Design Methods for Child-Centred Interactive Television

Ana Vitória Joly
University of Brighton
A.V.B.Joly@brighton.ac.uk

Abstract
This paper outlines methods to involve preschoolers on the design of iTV interfaces in order to make interactive services accessible and usable for this age group.

1. Introduction

According to Ofcom, although today children have increasing access to a range of electronic media, TV appears still to be a secure part of their cultural 'diet'. The same report highlights that television is more important than other media because of its universal accessibility to all classes, ages and types of children (Davies & Thornham, 2007). In the United Kingdom, interactive television (iTV) might be accessible to all classes once 86% of the homes already have digital TV (DigitalUK & Ofcom, 2008). But most of the interactive services on iTV, including applications for children, have textual interfaces and complex navigation structures that prevent young children to interact on their own. As a result, iTV services are certainly not accessible to all ages and/or types of children.

On technology research user involvement is identified as crucial to gain a better understanding of their needs and goals leading to a more useable product (Preece, Rogers, & Sharp, 2002). The interaction design for children literature already underlined the importance to have users contributing as research partners during the design (Druin, 1999). However, iTV researches still focus on children as merely testers evaluating the interactive services at the end of the design process (Hynd, 2006). Design methods being employed on a research that analyzes iTV interfaces for young users are discussed in this paper as well as the possibility to result on a child-centred interactive television, accessible and usable to pre-literate children.

2. Requirements and Ideas Gathering

During the initial stage of the research, children's needs and capabilities were defined according with the literature. Design guidelines and standards for iTV were combined with guidelines for interaction design for children and children psychology and development theories to compile requirements for the iTV interface.

Following this phase, it was decided to observe users in order to be more familiarized with the age group, refine requirements, obtain inspiration and ideas. The observation sessions were also a good opportunity for the researcher to get to know children and their behaviour and to make them feel more comfortable with the researcher's presence on the following stages of the study.

Five children (three boys and two girls), three and four years old, were observed while playing on the Nursery setting. These data were collected in form of field notes during four sessions lasting three hours. The data was coded and categorized, actions and procedures were defined and informed improvements on the prototype.

3. Defining the Interface Structure

It was then decided to involve users on the subsequent stage of the research. To define the structure of the interface children were asked to sort cards into pre-determined categories. This procedure was used to check how well the categories fit children's expectations.

To accomplish this, a card sorting activity was designed inspired on the Dimensional Change Card Sorting (DCCS) task used to determine extradimensional shifting abilities in young children (Kloo, Perner, Kerschhuber, Dabernig, & Aichhorn, 2008).

There were two side-by-side shoeboxes, each with a plastic sheet to display a pre-defined category and a slot through which the child should post an image. Two categories were displayed at a time and children were asked to post the card in the box they found more appropriate. Two new categories would then be displayed. Four children aged three to four years old (two girls and two boys) participated in this experiment. Each child

was tested individually in one session that lasted for approximately ten minutes.

During this study it was found that preschoolers are capable of categorising and understand the categorization process. As it was predicted from psychological studies (Kloo et al., 2008; Smith, Cowie, & Blades, 2003) the four year olds performed the task better than the three year old. The two four year olds in the pilot test placed nine out of twelve images in the correct box.

After the data analysis it was noted that there were some wrongly pre-determined categories that most children misinterpreted, so they had to be re-established to improve the interface. Given that children of this age are capable of categorisation, they could benefit from an interactive service that takes into account their developmental level and concept of categories. And this can be achieved involving them on the definition of the interface structure and navigation with an appropriate card sorting activity.

4. Low-tech Prototyping with Children

Previous data collected were informing the prototype being developed but there were still a lot of points to be clarified such as icons to be used and where to place them on the screen. At this point it was decided to ask children for direct input on the "look and fell" of the interface. Scaife and Rogers (1999) suggestions for low-tech prototyping with children, such as the use of laminated images which could be manipulated against a background, were combined with some ideas to work with younger children as design partners (Guha et al., 2004) to create a session appropriate for this age group but not as time consuming as the cooperative inquiry.

There were two sessions, with four children participating on each session (three girls and five boys). A TV screen was printed on an A3 paper and given to children along with laminated images and crayons. Participants were asked first to choose icons, one for each category, then to compose their own interface using the icons chosen, if they wish, and/or drawing. At the end of both sessions there were eight prototypes made by children. Overall, there were random choices and influences such as colours that made children choose certain icons to compose their prototype. But some ideas for the icons to be used could be taken, when most children chose the same icon to represent a category, and some concerns on other icons were raised, when children seamed confused with the options provided. Mainly, the session was great to understand how children can comprehend the interaction process, while they paste images and draw creating their interface children talked about what they were doing and what would happen during the interaction with their prototypes.

5. Future Work

The design methods described on this paper are informing an interactive TV prototype to be tested on the following months. We will then evaluate if the child-centred approach made the application more accessible and usable to pre-literate children and discuss if children involvement on the design process could be the first step to interactive TV services universal accessible to all classes, ages and types of children.

Acknowledgments
I would like to thank the collaboration of children from One World Nursery and my supervisors Dr Lyn Pemberton and Richard Griffiths for their encouragement, guidance and support.

References

Davies, M. M., & Thornham, H. (2007). *Academic Literature Review: The future of children's television programming*: Ofcom.

DigitalUK, & Ofcom. (2008). *Switchover Progress Report Q4 2007*.

Druin, A. (1999). *Cooperative inquiry: developing new technologies for children with children*. Paper presented at the Proceedings of the SIGCHI conference on Human factors in computing systems: the CHI is the limit.

Guha, M. L., Druin, A., Chipman, G., Fails, J. A., Simms, S., & Farber, A. (2004). *Mixing ideas: a new technique for working with young children as design partners*. Paper presented at the Proceeding of the 2004 conference on Interaction design and children: building a community.

Hynd, A. (2006). *Evaluating four and five-year old children's responses to interactive television programs.*, Murdoch University.

Kloo, D., Perner, J., Kerschhuber, A., Dabernig, S., & Aichhorn, M. (2008). Sorting between dimensions: Conditions of cognitive flexibility in preschoolers. *Journal of Experimental Child Psychology, doi:10.1016*(j.jecp.2007.12.003).

Preece, J., Rogers, Y., & Sharp, H. (2002). *Interaction design: beyond human-computer interaction*. New York: John Wiley.

Smith, P. K., Cowie, H., & Blades, M. (2003). *Understanding children's development* (4th ed.). Oxford: Blackwell.