

SPECIALIZED DESIGN ARCHITECTURAL OBJECTS FOR THE REHABILITATION OF PEOPLE WITH VISUAL DISABILITIES

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In the city of Quito, the number of people with disabilities is high and approximately 12% are visually impaired. Centers dedicated to the rehabilitation are available, one of which is the Atahualpa Day Center (CDA). Although the center has trained personnel, and a set program, the facility was not designed for this purpose, it is an adapted space that tries to cover the needs of the staff and the participants generating gaps which have had to be solved in an improvised manner. The Con Lo Que Hay -With what is available-11 (CLQH 11) workshop, identified several spatial needs of the CDA and utilizing a specialized space-object sought to solve the necessity of the step by step methodology process to enable visually impaired individuals into daily life. This means that the skills developed within a controlled space are put into practice in spaces like the city allowing them to acquire the confidence to function autonomously. This study evaluates the pertinence and importance of a space-object specifically designed to help the visually impaired population to reintegrate into daily life. This topic is important within the Ecuadorian context because all the efforts and investments usually are focused on generic buildings and basic services.

Keywords: Visually impaired, Ecuador, Hands-on, Experiential architecture.

1 CURRENT REALITY

As Castells (1974), in his text the Urban Question mentions “Space as a material reality, as a container of human activity. Both the political stance and the urbanist stance imply that the interaction in space is linked to human needs.” With these concepts that emphasize inclusion and participation, centers have been created for support to people with disabilities. Although these centers have trained personnel, not all of them have a specialized design, such as the Atahualpa Day Center (CDA).

In an interview conducted by María Cañizares, a Central University of Ecuador student, the former CDA coordinator Monge (2018) states that, “the CDA exclusively works with people with visual disabilities. For this reason, the existing spaces were adapted trying to satisfy the requirements of the staff and the participants”. As expressed by Suarez (2018), coordinator of the CDA, “the objective of the center is to provide support to people with visual impairment, to rehabilitate them to overcome the crisis caused by the loss of their sight”. A rehabilitator of a

center also states that, “the goal as occupational therapists is to teach the person to develop their senses to be independent.”

2 SPACE AS A REHABILITATOR

The independent development is achieved through the specialized design of the spaces. According to Banguero and Molina (2008):

“An adequate space to stimulate several senses is a multisensory space, divided into several corners, each focused on the stimulation of a sense. The sensory space is an area to stimulate the central nervous system using various materials and tools, psychological support for families and guidance by pedagogues reinforcing the senses that is more functional.”

In other words, to compensate for the deficiency or absence of one of the senses, the others are enhanced, developing control over the body and perception independently as evidenced in the CDA rehabilitation process. According to Palacios (2014):

“The senses gather information through sensation and sensitivity to external stimuli and a secondary function that consists of originating new responses and combinations to the issues related to communication or language and in transforming the perception of time and the space that surrounds us.”

According to this definition, the stimulation of one sense and its perception can generate a response in another; this can be compared with the synesthesia or fusion of the senses “described as a set of cognitive states concerning the union of the senses, or in other words, understood as the art of seeing music, smelling colors or touching emotions” (Llamazares de Prado *et al.* 2017). Within the development of people with deficits, synesthesia is vital, because it generates subjective experiences that allow relating external perceptions with sensations, memories or acquired information and thus interpret the environment. Because it is a subjective quality, it is not a skill that is taught and learned but is acquired with time and experience, despite this, the practice of this ability is encouraged in the CDA.

3 THE REHABILITATION SYSTEM AND ITS SPACES

The attention given to people with disabilities is carried out through a person-based model, with a rights-based approach, aimed at strengthening the individual, family and community skills and abilities of those who live with a disability condition in Ecuador (MIES 2017). This model has been implemented based on international parameters. In Latin America, the body in charge of these standards is the ULAC, this organization published a rehabilitation manual (Technical Manual of Integral rehabilitation services for blind or low vision in Latin America, Aguirre *et al.* 2010), which became a guiding instrument focused on the dignification and inclusion of blind people in society, for this case study an interpretation of the parameters is created generating spatial typologies.

The rehabilitation of the person with visual impairment requires a gradual development of their abilities and senses. CDA works with people who have suffered the loss of vision and their rehabilitation begins with the admission to the center where the participant receives psychological support to accept their condition, followed by the development of skills through techniques learned within the classrooms and workshops, simultaneously these skills are practiced with the help of rehabilitators in spaces that for this article have been determined as uncontrolled, that is, public spaces, to finally achieve their integration into the city and the labor force independently.

The Experiential CubeWall (ECW), whose function will be described later, becomes part of the process, the spaces, and experiences that occur therein reinforce the class lessons and workshops.

Each of the spaces becomes an indispensable part of a progressive process, in which the city of Quito responds to the development of the relationship and public interaction, the CDA rehabilitates the development of skills, techniques, and interactions on a personal level, and the ECW takes an intermediate position between the CDA and the City of Quito to put into practice the knowledge acquired in the center and initiate an approach and a relationship with the city.

4 ATAHUALPA DAY CENTER (CDA)

The CDA, not being a specialized space, to begin with, has adapted the infrastructure to satisfy the different fields of the methodology. In the main block, there are classrooms for psychosocial management, learning and skill development, workshops to practice motor development and administration offices. The walkways and green spaces connect the main block the example house enabled for the practice of daily home activities, the multipurpose room, and the laundry. For the psychosocial and medical aspects, the Center has workshops; the CDA supports the development of skills and relationships primarily at the individual and family level. It works with the support of academic institutions and cooperating entities, as stated by Suárez (2018), the center coordinator. Because of this, there is no medical care space. The spaces of socialization allow reaching a psychological treatment that begins with the acceptance of the condition and helps in emotional management, subsequently generating guidelines that allow adaptation to the social and work environment. In the classrooms, mobility techniques (guided and autonomous) and body protection practiced in corridors, walkways and green areas are taught. The practice of the orientation and interpretation of spaces is given through the use of different senses (touch, hearing, smell), creating references to generate a mental plane. As for the category of activities of daily life, the use of the cane as a guide for mobilization and development is taught; Guides are also provided for body protection and spatial development. In spaces such as laundry, sample house, and dining room, grooming activities, cooking, and manners are taught in addition to the location inside and outside these spaces. Tactile discrimination and coordination are also practiced by learning oral communication techniques, braille, use of technology and tools for basic calculation such as the abacus. The manual skills are given through the development of fine motor skills through crafts and culinary activities and the tactile development that is carried out within the workshops and green areas by identifying textures and sizes. Another objective of the center is to reintegrate people into the workforce, for that reason the knowledge and crafts developed to allow them to create items that can be marketed to restart their economic activity, so that the center provides personal support and facilitates the relationship with other people, while giving guidelines and guides that allow the development within their immediate environment, generating a simulation of integration into the abrupt environment (city), to subsequently implement them in this medium independently.

5 THE CITY OF QUITO

Within the CDA rehabilitation process, there is a section aimed at the interaction of participants in uncontrolled spaces, that is, the city. This section encourages the development of the senses through synesthesia; it begins with the development of orientation in open areas such as parks and plazas, shopping centers, banks, markets, etc., while generating interaction with other people. The mobilization in the city is implemented as a crossroads, sidewalk traffic, mobilization in public transport and identification of landmarks. The objective is that the person with a disability becomes familiar with the external elements that influence everyday life.

Although the city has health centers, in this case, other spaces respond to the psychosocial and medical categories such as parks where the blind and society interact. As for physical

activities, the displacement and orientation in streets, sidewalks, and public spaces are implemented autonomously or guided thanks to the application of the different senses that allow the person to create references such as car sounds and people, different aromas of the city and textures in walls and floors. In the category of activities of daily living, the city facilitates external development and social behavior through dialogue and money management. Oral and body expression is given through interaction in meeting spaces that favor relationships and dialogue. Textures in floors, walls, furniture, and vegetation, in addition to developing the sense of touch and medium and fine motor skills are the guide for orientation and recognition of places, this application and coordination of touch also allow recognition and use of cash. In the economic and productive field, the city has public and commercial spaces that allow the exhibition and sale of products to also face real situations where the use of money is applied in stores, buses, etc.

The city being an uncontrolled environment becomes a danger for people who are not familiar with the environment, especially for people with visual disabilities who do not have total control over their movements, so they require a prior approach, in which knowledge and skills that facilitate their development in this medium are acquired.

6 EXPERIENTIAL COVERAGE

The students who participated in the workshop CLQH 11 carried out a project within the CDA with which it was not only intended to offer a rehabilitation tool for its users but also to raise awareness about the importance of the inclusion of people in vulnerable conditions. For the development of the project, the students held meetings with the staff of the CDA and investigated the disability to be treated, in this way they understood the therapeutic needs of the users, solving them utilizing an architectural object that opens and closes. It was conceived as a sturdy metal structure that will allow its use in public spaces. In the closed position, it is 3 m x 4 m and 2.10 m high cube. In the open position a 14 m long 30 cm thick wall. The ECW when open as an experience wall rehabilitates, allowing passers-by the opportunity to tour the mural, interact and learn. The interaction with a Braille wall allows us to understand the reading and writing, the textures in the metal panels, the sounds that can be generated and the greenhouse of medicinal plants encourage the stimulation of the senses. The exhibition in the gallery allows visitors to observe and acquire products that users have made in the CDA.

When closed as a cube it raises awareness about the possibility of blind users interacting and guiding peers, as well as exposing what is taught within the center to the community in the gallery wall of the cube. Within the rehabilitation process, the ECW is an intermediate position between the CDA and the city of Quito; in this specialized object, the knowledge acquired in the Center is put into practice and an approach to the community begins.

Within the psychosocial and medical category, the Experiential CubeWall allows the creation of meeting spaces between users and visitors. This has two spaces (cube-wall), which encourage the use of the senses for orientation. At the same time, it has become a milestone that relates the city to the CDA. In the physical category, the different modules of the ECW allow putting into practice what has been learned in the CDA, mobility through the architectural object, which becomes a transformable space and allows the displacement in different forms and distances. Protection is generated through hand positions and cane handling to avoid obstacles; spatial orientation through other senses such as smell, or physical references and especially sensory and cognitive training through locating objects through interaction. As for activities of daily living, this allows spatial orientation, and displacement within a closed space and an area stimulates plant care. Communication is expressed through the braille graffiti wall that can be practiced and

allows basic mathematical calculations. The possibility of transforming the ECW allows meeting spaces to be created that encourage meeting, relationship, and communication. The development of manual skills occurs in large parts of the object, being focused on the development of this skill; allow the development of sensory and fine motor skills thanks to the different sounds and textures. While in the economic and productive category the ECW has a showcase gallery that allows the display and sale of products made in the CDA. As mentioned, the ECW takes a mediating position that generates a transition between the CDA and the City of Quito, in this medium the skills obtained in the center are put into practice and allows a tenuous approximation, from a controlled medium (CDA) to an abrupt medium (Quito City).

7 RESULTS

Table 1 shows the comparison of the three spaces concerning what each of them rehabilitates according to the categories obtained from the ULAC manual.

Table 1. Comparison of the spatial interpretation of the different rehabilitation areas.

REHABILITACIÓN	CDA	QUITO	ECW
Psychosocial and medical	1. Psychology, 2. Social and family	2. Social and family	2. Social and family
Physical	1. Mobility	1. Mobility	1. Mobility
	2. Protection		2. Protection
	3. Space orientation	3. Space orientation	3. Space orientation
	4. Sensory and cognitive training	4. Sensory and cognitive training	4. Sensory and cognitive training
	5. Physical education	5. Physical education	
Daily life activities	1. Home management		1. Home management
	2. Hygiene and personal presentation		
	3. Social behavior	3. Social behavior	
	4. Space location		4. Space location
Communication	1. Braille		1. Braille
	2. Computer training		
	3. Oral and body expression	3. Oral and body expression	
	4. Mathematical calculation		4. Mathematical calculation
Manual skills development	1. Sense perceptual development	1. Sense perceptual development	1. Sense perceptual development
	2. Manual skills	2. Manual skills	2. Manual skills
	3. Workshops		
The economic and productive area	1. Product development		
		2. Product display	2. Product display
	3. Product sales	3. Product sales	

The comparison between the City of Quito, CDA, and ECW was carried out following the ULAC manual, allowing us to know and quantify the different rehabilitation fields that each one meets.

With the comparative table, it was confirmed that these spaces complement each other, as there are fields that do not cover a certain space, but if another, becoming a progressive process. The system complies with the learning of different fields in the CDA, then they are practiced in the ECW and finally they are put into action in the city.

In the CDA, activities are carried out on a personal and social level that will allow the person to perform in a guided (controlled) and autonomous (uncontrolled) manner in different spaces. Personal hygiene, home care and even the acquisition of new skills are activities that require a controlled space where you have the confidence to learn them.

On the other hand, in the city of Quito, public skills are practiced, previously acquired in controlled spaces. The crossing of streets, orientation by sounds and smells, use of public transport and interaction in meeting spaces are activities that cannot be practiced in the center.

While the ECW plays the role of an intercessor object where skills related to the activation of the senses are practiced in addition to becoming a milestone that evidences and teaches visitors what is practiced within the center.

8 CONCLUSIONS AND RECOMMENDATIONS

The implementation of the specialized ECW object turns out to be a mediating object between the CDA and the city of Quito. It allows a mutual approach between people with visual disabilities and society as well as raising awareness among visitors, showing an advance of what is practiced within the Center.

The ECW provides support for rehabilitation, by allowing motor activities, experimentation with the senses and orientation to be put into practice; thus, enhancing the development of the synesthetic skills of the person with disabilities. Although this object does not turn out to be indispensable within the rehabilitation methodology, it becomes the first step of rapprochement between people with disabilities and society. In the table, it can be evidenced that no field is only covered by the ECW, however, this provides support and reinforcement of skills. From this study, it is recommended that the design of a specialized object focus not only on the needs of the person with disabilities but also those of the rehabilitators so that the object can be part of the teaching methodology. It is also recommended that the specialized object be part of the public spaces and raise awareness not only of the immediate surroundings of the rehabilitation centers but also of the city.

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