Interaction Design and Children: Reflections on our field

Introduction to the session

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This document presents some reflections upon the field of Interaction Design and Children compiled for the purposes of the panel session “Views on our field” on the first day of the IDC 2006 conference, at Tampere, Finland.

The need to reflect on progress, identity and scope arises in most scientific fields – as they are defined and redefined by researchers convening at related conferences and considering themselves members of the corresponding research communities. Such reflection is rarely if at all included in conference themes or calls for papers. Occasionally a paper may challenge some of the perceived wisdom in the field or will make apparent the shift in the mindset of researchers over the years or the changing mix of people that make up the community. In some occasions, even in longer established communities such as HCI, conflicting reviews on papers question whether some research contribution ‘belongs’ to this field or not. This dialectic has been part of the nature of IDC from its very beginning, when the first event was held in Eindhoven, the Netherlands. In 2002, the foundations of the field had already been laid by Druin, Scaife, Rogers and Kafai among others and there was a growing research interest in designing technologies for children. In shaping the first call for papers for IDC Tilde Bekker and I outlined implicitly what we thought the scope of the field should be. The conference themes were as follows:

- Children as participants in the design of interactive systems
- Evaluation techniques for children users
- Changing capacities, technological needs and interests of children
- Interaction design issues in games, educational software, and other interactive products for children
- Input devices and interaction styles for children
- Guidelines for designing for children
- Guidelines for involving children in the design process
- Successful cases of interaction design involving children
- Innovative interactive products and technologies aiming at children
- Techniques for collecting children's requirements early in the design process
- Empirical studies of children as users of interactive systems
- Theoretical models of interaction targeting children users.

This list could reasonably well capture the content of this year’s papers. Perhaps the latter two themes of the list above have been less represented in IDC papers in these years. This original selection of themes for IDC portrays a focus on human-computer...
interaction, seeing this field as a sub-field of human computer interaction, reflecting our own research backgrounds.
Comparing the papers that were presented in that first event, to those that we have seen in the years that followed leading up to this 5th event, we note that they have gradually tended to include less emphasis on product design, with the absence of major toy manufacturers being the most striking. The conference traveled to the States for a couple of years, including a larger USA representation than before welcoming representatives of the Constructionist education approach pioneered by Papert and the Participatory Design approach advocated by Druin.

Following the first enthusiasm and energy that comes with building up of a community around a novel conference series, last year’s conference at Boulder Colorado, triggered participants to start the reflection process on our future aims and past achievements. Two papers seemed to catalyze this debate. First, Mitchel Resnick’s retrospective presentation on his research on technologies to support learning, highlighted achievements and experiences from one of the most influential research programmes in our field, how targets are changing over the years and how some remain elusive. Second a paper by Jensen and Skov presented a systematic analysis of the publications in past IDC proceedings and related publications, invited the audience to write reflective and theoretical papers and directly engaged us in a reflection process about our field.

This gradual maturation of the field was reflected in shaping the IDC 2006 themes, where the chairs of the 2006 conference directly invited authors to contribute “reflections that offer manifestation, insight, opinion, criticism or other thought-provoking well substantiated analyses on the state or phenomena in the field of IDC”. The invitation for reflection papers was clearly stated in the call for papers, but as Jensen and Skov noted in 2005, these are hard to come by. The views of our field session was organized to continue the discussion from last year, trying to answer the question of what is the field, what is our relation to neighboring disciplines, which overlaps or crossovers are needed for this community?

Participants in this session represent different perspectives in the field of Interaction Design and Children. They were invited to engage in retrospection about their own work, to reflect upon the progress of the IDC community and to discuss how this community should evolve and position itself with respect to related research fields. The short bios and abstracts they provided are presented below. We hope their presentations inspire the audience and give food for thought but also that the audience will provide interesting feedback to them.

We hope that the “views on our field” session at IDC 2006 will trigger some discussions regarding the nature of our field and its direction that will perhaps extend to the whole community of researchers in Child Computer Interaction, beyond those present today.
Emphasizing science, diversity, and developmental impact

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Juan Pablo Hourcade is an Assistant Professor at the University of Iowa's Department of Computer Science. His main area of research is Human-Computer Interaction, with a concentration on technologies that support creativity, collaboration and information access for a variety of users, including children and older adults. Dr. Hourcade completed his graduate studies at the University of Maryland's Human-Computer Interaction Laboratory where he obtained his Ph.D. in Computer Science in 2003. Dr. Hourcade is actively involved in the research community, serving as Papers Chair of the IDC 2004 Conference, and Papers Co-Chair of the IDC 2005 Conference.

Areas where IDC is doing well
I believe the work presented at this conference shows evidence that as a community we are doing well in terms of applied research (using technologies to help children learn, collaborate, express themselves, and have fun), the use of novel technologies, and methodology (involving children in all phases of the design process).

Areas for improvement
I believe there are three areas where we could do better. The first is in terms of conducting more basic research on children’s evolving cognitive and motor abilities and how these affect children’s use of technologies. Most interaction design work in HCI involves developing and testing a new interaction style, or comparing two styles. Most of the time, these interactions are designed based on experience, intuition, and work with children. Experimental data on children’s abilities would be a positive addition to these interaction design ingredients. This work is often not very attractive to the HCI community at large because it usually does not involve innovation and may not provide immediate guidelines or recommendations for interaction design. However, I believe it is crucial to the development of HCI and IDC as mature fields. Another area where we have done some as a community, but could do more is in terms of using technologies to empower children of low socioeconomic status and underrepresented cultural groups. Oftentimes we refer to children in general in this conference, but we are just referring to some children in the countries we come from. We need to try to broaden our target populations across social, economic, and cultural lines.
Finally, we need to do a better job of demonstrating that our work has a positive measurable impact on children’s lives. While we can sometimes show short-term gains, there is very little research on the longer-term impact of the technologies we develop. How many studies can you think of that follow children using a novel technology for at least a year to understand the impact the technology has in their lives? The lack of this type of studies is often related to an issue of funding, but at the same time, these are the types of studies that can bring further funding and solidify the reputation of our field.
A Play on Words

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Dr Janet C Read is the leader of the ChiCI group, a research group focusing on Child Computer Interaction. Her research interests focus on the use of digital ink technologies with children but she has also published several broad papers on the evaluation and design of interactive products for and with children. She has participated in every IDC conference, co-chairing IDC in Preston in 2003 and chairing tutorials in 2005. She is chairing a master class on Child Computer Interaction at IDC 2006. She is co-editor of a special edition journal on methodological research in Child Computer Interaction.

A Play on Words

It was as my third daughter began school that I fell into research in child computer interaction. She was a little over four, moving onto full time education and I was looking for an academic challenge. About that time, speech recognition was being touted as the soon to be universal input method for writing and composing text and I wondered about how my daughter, and other children, might succeed with such systems.

Language and interaction are very much intertwined. Machines require us to communicate with them in a shared language that we, and they, understand. It is the same with humans but, in interactive dialogue, there are ample possibilities to repair poor interactions and ‘fix’ unconventional utterances. Because they are young, the language of children is not the language of adults, it has a different vocabulary, words have different meanings, and, whether written or spoken, it is not always easy to understand.

I dabbled in speech recognition for children for a while, then realized that I was probably wasting my time and moved into pen based systems and handwriting recognition. My motivation was, if the writing of children could be recognized, the potential for playing with their writing would be great.

Play is what children do. As little children they play with toys, then they play with their peers and siblings, then, as they morph into strange adolescent creatures, they play with the adults! Eventually, many of them have lost the ability to play and they end up as watchers of players, a poor substitution indeed!

In the IDC community there is a plethora of research around children playing with technology, most of this is at a somewhat superficial level and concerns itself with research ‘findings’ that indicate that children enjoy the technology or that the children are engaged with the activity presented to them. Given that many young children can be engaged by a moving screen saver or a dreadful TV programme, we are hardly reporting anything surprising! A fun activity is expected to be fun, therefore it will be fun and there is very little else to say. The papers present well, there are cute pictures of children playing and we get to attend the conference.

My view is that the IDC community needs to grow up to move evaluation beyond the obvious and design into new spaces. We need to start thinking outside the box and lay down some new theories of interaction and resist applying standard interaction language to children’s spaces.
There is more though! A word processor is not meant to be fun, neither is an internet search engine, but, were these applications designed for playfulness, how might they look? For too long, we have used an interaction model for children that has been inherited from our work with adults. Imagine how an interaction model for children might look? There would possibly not be gulfs of execution and evaluation, rather in a playful space there might be puddles to go round or through or tempting coppices full of potential that would draw children away into new interactions.

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Nina Walia oversees development of websites and games for PBS’ Webby-award winning pbskids.org. She joined PBS Interactive in 2004 and has worked with producers on a variety of award-winning television program sites, such as Cyberchase and Dragon Tales. Before coming to PBS KIDS, she earned a MS in Information Design and Technology from Georgia Tech where she examined how handheld computers can be used effectively by middle-school science students for data collection, sound designed a responsive media space for the Topological Media Lab, and designed & created shisha, a digital mirror to reflect collective identity exploration and contextualize discussion within an online community for second generation South Asian Americans.

A healthy balance all around

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I have a background in Industrial Design Engineering (MSc in 1988, and a PhD in 1995). I worked at Queen Mary and Westfield College in London for 3 years, before starting my work at the Eindhoven University of Technology in Eindhoven in 1997. Most of my research has focused on user involvement in design. I have been working on design and design methods for children for the past 6 years. My research interests include development and assessment of design and evaluation methods for interactive products for children and the design of persuasive products for children to stimulate them to live a more healthy life.

Products need to appeal to children’s interests and developmental level. An important question when designing technologies for children is what the added value of the technology is for children. Design methods also need to match with children’s interests and developmental level. Here the question is: what makes them work and do they deliver quality outcome?
I have done research on how to develop products for young children, such as a communication product for children and working parents and an educational game for the zoo. These designs were often inspired by the developmental phase of young children, such as the need for safety and care, for exploration and for learning to observe details in your environment. More recently I have started working on the design of persuasive products for children to create awareness about balance between eating and physical exercise. This work builds on ideas such as those described by J.B. Fogg on Persuasive Technologies and work by Deborah Lieberman on designing persuasive computer games for children.

Furthermore I work on developing and assessing design and evaluation methods for children products. I have been involved in a number of case studies on early design methods, such as the KidReporter method and Photo and Text diary methods for gathering user requirements. More recent research with Wouter Sluis Thiescheffer focuses on comparing early design methods for groups of children. This work is related to work by Allison Druin and Yvonne Rogers. I have also conducted research, most recently with Wolmet Barendregt and Ester Baauw, on empirical and predictive evaluation methods, to determine how to optimize evaluation efforts of children’s products. This research is related to work on evaluation methods by Mikael Skov, Johanna Höysniemi, Panos Markopoulos and by Janet Read and Stuart MacFarlane. Looking at the state of the IDC field, much more work is needed to explore the wide diversity of how children interact with technology, for different purposes, in diverse contexts of use, using a wide range of technologies. This work should address topics such as the added value of the technology, be it from an educational, social, fun, persuasive or other angle. To explore these issues properly related evaluation criteria and methods need to be developed. My own future research focuses on continuing to assess methods on quality of outcome and satisfaction of participation. This also requires developing assessment procedures, i.e. how to measure the outcome quantitatively and qualitatively. Furthermore, I will explore the application of theoretical concepts, such as challenge and persuasion, as an inspiration source for the design of children’s products.

Profiling the Child-Computer Interaction Literature

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Mikael B. Skov’s research interest is centred on design and evaluation of mobile systems with a particular focus on understanding and extending existing approaches to mobile systems. Furthermore, he is doing research within usability engineering focusing on simplifying usability evaluations and investigating the involvement of children during interaction design. During the last years, I have conducted or managed more than 100 usability sessions with children particularly on social aspects of evaluating children’s technologies.

Abstract

During the past decade, there has been a significant increase in the published work relating to children and interaction design where the IDC conference series strongly support this development. As a consequence, we are currently seeing that child-
computer interaction (CCI) is becoming a vibrant sub-field of human-computer interaction (HCI). However, while HCI has been growing in importance during the last decades and has matured as a discipline, CCI is still rather immature and finding its way. At the same time, research methods have been objects of discussions for decades and defining research methods is still a substantial challenge. However, it is important to understand how research methods have been adapted in different disciplines as it potentially informs us on future directions and influences on the discipline.

Inspired by studies within information systems and related disciplines, we wish to evoke the discussion of research methods adapted in CCI during the last ten years. Thus, we conducted a classification of research methods in paper publications within child-computer interaction (CCI) published in the period 1996-2005. From a total pool of 3296 papers, 132 papers on CCI were selected and classified on a two-dimensional matrix on research method and purpose. Our results show a strong focus on engineering of products as applied research and on evaluation of developed products in the field or in the lab. Also, we find that much research is conducted in natural setting environments with strong focus on field studies. Finally, gender issues are important in many research studies with children while age issues play less significant roles.

A wide-angle lens on Child-Computer Interaction

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My work over the past 25 years has focused on literacy and technologies but only in the last four years have I centered that work on children. Literacy presents some especially interesting opportunities for this community because it is so deeply technologized already, because its twin components – reading and writing – are so profoundly fundamental to children’s educations, and ironically because its key activities are virtually invisible to us. Reading has been especially difficult to study because it leaves no visible traces. Yet it is deeply implicated in so much of what children already do with interactive technologies – text messaging and chatting and blogging and emailing – and is almost always involved in the tools this community develops and explores with children.

Some of the important contributions of the IDC community to broader or more general questions in interaction design include the community’s insistence that children are not simply smaller adults; the diligent work that has explored and validated techniques for observation and for participatory design practices that are deeply respectful of the differences between adults and children; and the widespread use of field studies and action research that foreground the importance of studying technologies in use in naturalistic settings.

We might think about the work of this community across two dimensions: both what we study and the methods we use. In both areas there are some clear differences
between this community and the more general fields from which it developed. Looking at children and their interactions with computing technologies has obviously opened up a whole new range of questions and has necessitated some innovative strategies for testing propositions, mostly involving techniques for gathering information. The novel methodologies and adaptations have yielded important results, though I think we still have work to do in this area. We could use some better accounts of the interpretive activities that necessarily arise from participatory design practices, field studies, and action studies.

Much of the research, as Jensen and Skov’s paper last year demonstrates, looks at particular artifacts, interfaces, interactions styles, often in the context of building educational widgets, either for formal schooling or for informal learning. What that focus leaves out is the totality of children’s lives and lived experiences, and the important ways the technologies we help develop inform and shape the cognitive, emotional, and the social lives of our subjects. The field could benefit, I think, from some contributions that use wide-angle lenses. By that I mean infusing some of the thinking in the field with relevant issues from social studies of science and technology, where nuanced discussions about larger cultural, social, and economic impacts of technologies take place. But I also mean longer-term investigations of technologies in use. These kinds of studies are especially difficult to undertake with children because children’s lives are generally more constructed by powerful people (parents) and institutions (schools, family life) than are the lives of adults, or at least these agents play a more obvious role in the shapes of children’s lives and in their social practices than they seem to do in the lives of adults. Funding for extensive and longitudinal studies may also be problematic.

Perhaps such work would take us out of the most well-defined orbit of traditional interaction design and HCI work. And it will certainly not be for everyone. But I think pursuit of these wider studies would provide invaluable context for the field.