

Electronic Programme Guide Design for Preschool Children

Ana Vitoria Joly¹, Lyn Pemberton¹ and Richard Griffiths¹

¹ University of Brighton, Lewes Road, BN2 4GJ,
Brighton, United Kingdom
{ A.V.B.Joly, Lyn.Pemberton, R.N.Griffiths @ brighton.ac.uk }

Abstract. The proliferation of audiovisual content available for young children brings with it the need for an appropriate Electronic Programme Guide (EPG) that meets needs and preferences of pre-schoolers. Two approaches to the design of such a service are discussed. Firstly, a range of existing guidelines on interactive television applications, personalized recommendation systems and interaction design for children are reviewed, in the context of theories of child development. Secondly, we explore the potential for children's collaboration during the categorization process to create a user-appropriate information architecture and interface.

Keywords: Electronic Programme Guide, Children, Interactive Television

1 Introduction

The Electronic Programme Guide (EPG) is a vital component of interactive television, enabling viewers to find their way in an ever-increasing landscape of audiovisual content. The design of EPG's has been addressed by a number of studies, focussing variously on efficient EPG design [1,2] and personalized recommendation systems [3-5], yet these researches tend to assume a homogeneous adult audience. However, it may be that significant sub-groups within the television audience might benefit from specialised EPGs. For pre-school children, for instance, television viewing is part of the daily routine and is often an activity performed unaccompanied. Despite a general concern about TV's negative impact on children's development several studies underline that programmes designed specially for young children benefit their cognitive and social development [6]. As part of a larger research project analyzing iTV interfaces for young users, in this paper we discuss the design issues raised by the development of an EPG for (and with) pre-school children, which could be used independently and which would provide access to adult-moderated content.

2 Guidelines for EPG Design

Guidelines developed for interaction and interface aspects of general EPG's need to be supplemented with child-oriented approaches. While adults can manipulate complex remote controls, children have small hands and less developed motor skills, suggesting that a limited number of keys should be used in the remote and paging should replace scrolling [7, 10]. Given limited reading skills, text on the EPG menu could be replaced by real world metaphors associated with simple words [9]. Animation and audio on rollovers can help indicating where to find functionality [9] while clarifying what to find on the selected button.

For navigation, Bakhshi (2007), for instance, proposes thumbnails, which allow viewers to perform tasks with drop-down menus. Children up to the age of five, however, appear to be able to hold in memory only one chunk at a time, suggesting the use of a flattened hierarchy instead of sub-menus [7]. On the other hand, studies of adult users demonstrated that navigation by colour buttons works well, with colours and labels used carefully to match buttons of the remote only when this correspondence is intended [1, 2]. Since pre-school children can match and name four primary colours [8] the use of colour buttons should also be explored on applications for young users. As in applications for adults the core functionality needs to be presented consistently and be available throughout the application [10] with icons always visible and placed in the same position [9]. Children usually focus on the middle of the screen so important icons should be placed in the middle of the page [7]. Kindergarten children are imperfect in the course of their actions and tend to make errors [12]. A proposed solution to help with error prevention, recognition and recovery is to map children's action directly to actions on the screen [9].

Studies on personalized recommendation systems could also offer some inspiration but will need adaptation. The EPG-Board, for instance, integrates a to-watch planner with a message board and a rating and tagging system [5]. The SenSee Framework combines the context with user profile to improve the multimedia consumption experience [3]. And AIMED is another personalized TV recommendation system based on user properties such as activities, interests, moods, experience and demographic information [4]. Young children don't read or are not expert readers, so text should be avoided to reduce cognitive load [9]. In this case, a message board could be hard to be incorporated; but rating could be appropriate and recommendations based on user profile and preferences would also be relevant and useful, this could be set by children or by parents with what they think best suits their children's needs.

3 Methodology: closed card sorting with pre-school children

Search and classification present a particularly difficult problem for this audience. Bakhshi (2007) recommends two complementary methods in the context of searching for video. The 'bag of words' approach where viewers can search for content by entering keywords and the 'Subject/Genre/Channel' approach where viewers can choose videos within a set of pre-defined categories [13].

The first approach suggested would be hard to be implemented for pre-school children. Even with a speech interface such as that developed in the VISTA project [14], the children's limited vocabulary and possibly idiosyncratic speech patterns would make the task complex for both system and user. Browsing via established categories is more viable and adequate for this age group. However, conceptual categories should not be merely characterized in terms of objective properties of categories members. Human conceptual categories have properties determined by the nature of the people categorizing and have properties that are a result of imaginative processes [15]. We therefore felt the need to involve children in the process to define categories for the EPG: in this way, categories appropriate to the user group would be developed, making their browsing tasks easier to accomplish.

According to Piaget, children from 2 to 7 years old are in the preoperational stage in which they begin to understand the classification of objects. About the age of four years, children begin to classify in a more systematic way, however they are unaware of the principles of this operation, cannot explain why they have done it and cannot carry the out the activity of classification in a fully satisfactory way [16]. For this reason, an open card sorting task, process that involves asking participants to sort items into meaningful groups would not be appropriate. However, children could be asked to sort cards into pre-determined categories (closed card sorting). This procedure can be used to check how well the pre-assigned categories fit children's expectations.

We designed a card sorting activity inspired on the Dimensional Change Card Sorting (DCCS) task frequently used to determine extradimensional shifting abilities in preschool children [17]. In current UK EPG's, children's channels are found grouped under a simple "Kids" heading, with no further sub-categorisation. This indicates a need for further categories to be labelled. For the study, suggested categories were pre-determined based on children's channels websites such as CBeebies, CBBC, CITV and Disney, children's films categories from Amazon and books categories from the International Children's Digital Library. This resulted in seventeen categories: movies, cartoons, music and songs, make and do, animals and nature, fairy tales, super heroes, around the world, TV shows, Cbeebies, CBBC, CITV, Jetix, Disney Channel, Boomerang, Cartoon Network and Nick Jr.

Four children aged three to four years old (two girls and two boys) participated in a pilot experiment. Each child was tested individually in one session that lasted for approximately ten minutes. First the researcher introduced herself and asked the child if s/he watched television and what was hers/his favourite programme. The researcher then explained that she was working on a TV guide for children but she did not know many children programmes so she needed children's help. She asked if the child could help her: if s/he decided not to help or to stop helping at anytime it was acceptable. Following this introduction the researcher described the card sorting activity. Two side-by-side shoeboxes were designed, each with a plastic sheet to display a pre-defined category plus a slot through which the child posted a laminated card showing a thumbnail screenshot from a programme. Two predefined categories were displayed at a time and the child's task was to post the card in the box they found more appropriate. First the researcher showed the thumbnail and asked if the child recognized it. If they did, the child was asked to post the card into a box. There were icons representing each category but the researcher read out the names of the

categories for clarity. If the child did not recognize the screenshot, the researcher would show another picture of the same category. If the child did not recognize any screenshot available for a determined category, they were asked to choose a screenshot and place it on the box it would be most appropriate. Two new categories would then be displayed. In all, twelve screenshots would have been sorted.

This card sorting activity was a pilot test conducted with a very small sample. Further studies will need to be carried out to produce results that are statistically significant, but there were interesting outcomes that are worth reporting. Some screenshots such as the cartoon “Pingu” were identified instantly and inserted immediately in the correct box, with the child stating that it should go in the “CBeebies” not in the “CITV” box. The four children also identified the “Club House Disney” picture and put it in the “Disney” box instead of the “CBBC” box. This is evidence that young children do associate audiovisual content with the channels on which they appear. The “Wild Show” was a screenshot with two deer: no participant recognized the show but they all said it belonged to the “Animals and Nature” not to the “Cartoons” box. Thus these children could manipulate abstract categories.

No single screenshot was assigned to the wrong category by every child but the three last screenshots to be presented were mis-classified by all but one child. This may be due to tiredness at the end of the session, but it could also be due to wrongly pre-determined categories. In the case of “Teletubbies”, for instance, the choice was between “Super Heroes” or “TV Shows” and three children promptly chose the “Super Heroes” box. If children really consider “Teletubbies” super heroes they would certainly expect it to be in the super hero’s category and the EPG should display that, reflecting children’s views and choices. However, the most important result is that preschoolers are capable of categorising videos. As we would predict from psychological studies [16, 17] the four year olds performed the card sorting task better than the three year old children. The two four year olds in the pilot test placed nine out of twelve screenshot in the correct box. Given that children of this age are capable of categorisation, they could benefit from an EPG that take into account their developmental level, preferences and concept of categories.

4 Future Work

As the amount of video available for children increases the EPG will have to be modified to meet preschooler’s needs and allow them to find content according to their preferences. Guidelines suggested for iTV applications, personalized recommendation systems, interaction design for children along with children developmental theories could inform an appropriate design. But they do not replace user involvement during the design: the most important elements of the Electronic Programme Guide, such as structure and categorization, should have direct input from the end-users. The method described here is one way of eliciting this design information and will be refined for application in further work.

Acknowledgments. We would like to thank the collaboration of children and staff from One World Nursery.

References

1. Daly-Jones, O.: Case Study: The usability of electronic programme guides. In: Gawlinski, M. (ed.): *Interactive Television Production*. Focal Press, Oxford (2003)
2. Eronen, L., Vuorimaa, P.: User interfaces for digital television: a navigator case study. Proceedings of the working conference on Advanced visual interfaces. ACM, Palermo, Italy (2000)
3. Aroyo, L., Bellekens, P., Bjorkman, M., Houben, G.-J., Akkermans, P., Kaptein, A.: Sensee Framework for Personalized Access to TV Content. In: Cesar, P., Chrorianopoulos, K., Jensen, J.F. (eds.): *Euro iTV*. Springer, Amsterdam, The Netherlands (2007) 156-165
4. Hsu, S.H., Wen, M.-H., Lin, H.-C., Lee, C.-C., Lee, C.-H.: AIMED- A Personalized TV Recommendation System. In: Cesar, P., Chrorianopoulos, K., Jensen, J.F. (eds.): *Euro iTV*. Springer, Amsterdam, The Netherlands (2007) 166-174
5. Iatrino, A., Modeo, S.: EPG-Board a Social Application for the OmegaBox Media Center. In: Cesar, P., Chrorianopoulos, K., Jensen, J.F. (eds.): *Euro iTV*. Springer, Amsterdam, The Netherlands (2007) 31-36
6. Hynd, A.: Evaluating four and five-year old children's responses to interactive television programs., Vol. Doctor of Philosophy. Murdoch University (2006) 313
7. Hutchinson, H.B., Bederson, B.B., Druin, A.: The evolution of the international children's digital library searching and browsing interface. Proceeding of the 2006 conference on Interaction design and children. ACM Press, Tampere, Finland (2006)
8. Sheridan, M.D., Frost, M., Sharma, A.: *From Birth to Five Years: Children's Development Progress*. Routledge, London (1997)
9. Chiasson, S., Gutwin, C.: *Design Principles for Children's Software*. Computer Science Department, University of Saskatchewan (2005)
10. Gawlinski, M.: *Interactive Television Production*. Focal Press, Oxford, UK (2003)
11. Gilutz, S., Nielsen, J.: *Usability of Websites for Children: 70 Design Guidelines*. Nielsen Norman Group, Fremont, CA, USA (2002)
12. Mansor, E.I.: 'My world(s)': a tabletop environment to support fantasy play for kindergarten children. Proceeding of the 2007 conference on Interaction design and children. ACM Press, Aalborg, Denmark (2007) 193-196
13. Bakhshi, O.: The Implications of Convergence on EPG Design: Enabling the Mediation of Content through Converged Technologies. In: Lugmayr, A., Golebiowski, P. (eds.): *Euro iTV*. TICSP, Amsterdam, The Netherlands (2007) 9-16
14. Carmichael, A., Petrie, H., Hamilton, F., Freeman, J.: The Vista Project: Broadening Access To Digital TV Electronic Programme Guides. *PsychNology Journal* 1 (2003) 229-241
15. Lakoff, G.: *Women, Fire, and Dangerous Things: What Categories Reveal about the Mind*. The University of Chicago Press, London (1987)
16. Smith, P.K., Cowie, H., Blades, M.: *Understanding children's development*. Blackwell, Oxford (2003)
17. Kloo, D., Perner, J., Kerschhuber, A., Dabernig, S., Aichhorn, M.: Sorting between dimensions: Conditions of cognitive flexibility in preschoolers. *Journal of Experimental Child Psychology* doi:10.1016 (2008)