) elderly expressed the wish for some changes in the physical aspects of the home. One of the users expressed the wish that the institution had three (3) bedrooms so he could house his family.

Another elderly resident, recently come to the institution, said he would like the house to be more spacious and to have a greater amount of furniture, and the beds to be broader, the ideal being the use of hospital beds. Finally, one of the interviewees expressed the wish for thee to be more green areas.

6. Conclusion

The elderly must have suitable environments that enable them to live a quality life and the purpose of which is to mitigate the constraints brought about by the limitations imposed on them by the aging process, whether this be senescence or senility. Therefore, making the environment suitable must consider in addition to normative aspects (pertinent laws) and physical aspects (environmental comfort, sizing, layout, cladding, etc.), the subjective aspects of its users, this, therefore, being a synergy between the spaces and their users.

In this context, understanding how people 'feel' the spaces becomes fundamental to the person-environment relationship and its effects. Thus, the perception of the environment contributes as an auxiliary element that guides adaptations of existing environments and new projects, especially those aimed at the elderly.

The investigation of the perception of the environment created in the three institutions presented here, using different techniques, revealed similar results, which leads us to reflect on the effectiveness of the instruments applied to this type of population (elderly people) who have such particular characteristics.

For institution 1, the Constellation of Attributes was applied which showed the predominance of organizational aspects and the physical structure for both the actual situation and for an ideal institution, while aspects relating to environments were not addressed. It is possible that this result is due to the public established there, elderly people who had been abandoned by their family or were homeless and who may give priority to the services offered as to the quality of the environments and their effects.

According to the profile of the elderly of institution 2, the technique applied of the questionnaire associated figures to the level of satisfaction in their attempt to overcome the barrier of the cognitive and/or social deficit present in the users of that institution. The results showed the majority are satisfied with the general purpose environments and the private units (bedrooms). It is believed that the extent of such satisfaction is due to the fact that the institution reformed the pavilion of bedrooms, up until then similar to the old wards characteristic of homes of refuge of by-gone times, thus developing the users' territoriality.

Also in institution 3, the Wish Poem tool did not show it was effective at extracting the elderly people's expectations and aspirations regarding the environments they have lived in, even though the results of the poems were richer than those of the other techniques. The application of this technique on the elderly showed evidence of the users having become used to the environments that surround them, and that they do not aspire to major changes, or even they have no wish to change existing spaces.

Therefore, the results from analyzing the perception of the environment of the institutions investigated provided

little evidence of the effectiveness of the evaluation instruments applied to explore subjective aspects that may contribute to the improvement of the spatial quality of environments in collective housing.

The importance of the physical environment in which people carry out their day-to-day activities and the influence that spaces have on human behavior are indisputable. Poorly designed environments, or those without effective adaptation, generate a negative impact on the safety and quality of life of their users. In this context, understanding how people 'feel' spaces is fundamental to the person-environment relationship and its effects. Thus, it becomes necessary to propose tools that evaluate perceptions of the environment and that demonstrate that the data obtained are reliable, and that they can be adjusted to the particular characteristics of elderly users.

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