

From the ideas to the design concept: pre-design research

Each design process starts with preliminary ideas. Based on a particular premise, the preliminary ideas bring along the concern of feasibility, and so comes the need of pre-design research.

As pediatric means “for children”, the preliminary ideas suggest integrating some of the elements children identify into the design of the PET, the main component of any pediatric equipment line.

They are based on the premise that a particular pediatric line, might turn the pediatric exam room into a better environment for the children, and minimize the children’s anxiety during the medical exam.

Bearing the previous thoughts in mind, the pre-design research consists of:

- References to back up the preliminary ideas,
- Ethnographic research to reveal the needs and the expectations of users of the PET,
- Existing products analysis to assess strengths or weaknesses of some market products to nourish the project and,
- Design concept concerns.



References for preliminary ideas

To have a better understanding of how children are able to feel at ease with things or in places that may, a priori, seem out of their world, three references are presented.

Joan Miro can be part of the child’s world

The first reference is to Joan Miro and how the elements that are critical to his work might be a strong reason for the children to appreciate his art so much. After accepting that there are many ways to appreciate art and that the adults don’t perceive in the same manner as children, it is also important to agree that adults can’t exactly know what a child feels in front of a Miro.

However, looking closely at a three-year-old child’s drawings, picked at random among the many ones parents see everyday, a surprising parallelism with “The Encircled Prophet” by Joan Miro is observed. In both, continuous lines of different thickness, drawn in primary colors, define simple shapes.

This parallelism might surely be of no relevance for an art student but, for thesis’ purpose, it suggests that the child might identify herself with Miro. For the child, **his paintings and sculptures are harmonic compositions of mainly bright colors, free lines and simple shapes, elements**

that a child is able to seize and recognize as belonging to her childhood world. Attractive colors, lines and shapes are the elements she is in touch with all the time when she is at home, at school or at the playground.

Bright colors and audacious lines bring also expressions of joy and trust on the faces of hundreds of children that visit Georges Pompidou cultural center everyday. “Beau Bourg”, (beautiful place) as Parisian children call it, is not only attractive because of its building but also because of what they might discover inside.

Museums’ discovery exhibitions are rich examples of successful child-centered designs

Related to its permanent or temporary exhibitions, George Pompidou cultural center offers workshops addressed to the children. They are created for the children to participate at the museum’s exhibitions. Although they are all worth referring, the one called “The gates to design or the object’s adventure”³ is the second reference.

The public for this exhibition ranges from 6 to 12 years old. Its contents are, “playing devices to let children discover the process of conception and production of everyday objects”. It is organized in three consecutive sections: “Choose an object”,

“Question the object” and “Discover the designer’s universe”. At the beginning the visitors “Choose an object” among many, offered at random. Then they “Question the object” through six furniture-games children face the basic questions linked to the object; each game is associated to a precise question like: what is it for?, what is it made of?, etc. At last they “Discover the designers universe” in three steps. First they view the design history by observing the collection of miniature chairs (Vitra edition). Then they are challenged to assemble six chairs of six famous designers through “the game of the ideal chair”. This game consists on putting together the photographic pieces of the chairs as parts of a large size magnetic puzzle. To finish, they have the possibility of going through some outstanding designers’ sketches.

The conception of everyday objects is not a children’s issue but if a child asks the young visitors about this exhibition they would probably answer: “It’s fun, you play games, make puzzles, discover famous designer’s chairs that are your size and, learn lots of things about everyday objects”. The children enjoy participating in the discovery experience; indeed the exhibition is successful, mostly due to its design merits.



³ “Les portes du design ou l’aventure de l’objet” <<http://www.centrepompidou.fr/Pompidou/Manifs.nsf/Docs/>> (24 Oct.2001)

Centre Georges Pompidou: main and side facades
Exhibition “Les portes du design ou l’aventure de l’objet”:
Presentation panel
Magnetic puzzle for “the game of the ideal chair”



The example presented above is far from being an isolated case. Other examples can be found in the San Francisco Exploratorium or the Children's Museum of Los Angeles, to mention just two; all around the world cultural institutions carry out this kind of discovery experiences.

While in touch with well-known elements, (for instance blocks, puzzles, paintbrushes, balls or their shadows), the youngest visitors naturally explore and discover. As a matter of fact, they participate and interact, feeling at ease inside a museum, which a priori might be considered an alien environment for them. Thanks to the way things are presented, not only can children intuitively grasp even the most abstract concept, no matter whether it is scientific or artistic, but also naturally perceive the museum as comfortable environment.

Designing with children: the Storyrooms' experience

Museums interactive exhibitions' experiences are an important reference as well for the paper: "Designing Storyrooms: Interactive Storytelling Spaces for Children"⁴, written by the research team of the Institute of Advanced Computer Studies at the University of Maryland. This paper is the last reference presented and it might be considered as a case study. After reading the first part of its abstract quoted in the lines that follow, it will certainly be clear how this team project was triggered by preliminary ideas similar to the ones regarding this thesis project.

"Costly props, complicated technologies, and limited access to space are among the many reasons why children can rarely enjoy the experience of authoring room-sized interactive stories. Typically in these kinds of environments, children are restricted to being story participants, rather than story authors. Therefore, we have begun the development of "StoryRooms", room-sized immersive storytelling experiences for children. ..."

A "Storyroom", is defined as a room with interactive elements in it to create a story. It can be viewed as "a theatrical experience where the

audience takes active part in the story". In other words, a story reveals only when "storytellers" (the users of the "storyroom") carry out certain actions. To make the "storyroom" work, the designers need the children to do more than participate, so under no circumstances can the children feel intimidated. The challenge for the "storyroom" designers is to develop the right environment for the children to become story authors. This means to create an attractive inviting environment of friendly, intuitive, even spontaneous use. That is to say an environment where the children become authors because they feel inside a childhood world. To achieve their goal, the team members of the University of Maryland incorporated children as part of their design team and worked together. Even if this is not the case for this thesis project, four of the team's research conclusions are relevant to its purpose:

- **A critical part of the children cognitive development is in negotiating the physical environment**
- **The importance of familiar objects cannot be minimized**
- **A number of researchers over the past few years have combined the power of computation with the familiarity of the child's world.**
- **If children are mere story participants**

rather than story authors, it is because most of the storytelling environments are the result of adult's imagination, not children's.

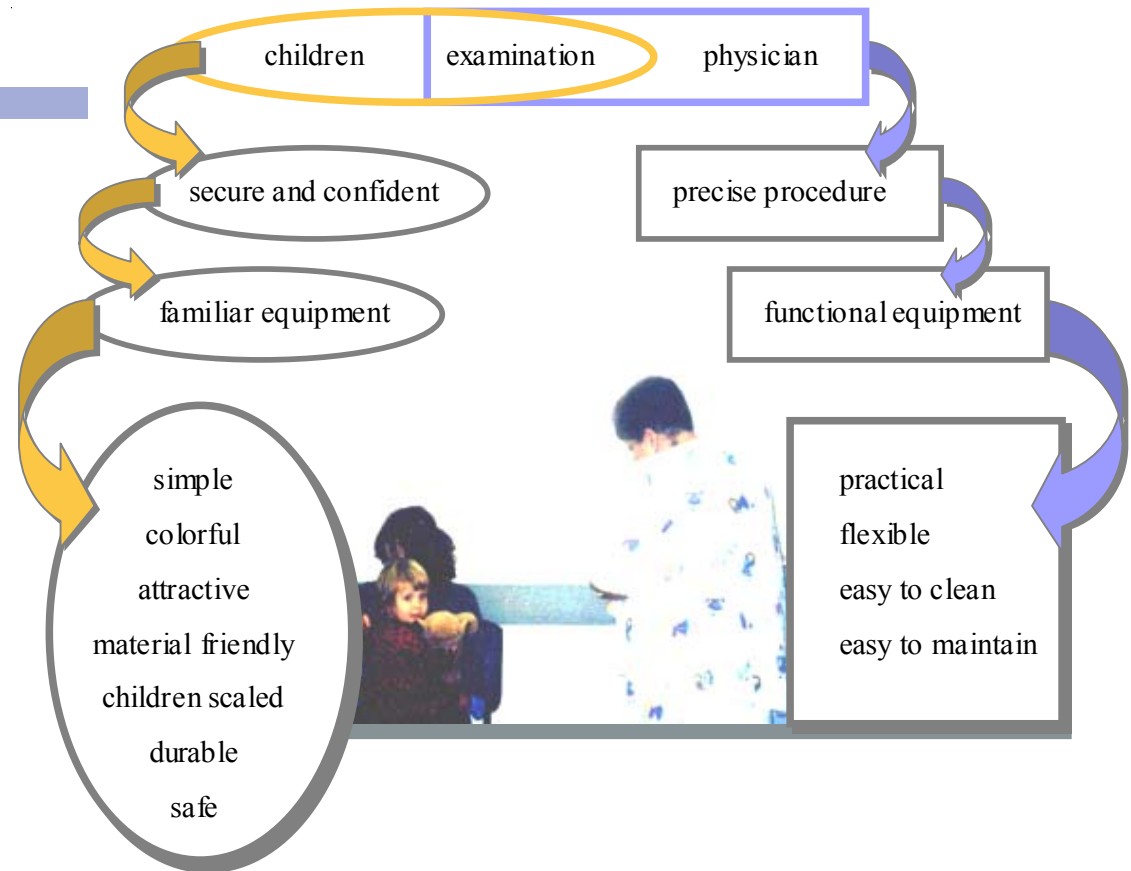
At the time this third reference came into the research process, information obtained from the Ethnographic research was already processed. Never the less the above four points were not only relevant but also reassuring.

After going through the three references that support the preliminary ideas, it can be assumed that: if the children are able to recognize familiar elements integrating a particular object or within a particular environment, even in an alien environment, they perceive the environment as "familiar". Moreover, they feel at ease and act naturally.

Having said that, another point that needs discussion is that many times adults believe they already know how children feel and what they like. As an adult, any designer is tempted to believe so, yet he cannot afford the mistake if his project involves children. Although integrating them to the design team might be questionable, there is no doubt that the start point in developing a project involving children is obtaining precise information about them. Ethnographic research is certainly the most effective method to achieve this objective.

Why is ethnographic research the most effective method the designer has available to obtain information about children? Because anyone who is in touch with children knows that asking them is the least effective way to obtain information. While undertaking an ethnographic research the designer rather than merely asking, inquires through observations. It is through the research subjects' acts, and their stories, that the information is revealed. And when the subjects are children this is a particularly effective method.

Of course, ethnographic research is not only effective with the children. On the contrary, it is a well-known method that the industrial designer borrows to study any user in interaction with an object inside a real-world environment. If he applies it, letting the users communicate their experiences regarding the product through their acts and free comments, it is because he knows this is an effective way to deduce real needs. Moreover, he hopes to infer "wants", which might be explicit or implicit in an attitude.



Ethnographic research

Based on the former arguments **ethnographic research is undertaken as part of the design process for an innovative PET. It effectively focuses on both participants of the pediatric exam and PET's users: the pediatric patients (the children) and the pediatric healthcare professionals (pediatricians and nurses).**

It should reveal, in physical-functional and emotional terms, not only the needs but also the expectations the users have regarding a PET. Besides, it should find out if a child-centered design for a PET is worth being developed. Finally, it should point out the critical design elements to ponder in the child-centered design criteria for a PET.

The information obtained, using together different data collection procedures, such as informal chats, videotapes, photographs and interviews, is synthesized in the two charts presented on pages # 12 and 13. The following paragraphs describe the research process and its goals, while highlighting important or unexpected data that comes from the ethnographic research itself.

In the pediatric examination room

The first part of the process takes place inside a

typical pediatric examination room at the pediatrician's office and consists of observations and interviews. The goal is to study how the pediatric healthcare professionals and the pediatric patients behave during the pediatric exam routine procedure, to deduce some design criteria.

First, the observations reveal that the exam procedure is precise and implies specific physical-functional needs. According to the way the pediatric healthcare professionals act, talk and dress, it is also clear that they are looking forward to gaining the patients' confidence and trust. The pediatric patients' behavior, however, shows the anxiety they experience.

There are different levels of anxiety according to the different ages of the pediatric patients' (from infants to teenagers). And there are many causes for the anxiety due to the very nature of the medical exam procedure (even a routine exam can include shots or a throat touch) Therefore at this stage, there is no clear relationship between the patient's behavior and the exam room environment, its equipment, or the PET. It will be clearer later when comparing this behavior with the one observed inside the children familiar environments. However, it is meaningful to notice that the child's scale is not considered in the equipment design and everything looks "gray".

Second, the interviews with pediatricians and pediatric nurses confirm the well-defined functional needs observed, and that the concern for the children's comfort during the exam procedure really exists. Moreover, they reveal that a child-centered design for pediatric equipment might be interesting as far as it doesn't compromise the equipment's clinical functionality.

In addition, some unexpected considerations arise during the interviews. They don't come from a direct answer to the questions that trigger the chat but rather from the pediatricians' free comments and stories. Two of these new issues concern the PET design. The first one is the fact that **some equipment specified as "pediatric" exists in the market but is too expensive to be worth buying.** In other words, although it might be useful it becomes nonessential because of its cost. The second one is the fact that, **since the youngest pediatric patients are accompanied to visits with their parents, the latter might be considered a third participant in the pediatric examination.** A last significant consideration is that despite the pediatric caregivers' efforts to be quick, half of the time patients spend inside the exam-room is waiting-time. **The exam-room equipment and particularly the PET is not only "in use" during the pediatric exam procedure**

but also during the previous waiting-time.

In a children “familiar” environment

The second part of ethnographic research is linked to the preliminary ideas already exposed at the beginning of pre-design research section. Its final goal again is to deduce some design criteria but in this case, the research subjects are children in interaction with their physical environment. It takes place inside many well-known children-familiar environments: the classroom, the playground, and the children’s section of the library and the bookstore. Different examples of the mentioned places were observed and in more than one occasion

The first step of this second part is to collect trustful data. This means to observe, talk or play with children of various ages, take pictures and videotape them (to keep a reference record) and to have informal conversations with parents, teachers and school supervisors. **The information synthesis allows establishing a children’s behavior pattern inside an environment qualified as “familiar” and demonstrates that the children feel naturally at ease when they can interact with some specifically designed equipment.**

The second step illustrates the impact the environment has on the children’s behavior. **It assesses the importance that the elementary education philosophies give to the environment in the child’s cognitive development when they even suggest guidelines for the design of the classroom environment.**

For example the Montessori philosophy coins the term “absorbent mind” to refer to the ability the young children have to learn unconsciously from the environment. In like manner, the Administration of Early Childhood Education of the Municipality of Reggio Emilia includes the same concept in the expression: “the environment is the third teacher”. Besides, when it comes to guidelines to create the classroom’s physical environment, both philosophies value reference elements within a complex sensorial environment to ensure the children’s comfort and confidence. A global complexity is desirable to stimulate the learning capacity through exploration but a local simplicity is necessary for the children to seize the whole. For instance a child-scaled equipment defines the activity areas and within these areas the learning materials are attractive, colorful, and of intuitive manipulation.

Both first and second step’s results encourage the

last step. The last ethnographic research step deduces what defines a particular environment as “familiar” in design terms; in other words, **it defines which are the design elements that trigger a natural feeling of comfort. When it comes to a child-centered design it is critical to consider children’s anthropometrics, bright colors, simple yet intriguing shapes, and well-known durable materials. Besides, the children’s safety must also be seriously addressed.** From those elements one should be able to extract which ones are critical to ponder in a PET’s design that might contribute to the children’s comfort during the routine pediatric exam.

To summarize, the pre-design ethnographic research study reveals practical-functional, cultural-emotional, and economical needs. It reveals users’ expectations that the proposed PET should contemplate, as well as some potential interest in an alternative pediatric equipment based on a child-centered design. And last but not least the ethnographic research helps to establish the design criteria to apply on the first concept sketches.

“the people we study or seek to help have a culture of their own.” 11