Build environment and wayfinding – a study with visual impaired users

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Abstract

Build environment has been studied by designers and architects, and the ergonomist plays an important role also. A field study was conducted with visual impaired users in Rio de Janeiro city, Brazil. Data about the perception of these citizens about accessibility in build environment, in the nearby of the main school/ treatment center for this public – Benjamin Constant Institute (IBC) was collected. The results show that environment creates false expectations, and also auditory warnings are incomprehensible or even null. As consequence, the judgment process of the users is affected.

Keywords: applied ergonomics, field study, inclusive design, building and construction

1. Introduction

According to Bins Ely *et al*. [1], in last two decades, in Brazil, was observed an increasing conquest of rights for the inclusion of disabled people in the society.

Campaigns in Brazil are attempting to the problems related to architectural barriers and disabled users. It's just a piece of a bigger proposal for inclusion of these citizens in social life.

The model of urban distribution of many cities follows standards that do not correspond to the majority of its population, therefore excludes a great parcel of the same one. Urban obstacles impose forced exile, limiting individual even more in its space of performance, denying the right to achieve its citizenship's role inside in a social and economic context. From a concept of social inclusion it means that society excludes the segment of the social minorities in the Brazil: disabled people, unemployed, illiterates, whom are an enormous parcel of our society, as affirmed by Silva & Martins [2].

Brazilian Government does most actions for universal design and social inclusion. The major step was obtaining some data about these citizens, aiming a bigger discussion on municipality, state and federal levels.

Accessibility, Wayfinding and Social Inclusion

Accessibility include physical and social dimensions and deals with the possibility of individuals to have access and to make use of the environment, equipment, or both, in independent way. To that, is necessary access to information about the activities and the places where they are developed, the possibility of displacement safely and comfortably, and the possibility of usage of these environments and equipment without previous knowledge concerning it way of working. In short, "it is mainly through information and mobility - movement to go and to come - that individual participates in places and in activities; and establishes contact with other people, or either, performs its right of citizenship", as affirmed by Dischinger in Bins Ely [1].

As defined by Ribeiro *et al* [3] information contained in environment are important to orient users. All process of environment perception used to orient individuals on space is, nowadays, focused on studies called *Wayfinding*. Wayfinding, according to Arthur and Passini, approaches three distinct aspects:

a) Making decisions, referred to action planning;
b) Decision execution, transforming a plan into action; and
c) Information processing, environment perception and the transformation of information into mental images.

The relationship between humans and the built environment is known as an interaction where one interferes on another and, at the same time, is influenced by the other. "The individual is always interacting with the environment. Therefore, we may affirm the existence of an unique relation between environment and behavior – a relation where one affects and influences the other, mutually, on an action/reaction form" (Ribeiro et al.[4]). Figure 01 illustrates this relationship.

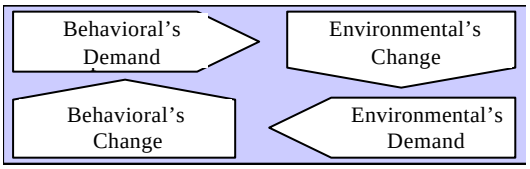

Fig. 1: Schematic relationship between humans and built environment

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2. Who are the visual impaired Brazilians?

According IBGE (Brazilian National Institute of Geography and Statistics [5]) Brazilian the inquiry about disabled people was incorporated, in the most recent censuses, Demographic Census 1991. The promulgation of Law n the 7,853, of 24 of October of 1989, brought, among others issues legal guarantees, the obliges the inclusion in the nationals censuses specific questions about disabled people, once the study of this population started to constitute indispensable condition to support more definitions of specific measures to the national reality.

The used concept, including diverse levels of limitation of activities, allows distinguishing the degrees from incapacity of to see, to hear and to move itself, besides characterizing disabled population and its socio-economical aspects.

This conceptualization is compatible with the international recommendations, especially with the International Classification of Functioning, Disability and Health ICF (2001) published recently by Worldwide Organization of the Health. United Nations recommends the use of international classification as theoretical landmark, and its concepts and terminologies to supply the international comparisons between statistics, even they fulfill to each country necessity of information [4].

Of the 24,6 million people who had declared some deficiency (14.5% of the total population), 19,8 million were in the urban zones, and 4,8 million in the agricultural zones in 2000. The percentage of people whom had declared suffer at least one deficiency or incapacity is of 14,3% in urban zones and 15.2% in the agricultural zones. Southeast is the region that has the lesser ratio of people whom they had declared has some kind of deficiency (13,1%). Also Northeast presents the percentile greater of disabled, 16,8%, as seen in Table 1, that presents the distribution of disabled people according Brazilian regions.

Table 1
Distribution of disabled people according Brazilian regions

Regions	Proportion of disabled people according to regions (%)		
	Total	Urban	Rural
Brazil	**14,5**	**14,3**	**15,2**
North	14,7	15,7	12,5
Northeast	16,8	17,0	16,3
Southeast	13,1	13,0	13,8
South	14,3	13,8	16,5
Center-west	13,9	14,0	13,1

Sao Paulo is the state with the biggest number of blind people (23,900), followed for Bahia state (15,400). Although Minas Gerais and Rio de Janeiro are more populous, have a lesser number of people whom had declared be incapable to see: approximately 14,000 and 14,400 people, respectively [4].

3. Aspects of the investigation

3.1. In which place is better to find these visual impaired citizens?

The chosen point to lead the research was the Institute Benjamin Constant (IBC) which is a federal institution of Basic Education and that takes care of the 519 blind pupils and acts in the formation of teachers and production of materials in Braille. For its specialty it is a national reference and together with the Ministry for Education and Culture it support specialized actions to the education of blind pupils, aiming to promote the inclusion at regular school.

The Institute Benjamin Constant was created by Emperor D.Pedro II through the Imperial Decree n.º 1,428, of 12 September 1854, having been inaugurated, solemnly, in day 17 September of the same year, in presence of the Emperor, the Empress and all the Ministry, with the name of *Imperial Institute of the Blind Boys*. This was the first concrete step in Brazil to guarantee to the blind person the right to citizenship.

Currently, the Institute Benjamin Constant sees its objectives redirected and reviewed. It is a Center of Reference, at national level, for questions of the visual deficiency. IBC offers: a school, that enables professionals of other areas; assessor other schools and institutions that work with blind people; carries through ophthalmologic consultations to the population; rehabilitates; produces specialized material, as printed matters in Braille and scientific publications [6].

3.2. Which are the municipality projects for attending these people?

Rio de Janeiro city hall, through the Municipal Foundation Home School Francisco de Paula – Funlar-Rio, associated to the city department of Social Assistance - is an institution focused on disabled people who lives in the City of Rio de Janeiro. The role of Funlar-Rio is to formulate public politics of attendance to disable people in city and execution of actions in this direction. Actions are related to accessibility in built environment and also training and employment for disabled people. [7]

Funlar-Rio also elaborated and diffused at Internet manuals about accessibility at residential buildings and transport systems. So, if information it's available, we tried to check these initiatives with the main users: the visual impaired citizens.

4. Exploratory investigation

4.1. Overview

A field study was conducted with visual impaired users in the nearby of IBC Benjamin Constant Institute.

At first, a semi-structured interview was conducted with IBC's managers to know a little bit more about the Institute routines and its students and workers. A bibliographical research was also carried out and some official documents of the municipality were examined.

Then, a formulary was applied to collect data directly with IBC's students and workers. The questions aimed obtaining the profile of this universe of users in the nearby of IBC and also some data about their trip to the school/ work. They also answered about their perception of the build environment and its "tips" that allow them getting to IBC.

4.2. Results

The majority of the interviewed subjects has more than 41 y.o. (44,4%). This can be explained because even IBC is a educational institution, it also offers a specialized medical attendance, and many visual impaired person search for this kind of service.

Most of them travel to IBC by bus (77,8%), and once they come from very far neighborhoods in the city, the estimated travel time (in media) is 1 to 2 hours.

Even being so far, the institution attracts its users because it's a medical reference center for rehabilitation, and when asked "Why did you choose to study/ work at IBC", some subjects said "*It's a dream for every blind person be treated here!*".

Regarding to their visual capacity, figure n.2 shows the distribution of type of deficiency of the questioned subjects.

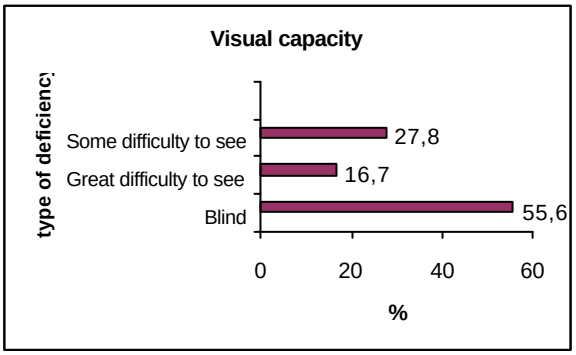

Fig. 2: Distribution of visual capacity of the interviewed subjects

When analyzing accessibility in transport system, regarding to departure and arriving process, it was mentioned by 61,1% that they need assistance and have to ask people in the surroundings which bus/train they want to take. This situation leads to dependency, what make feel users uncomfortable.

When arriving to IBC, that is located in a very well signalized road, they can feel the curves and the speed bumps, that means that they are close to stop. At the same time, bus driver always confirm arriving. These signals give them back the confidence of where they are, that didn't happened when they take the bus (see Fig. 3).

Fig. 3: Road in front of IBC (institute building at right)

About the accessibility condition in the Rio de Janeiro city, commentaries were done about the physical barriers, inadequate governmental buildings (that don't have ramps, only stairs), no tactile information in bus stops about buses itinerary, and very poor assistance to blind people. For example, some people said that there is no kind of auditory warnings in bus station.

And more: other people are not prepared to assist blind pedestrians. They are not instructed how to help a blind person to cross street. They consider this act very simple, but they feel like the **society is not interested** into prepare itself to be more comprehensive.

5. Final considerations

Results demonstrated that is very difficult to arriving or leaving IBC. It also related that frequently the majority of the respondents experience frustration, a false expectation, misunderstanding or absolute absence of hearing stimuli containing strategic information for their dislocation in the urban environment and as consequence, in the decision making. We can also affirm that Rio the Janeiro is a very poor city when related to visual impaired community. Also, the proposition of new spaces for the inhabitants rarely includes solutions for this group of users.

As a partial conclusion we can recommend that any design solution that intends to be inclusive must effectively highlight the perception of the city and its spatial and build environment and must be focused to attend both common users and visual impaired demanding as well.

Mentioning the major of Rio de Janeiro, Mr. Cesar Maia [8] "The model of the city that we want is a city

> for all, accessible, without barriers, that guarantee the citizen, security, welfare and access, its right to go and to come and to use it fully. To reach this model the city will have to observe this conception in its build environment. Architecture without barriers expresses design in its universal way that will have to take care of different characteristics of the individual.
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> The metropolises already do not hold the myth of the "standard man ". The differences (...) characterize our population. The urban challenges are in present and will be projected in the future for us all, as example we have the aging of the population. Think the city for the elderly, the disabled, the child, the pregnant lady, person disabled temporarily, is to face restrictions, limitations, the difficulties that any individual can have or have someday.
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> We are talking, therefore, of an inclusive society as mark of modernity. The wakening of the society for this social and sympathetic responsibility is basic, in a joint action, breaking preconceptions, preventing discrimination and extending the possibilities of each human being.

So, let's wait Rio de Janeiro city introduces all these beautiful concepts in daily life, in a way that citizens could really perceive it.

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