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Tactile and visual guide for kids with cerebral paralysis and low vision

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Abstract

The present work was developed taking as reference, studies in User Centred Design and Included Design and attending very specific necessities of a very specific public – target: kids holders of brain paralyse with low vision.
For the coherent development of this work, the collaboration with the institution that helps people with this type of deficiencies was quite important and decisive, because they turned the project viable, in a theoretical and practical way.
The starting point of the study was the lack in specific products which help children bearers with several deficiencies, on their daily evolution.
To respond to this necessity, several studies were developed with the intention of reaching a product that children could identify themselves in it and, above all, helping them in their orientation and learning.
The result was a creation of a Visual-Tactile Guide, to help children in their development through life with some pleasure and fun, and also, to help them becoming more autonomous.
It's a product that can be applied in institutions, hospitals, clinics, but also, in daycares and at home. Although it is a product developed for kids with those specific necessities, other children can used it too.

Keywords: brain paralyse; children; design

1. Introduction

When the problem was identified, the development of the present work had begun, by searching for solutions to solve it, like creating a new product appropriated to the needs of the public-target. Inherent in the problem, is the bibliographical research about the clinical aspects of these specific children, as well as the concepts of User Centred Design and Included Design.

After the research, it was discovered that the adaptation of conventional products, very often, is the solution found by parents, therapists and teachers, to attend the punctual

needs of the children. However these products were not primarily developed for these specific needs.

The challenge created by this need in the development of such products, favoured the contact with Holders Association of Cerebral Paralysis. After some meetings with the staff wrapped daily with the children, it stood out the difficulty of the kids with low vision in moving through the corridors of the Association without being lost because they are too similar and all white.
The problem of the children with brain paralyzes lead to the specific problem: to develop a product turned to kids' suffering of brain paralysis with low vision, disposing for that of visual, tactile and playful referential systems.

The cerebral paralysis is defined by Finnie et al. (2000) as a disturbance of movement and resultant posture due to an injury in the immature brain. When installed, it is not common to stretch out or to get worse, by this fact it is considered static. According to the Association, there are not two equal cases and isn't commonly caused by deficiencies of the parents, or hereditary diseases. Haemorrhages, deficiency in the cerebral or deficient circulation of oxygen in the brain, besides trauma, infections, premature birth and serious jaundice neonatal are the probable causes. It's difficult knowing when and why the child was affected, but it takes place generally before the birth, between childbirth or after this one (Apifarma n.d.).

2. Partnership research

The work only became possible because of the interaction between the University and the Association that welcomes the holders of cerebral paralysis. In most of the cases, because of the distance between the theory and the practice, many studies are carried out only from books and not with the real public, leading to several products that do not carry out their proposed functions.

In the first visit to the association, the research team knew the whole infrastructure, as well as all the people who worked there, which help the brain paralyses' holders. Physiotherapists, speech's therapists and psychologists received the team for several meetings. The activities developed in the association, have one main goal, to change the society and insert the holders in it, promoting recreational and athletic activities, to support the children and family, in different contexts.

The initial concern was focused in the children behaviour, daily activities and difficulties realized by the daily contact with them, followed by ideas about the product and specific items. One of the worries was related to the security in the use of the product, associated with the raw materials, hygiene and fixations systems. The measures, textures, colours, as well as the search for the attention of the kids for the use of the product, were debated topics.

User Centred Design, the main intention of this project, is known by the adaptation of the product to a user. The designer must work with real and future users: initially, to investigate the necessities, characteristics and limitations; and then, to value what is

more adjustable to their requisites of usability, functionality, etc. Nevertheless, the product can enlarge its public-target, from initially attending these specific children, to including ” normal children" and even adults, using the concept of Included Design.

In the design for children, Fiell and Fiell describe that (2006, p. 71), products “are drawn inside a set of parameters completely different from the destined ones for the adults, and they are divided in two great categories – equipments and toys”. The equipments must contemplate: a good ergonomic solution for good handling, robust construction, and nice surface to respond to questions related with hygiene and to avoid accidents, besides having strong colours to attract the child’s attention, stimulate their creativity and be fun. The concept explored for the product is centred in the interaction between the child and the equipment, and this one needs to be fun, waking the child attention to become frequently used.

3. Market and target - consumer

For a product to have success it’s necessary to know the market and target consumer. The lack of research can lead the product into failure, principally in the case of user centred design, because it is necessary to adapt the product to its user, and not the way around. Therefore, this product was thought to give an answer to a piece of consumers left to the edge for the enterprises and that deserve a special attention.

The specific market to which the product is intended it is composed principally by clinics, hospitals, associations and organizations that develop activities centred in the holders of cerebral paralysis. Besides this, the families are potential clients, as well as schools and day-care centres.
The created product is destined to children holders of cerebral paralysis with low vision, more specifically between 02 to 10 years of age.

According to Finnie (2000, p. 41-40), children with paralysis present difficulty in the visual perception, in other words, in the identification and differentiation of the forms, like a square and a circle. Besides this, and more importantly, there is no recognition of the directions, like right and left. The author suggests the encouragement and the teaching, and affirms that “great stimulus and opportunities are necessary to help the child to appreciate forms and standards and to associate such perceptions by using hands”.

4. Product

4.1 Concept

The concept is based in the use of the tactile and visual senses, allied to the children’s characteristics playful universe. So, the product has to be stimulating and inviting to the use, favouring the relation of the child with the object and through this, making easier his daily activities.

The product is formed by two guides, with different heights to be placed in corridor walls. It is composed by different textures and strong colours, stimulating the vision and the touch in simultaneous. Besides the senses stimulated, the involvement of the child will

happen by means of the insertion of thematic rag puppets in the beginning of the guide, comprising an objective to reach out. These puppets will be transported by them up to the final goal, helping in their understanding of space and distance, creating the interaction between the product and its user.

4.2 Inspiration

The inspiration comes from the rag puppets that represent the childhood and fun. With the craftwork, the playful universe thing is evoked as well as the games in the open air, far from the therapy rooms. The puppets are the accomplices of the children, they guard theirs secrets and silently accompany all their development phases. The colours and textures can stimulate the child curiosity, wake his attention and contribute for his learning.

4.3 Specificities

Some basic attributes for the product, were defined by the group, like the possibility to remove the guides of the walls of the corridors for cleaning purposes. Specific details also about the necessities and difficulties of the kids, as well as combinations of colours which stimulate them, heights of the guides, proposed materials, characters for the puppets and fixation to the walls, were topics considered in the product's development.

4.4 Raw Materials

The research of the raw materials for the product was exhaustive since they should be resistant materials and at the same time, soft because of children's security. The foams seem to be at first a viable option but they were not presenting the necessary characteristics of air permeability for the specific use.

After professionals' direction of the textile area, it was noticed that the mesh spacer satisfied the project necessities. As Ye et al (2006) elucidates, the spacer fabric presents good air permeability, which allows cycles of compression appropriated to not prolonged cyclical loads. For the coating, various solutions were analyzed, such as laminated materials, smooth warp and weft fabrics, textured fabrics, smooth synthetic materials and nape. A velvety surface was considerate a positive solution. A cape was prepared in cloth with a zipper, sewed in conventional machines, making possible the removal for washing. Sewed velcros were used, forming horizontal strokes, where the puppets will be fixed, such as shown in figure 1.
The conceived rag puppets are a girl and a boy, hand made with fabrics that can be originating from leftovers of the clothing industry.

4.5 Colours

The colours used in the guides were indicated by the therapists of the association because of the contrast, necessary requisite due to the low vision of the kids. The advised combinations were: dark blue with yellow, black with white or black with yellow. The choice was the dark blue and the yellow because they are primary colours easily recognized by the children. The dark blue was used for the cloth that covers the base and the yellow for the velcros that compose the horizontal strokes of the guides.

4.6 Fixation systems

There are several systems of fixation available in the market to position the guides in to the walls. There were considered the ones who caused fewer damages in the walls, with simple installation and easiness to remove for cleaning. The positioning of the guides was also a factor under analysis. Since the product is intended for children with different ages, their average height must also be considered. Therefore it was decided to place two sets of guides at different heights as shown in the 3D simulation of figure 2.

Figure 1: Final prototype of the tactile and visual guide

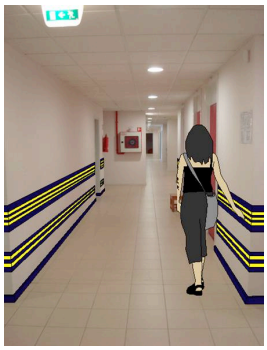

Figure 2: 3D simulation

5. Conclusion

The biggest challenge is to meet the aesthetic, functional and even economical requisites, allied to the context of the market and, above all, to the people's singular necessities.

It is the conjugation of so many items what elevates the work fulfilled by the designers, on behalf of people.

The design is a process that looks and promotes the continuous improvement and, so, it would be unsuitable to say that the project of the developed product is finished. There are improvements to be carried out and these will have to be based on the evaluation in loco by, installing the guides in the corridors of the association and observing, together with the therapists, the interaction of the children with it.

Through this product, the children will be able to develop their orientation skills, learning and creating their own independence relatively to their objectives. With the intention of improving cognitive processes of these children, the guides present several functions. They are used to help setting goals for children to reach, through the puppets. Through the colours, the children will be able to find the destination, and the guides maybe also work like interactive panels, where histories can be told to create proximity between the panel, the children and their helpers.

There are still many specific public - targets that have not their necessities filled out, however, with the new productive methods and technologies and with the professionals' increase in Design area, this reality will be able to be altered.

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