Design for social interaction through physical play

Tilde Bekker, Janienke Sturm, Emilia Barakova

TU Eindhoven, Department of Industrial Design
P.O. Box 513, 5600 MB Eindhoven
The Netherlands
{m.m.bekker, j.sturm, e.i.barakova@tue.nl}

Nine very interesting position papers were submitted to our workshop on Design for Social Interaction and Physical Play. The papers, presented in these proceedings, cover design concepts for very diverse user groups and contexts of use. Creating novel concepts is often done using theories about human behaviour as an inspiration source. This introduction describes the content of our workshop along three dimensions: user groups, context of use and related theories.

1 User groups

A number of papers focus on designing interactive products for children, sometimes combined with other user groups such as elderly. **Abeele and De Schutter** describe a design project of an intergenerational game controlled with the Wiimote is designed for children and elderly users. Both **Wainer et al.** and **Barakova** describe projects in which robots are used to stimulate interaction between autistic children. In the paper by Wainer at al. autistic children receive classes about programming Lego robots where they are motivated to collaborate while creating their Lego programs. In the paper by Barakova autistic children are motivated to collaborate by jointly having to interact with a life-size controller that interacts with a robot in a storytelling context.

The work by **Sturm** et al. focuses on designing open-ended intelligent play objects for children that are stimulated to social interaction through the negotiation of game rules and goals created by the children themselves. The paper by **Leal Panados** et al. describes the design process of an intelligent cuddly toy. Children have to care for their toy through diverse physical and social interactions and are rewarded for good behaviour by the toy staying healthy. **Novoa** draws a link between challenges of children on the one hand and design students on the other hand in participating in social and physical (design) activities. He discusses how both groups can be supported in their inquisitive process without being hindered by the limitations of products they interact with and which lack meaning and place.

Other papers describe projects for adult users. For example, the work by **Decortis** describes how the use of low-tech camera-like tools are used to stimulate people to explore their environment both through creating photos but also through a discussion about the artifacts created with the pinhole cameras. The work by **Ludvigsen** et al. on iSport explores how to apply technology to enhance various sport-related activities, such as training of professional athletes, game experience of spectators and sport

education in schools. The work by **Visser and Vastenburg** explores mechanisms for social interaction and introduces the concept of Social Nudge to describe persuasive concepts that stimulate social interaction between for example parents and children that just moved out house or between elderly.

2 Context of use

Technological developments such as miniaturization of technology, and sensor and actuator networks provide new opportunities for creating playful experiences in the context of social and physical play. In addition, designing dedicated games will stimulate social interaction through collaboration or competition. The technologies that are covered in the projects in the workshop are fairly diverse and cover a large part of the topics that we included in our workshop description.

Diverse research areas look into aspects of social interaction and physical play. In *sport-like contexts* Mueller et al. [10] have designed various networked sport-like games to stimulate social bonding. They use ideas about designing for social interaction to make physical activities more appealing. They explore whether collaborative and competitive aspects of the design contribute to the enjoyment of the games. The project by **Abeele and De Schutter** is based on Wiimote controlled computer games which clearly falls in the area of exertion interfaces.

Social and physical interaction is also a theme that plays in role in the relatively new area of *tangible interaction*. The framework by Hornecker and Buur [7], which consists of four themes, which are tangible manipulation, spatial interaction, embodied facilitation and expressive representation, nicely illustrates this. Embodied facilitation and spatial interaction are the two themes most related to our workshop topic because they are related to social and often also to physical interaction. The projects by **Sturm** et al. and by **Leal Penados** et al. explore mobile solutions based on sensor actuator technology for intelligent play objects.

Pervasive games, such as Uncle Roy All Around You [1] also combine social interaction and physical play. These games are often based on existing computer games, but are enhanced by adding a physical and networked dimension. For example, the mixed-reality game Uncle Roy all around you integrates aspects of the physical world (a city) and a virtual game world: street players and online players must work together using web cams, audio and text messages to find a secret destination. We received no submissions related to pervasive games.

Social play also plays an important role in the field of *robotics*. Keepon [6] is a small robot designed to perform emotive and attentive exchange with human interactants (especially children) in the simplest and most comprehensive way. Keepon is used to study the underlying mechanisms of social communication. Its simple appearance and actions make it possible for infants and children to interact with it as well as adults. The projects by **Barakova** and by **Wainer** et al. are placed in the context of programming and interacting with robots.

Some of the other submissions are harder to relate to a particular research area. **Decortis** applies low-tech camera tools for exploring the environment. Some of the

other papers were not yet specific about the type of technology that would be applied to create social and physical play concepts.

3 Related theories

One workshop goal is to share information and experiences among researchers in the area of social interaction through physical play. The work covered in the workshop is inspired by theories from diverse areas. A number of references are made to theories about social interaction and collaboration. For example, Parten's [11] theory about the development of social play in early childhood, describes how children develop from playing in a solitary manner, through parallel play to being able to play in a collaborative manner. The theory by Broadhead [3] about early play and learning describes how children's communication also develops from non-reciprocal to more reciprocal actions and language when being able to play in a more collaborative manner. Other relevant concepts that were mentioned were for example turn-taking, imitation, joint attention, shared gaze and helping activities as being indicators of social communication.

The papers also provide theories related to physical interaction. The work by Lackoff and Johnson [8] is used to understand how our bodies are the basis for how we build up our experiences and interactions with our environment. Ideas about kinesthetic empathy by Fogtmann [6] and kinesiology (the science or study of (human) movement) are used as input to look into how people can learn and explore through their movements. The work by Bruner [4] and his ideas about enactive knowledge (which is knowledge stored in the form of motor responses and acquired by the act of "doing") is also mentioned in the context of thinking about physical interaction. The theory can help to explore different types of physical interaction styles.

4 Conclusion

Social and physical interactions have been explored in very diverse components of everyday life. In addition, there is an increase in the number of persons with social impairments. The papers presented in the proceedings explore the opportunities that new technologies offer not for individual entertainment, but rather for social and physical interaction in order to fight this isolation and to enhance the benefits that the social engagements have brought to human society. They describe a wide diversity in terms of the technologies applied, such as robots, computer games, cuddly toys and low-tech camera tools to enhance activities such as exploring the environment, participating in sports activities, education, playing physical computer games and being connected to other people.

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