ERBOL – Design of devices to support physical and affective interaction for children.

Ivett Lilian Flores
Ivett.flores@gmail.com

Germán González
gerg@telefonica.net

Koray Duhbaci
duhbaci@gmail.com

ABSTRACT
In this paper we analyze the design of an interactive system that supports physical and affective interaction for children. After participatory design with children, radical changes to our first design approach aroused. We state that children must be part of every step of the design process of systems designed for children.

Author Keywords
Interactive, tree, affective interaction, kids, participatory design, cooperative inquiry.

INTRODUCTION
Kids spend too much time with toys that make them passive like playing computer games and other individual activities that don't require too much energy or collaboration with others. Even though these activities can foment the creativity and education of the children they lack an important feature of children development, physical interaction [3].

Children have to spend more time outdoors, collaborate with each other, and become a member of society. Our question is how affective interaction design can help to solve this issue.

Nintendo says that in the next ten years gaming will be about game play [5]. Interfaces that provide gesture and context input open very rich ways to overlay digital interactions onto the real world with more physical, tangible, embodied relationship. Embodied interaction works so well in games, because it is extremely easy to learn and it involves body movements as a very natural interface.

In this paper we analyze a project named "Erbol", its design process and why including children in this process is important in terms of affective interaction.

DESCRIPTION OF THE WORK

Design for kids without kids
The design team consisted of three adults in the beginning phase. The task was to find an affective interactive application or system. We came out with the idea of an interactive tree, "Erbol" which is a made up name from Electronic and "árbol", tree in Spanish. The first conception of "Erbol" was:

It is a tree that tells stories about feelings or nature, while hugging it or while you climb it. By climbing it in different ways, it will tell you different stories. When the top of the tree is reached, the way down is through a slide that goes inside it. The function of the slide is to make children get excited by the adrenaline produced while going down as fast as possible.

We though of our user group as children, but we did not really set any age, gender or number of simultaneous users at this point. The main idea was to affect kids by telling them a story, changing the flow of the story depending of the kid's selection of branches while climbing.

It is natural for children to climb trees, they like it, provides them with physical exercise and makes them be outdoors and enjoy the nature. We want to promote the idea of collaboration, and physical activity among children by enhancing their climbing experience with story telling and special effects like sound and music. The reward of reaching the top of the tree would be an entrance to the internal slide. We thought about physical security for children that fell from the tree. We decided to place a thick mattress underneath it.

The emotions that we wanted the kids to experience while climbing the tree were: intrigue, amusement, excitement, scare, romance, empathy with the nature. Different emotions can be raised by the use of special sound effects, music and lights on the tree. One example could be a scary branch, with faint light, sound of wind blowing on the background and probably a little bit colder. Kids will get easily involved in this environment. The slide, a key difference between our tree and the normal ones, would provide kids with an exciting experience freeing a lot of energy from their bodies.

Our first design approach was to make the design and then test it with kids, not designing the tree together. After reading some papers and talking with experts on designing for kids we realized that we should change our approach to the design. We decided to make children participate in the design.

Including kids into the design team
To design interactive devices for children requires understanding children's world and culture, which from an adult point of view is very difficult. In order to understand the children needs, we decided to make them active designers of the device.

Children live in an adult world that they do not fully understand. Their activities are restricted, supervised by their parents and teachers like going to school, doing their homework, watching t.v. They do not really have the opportunity to express themselves when interacting with adults. In participatory design with kids, they need to realize that their ideas are as valid as the ones from the designers and feel comfortable with the adult designers [4].

We decided to make a cooperative inquiry with children [2]. The subjects were Christopher, 12 years old, male, Samuel, 8 years old, male and Lina 7 years old, female. We observed them while they were climbing some trees and asked them questions about why and how they did it. Both the interviews and the climbing were recorded.

We explained them our idea of "Erbol". Then we asked each of them to draw how they imagined the tree. As we had seen in the cooperative inquiry that their style and needs while climbing were really different, we decided no to allow them to collaborate while doing the drawings.

 The drawings produced varied radically. Lina and Samuel produced a tree with branches close to each other while Christopher drew a tree with no branches at all, but with stones, as if the tree were a climbing wall.

From the interviews and the drawings we realized that our first design was focused in a narrow group of children. Some children prefer to climb in a relaxed manner, enjoying the views and with the feeling of safety, while other children prefer the feeling of exercising to the limit. For the first group of users, our first design would have worked, for the second, the only emotion that our design would provoke is boredom, as they would have to stop in every branch to listen to the story and then continue climbing, breaking the excitement of physical exercise.

The children were not just an evaluative tool, but also active design members. During a brainstorming session about their drawings, they suggested new applications. They said they would like to climb the tree in a competitive way, two players at the same time. While climbing they will find objects that, when touched they will turn into the color of the player. The player with more items, would win the game. Another application would be that the tree shows the path to the children to climb, coloring the branches the kid must climb. The kid should remember the path and climb the tree in that way, as the project described in [1].

The problem with this short period design project is that children need time to become part of the design team. Experiences have shown that a design team of adults and children is fully productive only after six months [3]. We spent only one day with them and even though one member of our design team knew them, it seemed that they were not very eager to say all the ideas that came through their mind.

RESULTS / FUTURE WORK

With this design idea we want to create an environment that makes children exercise while they are having fun. Children like climbing trees. We want to enhance the experience by providing story telling and games, either competitive or collaborative.

This application could also be useful for children with problems of overweight or disabilities, because they have the opportunity to exercise themselves in a controlled environment. We believe that this application can improve their quality of life and showing them how fun physical exercise is.

To design the device more work is needed. From our experience and the references [2], [3] and [4] it is clear that adults can not step into children shoes and design systems for them. A mixed design team of both children and adults can be the solution. Children should be involved on the creation of their own fun.

One of the most common ways for children to express themselves is in gaming. There, they are free to express themselves and are not tied to adult rules. With devices like "Erbol" their expressive freedom will be increased, as new applications and games can be developed.

A new generation of computer games is arising [6]. They will jump out from the screen of the computer and become part of the real world. With this paper we suggested a computer game that foments kids interaction through competitive or collaborative games and can make her feel the same emotions as when she goes for a walk in the forest.

REFERENCES

1. Liljedahl, M., Lindberg, S. & Berg, J., (2005) *Digiwall – an Interactive Climbing Wall*. ACE2005 Valencia, Spain, June 15-17. http://www.tii.se/sonic/

2. Druin, A. (May 1999) *Cooperative Inquiry: Developing New Technologies for Children with Children* Proceedings of CHI'99, Pittsburgh, PA, USA, May 15-20, ACM, New York, 592-599

3. Alborzi H., Druin A., Montemayor J., Platner M., Porteous L., Sherman L., Boltman A., Taxén G., Best J., Hammer J., Kruskal A., Lal A., Schwenn T.P., Sumida L., Wagner R., Hendler J.. Designing StoryRooms: Interactive Storytelling Spaces for Children , *Designing Interactive Systems* (DIS) 2000, 17-19 August 2000.

4. Druin A, *The role of children in the design of new technology, Behaviour and Information Technology*, 1 January 2002, vol. 21, no. 1, pp. 1-25(25),Taylor and Francis

5. Touching new interfaces. Interview with Matt Jones. *http://www.thefeature.com/article?articleid=101500&ref=7*

6. Lankoski, P.; Heliö, S.; Nummela, J.; Lahti, J.; Mäyrä, F.; Ermi, L. (2004). *A Case Study in Pervasive Game Design: The Songs of North*. NordiCHI 2004. Tampere, Finland, 413 – 416