Evaluating Experiences of Autistic Children with Technology

Katharina Spiel
Vienna University of Technology
Vienna, Austria
katharina.spiel@tuwien.ac.at

ABSTRACT

By looking at autistic children as a user group, my PhD work seeks to *reevaluate* existing concepts of technological experiences and broaden them in order to deepen the understanding of them. Next to this *theoretical work*, it establishes a *systematic methodological tool set* assessing the experiences with technologies in a multi-faceted and more holistic way than previous concepts, which allows research into user experience to better consider its situated context. Through a series of *case studies*, I plan to show the feasibility of my approach.

Author Keywords

Authors' choice; of terms; separated; by semicolons; include commas, within terms only; required.

ACM Classification Keywords

H.5.m Information interfaces and presentation (e.g., HCI): Miscellaneous

INTRODUCTION

Most technologies that are commercially available to autistic children[1] have not been validated beyond the claims of their developers[2]. Additionally, a large portion of these technologies focus on "functional deficits" (compare the approach to technologies in e.g., [17, 1]), defined by a mainly allistic[3] society setting implicit as well as explicit norms in behaviour. Because of this, the success of such a technology is evaluated in a normative fashion focusing on skills: Can the child now do a given task better? What are the success rates? Within the OutsideTheBox project, we design technologies together with autistic children targeting their holistic well-being. Evaluating these technologies forces us to focus more on their experiential qualities. My PhD work tries to find out how we can assess the experiences autistic children have with those technologies.

Doing so, I cannot rely on assumptions of users' life worlds, because autistic children perceive the world fundamentally differently (cf., [7]). Current concepts of technological experiences (e.g., [20]) fall short in providing an understanding that goes beyond researchers' capabilities of empathy (see [27]).

Through my PhD work, I expect to broaden concepts of technological experiences to include more diverse modes of experience, develop a methodological tool set to assess these experiences and show the feasibility of both concept and tool set through a range of case studies from the OutsideTheBox project.

RESEARCH TOPIC

There is little research into the experiences autistic children have with technologies that are designed for their holistic well-being, have meaning in their lives and make sense to them such that they can share positive experiences made with the technologies with their environment. When assessing these technologies, I am driven by two aspects I focus on:

- Which experiences do autistic children have with technologies that have intrinsic meaning in their lives?
- How do they share these experiences?

It is vital to this research to develop a methodology that makes it possible to elicit direct feedback from the children in a way that makes this feedback comparable and meaningful. Since difficulties with communication are one of the core characteristics of autism (cf., [9]), gathering their opinions has to be conducted flexibly in terms of the childâĂŹs preferred mode of communication. There is little work on how to include autistic and non-verbal children directly in the assessment of technology (exceptions include e.g., [8]). I will incorporate the children's opinions from different viewpoints and have them participate in making meaning about their experience with the technologies. For this, I require methods that consider the child's perspective on their lived experiences. Hence, my thesis will also consider suitable methods:

- In which ways can a researcher pay attention to the point of view autistic children present about their experiences?
- How does a systematic methodological tool set look which supports flexible means to directly elicit the opinions of autistic children look like?

[1] While the discussion about advantages and dis-advantages of person-first language is still ongoing, I opted for label-first in order to respect the predominant self-chosen form (cf., [16]).

[2] notable exceptions can be found, e.g. here: http://www.dart.ed.ac.uk/asdtech/app-reviews/

[3] meaning non-autistic, as coined by [19]

- How can a researcher outside of a shared life world use different angles from which to assess the child's experiences in order to come to meaningful conclusions about these experiences?

BACKGROUND

Autism is seen as a spectrum condition with a plethora of symptoms which differ from case to case. While the root cause is not yet clear, it is deemed to be a combination of environmental and genetic factors [9]. Symptoms vary and can include differences in reciprocal socio-communicative interaction (compared to allistic people) or repetitive interests and behaviours. Due to a surge in diagnoses, the condition receives a lot of attention among parents, professionals and researchers [2].

One of the most prominent theoretical understandings of experience in HCI has been conceptualised by [20]. They established a notion of *felt* experience that puts the user in the centre instead of focusing on designers' goals. By giving space to subjective truth, they acknowledge the user as a *social actor* (in reference to [25]) and their interactional situatedness as relevant. With that they created an adaptable concept that is applicable to a wide range of everyday contexts. Their concept relies heavily on the notion of researchers' empathy with their users [27]. Such a focus can help inform design, but is even more limited when assessing technologies. Especially since autistic individual experience the world around them differently and make sense of it in a different way [7], a researcher lacks the situatedness of these experiences.

Previous work showing how autistic children can be included in a design process also helps guiding strategies for eliciting their opinion about artifacts. However, only some research projects focusing on technologies for autistic children (e.g., [21, 14, 26, 5]) include them in the design process. This has led to an increase in research into how design processes with autistic children have to be shaped, such as which aspects to support [10], whole frameworks for design sessions [4], work on how to interpret feedback [11], guidelines for the setting in which design processes can come to fruition [3] or a definition of researchers' roles within the process [12]. It has since become clear, that it is indeed possible to include autistic children in participatory design processes. Recently [13] discussed the potential tensions arising by the limits of empathy between researchers and autistic children and how to expand on those limits.

Considering the different sense making processes of autistic children and taking their different perceptual experiences into account, there is a need for a conceptual opening of the term experience as used in HCI, a systematic methodological underpinning of that concept, an overview of suitable methods that include the children's perspectives as well as applied examples for such a framework.

PREVIOUSLY CONDUCTED WORK

While I started working within the OutsideTheBox project in September 2014, I am officially enrolled in my PhD since March 2015. My main supervisor is Prof. Dr. Geraldine Fitzpatrick, supported by Dr. Christopher Frauenberger – both located at Vienna University of Technology. Also part of my supervisor team is Prof. Dr. Eva Hornecker from the Bauhaus-Universität Weimar.

Within the OutsideTheBox project, we completed our first year in June 2015, providing me with an extensive data set that I am currently exploring, structuring and analysing. The first year prototypes are discussed along their embodiment paradigms as companion technologies in a first-authored full paper accepted at TEI'2016 (Conference on Tangible, Embedded and Embodied Interaction) [24]. Recently, I also submitted a description of my conceptual work to a journal [23]. Several other publications are in preparation.

I'm also heavily involved in co-designing the prototypes, which I will later assess. This opens up ethical questions about ownership of the design process and aligning participants' and researchers' goals within participatory design. Hence, I want to be able to reflect on the design process in situ as well as post-hoc in order to establish the contributions made by invested parties. For example, me taking up a different role towards a child (on a similar level as play partner or as an active observer with more authority, cf. [12]), might play a role in the experiences the children have, although my desire is that that is not the case.

One of the main questions driving me right now is how I apply my conceptual work to our actual use cases in different stages for different purposes, e.g. evaluation and reflection. Especially how I can analyse the participatory design phase to inform the construction and evaluation phases, is an important question to me.

METHODS USED

Due to the setting within the OutsideTheBox project, where we develop unique technologies for the individual children we work with, my research does not aim at generalisability or produce facts, but rather produces situated knowledge transparently. This means that through a comprehensive mode of critical reflection, I provide my perspective on the experiences autistic children have with technologies together with a description of how I came to have this perspective and, thus, enable others to go similar routes.

Currently, I am extensively survey related topics with a special focus on technologies available to autistic children at the moment. Using Actor-Network Theory (ANT) [18] and Critical Discourse Analysis (CDA) [15] as conceptual underpinnings of a discoursive approach that allow situating actors within a network of interrelations, I will map out and qualify the experiences autistic children have with technologies.

In order to develop a suitable tool set I explore different types of data elicitation such as team protocols, ethic questionnaires, documentation, object speculation, material speculation, video recordings, sketches, photos or logs (see for a description of data and in which phases they are gathered, Table 1).

This data will be elicited from case studies within the OutsideTheBox project along three different phases (Contextual Inquiry, Participatory Design and Evaluation). While each of these phases has unique goals and foci, they are useful to

Table 1. Possible Set of Data Sources

Data Type	Data Collected	Temporal
Text	Research Diaries	throughout
	Project Protocols	throughout
	Interview Protocols	beginning
	Ethic Questionnaires	middle
	Session Plans	throughout
	Evaluation Questionnaires	end
	White Board Documentation	throughout
	Publications	end
	Logs	end
Physical	Final Prototype	end
	Intermediate Prototypes	middle, end
	Workshop Materials	throughout
	Folder Material	throughout
Audio/Visual	Session Video Recordings	throughout
	Fotos	throughout
	Audio Recordings	end
	Sketches 2D/3D	middle, end

consider under different circumstances as well. For example, the protocols from contextual interviews: initially they help us understand the child's life, during the design process, it can inform potential reassessments of the child's environment and finally, it works as a critical tool to reflect our findings with. Some data sources are limited to a phase, though, such as final questionnaires.

Hence, data analysis methods are varied and include quantitative assessment about the number of uses and a layout of when which buttons were pressed, item based questionnaire analysis and qualitative data analysis methods such as thematic analysis for open questions and interviews (c.f., e.g., [6]) or critical reflection (cf., e.g., [22]) towards artifacts. Through the case studies from OutsideTheBox, I hope to show how my concept works and the methodological tool set it establishes.

PLANNED STEPS

As a next step, I will further familiarise myself with creative data elicitation strategies addressing young children as user groups. This way, I will also be able to assess a larger variety of methods according to their suitability to our and similar contexts. How to establish which methods lead to suitable data informing my conceptual approach is a question that I am currently trying to tackle.

In June 2016, we expect to finish our second set of participatory workshops with autistic children within the OutsideTheBox project by handing over the final prototypes. For their evaluation – which will largely happen over summer vacation – I plan to design the evaluation goals and data gathering methods in a participatory fashion together with the children. Another problem that I am trying to solve in that regard is how I can define evaluation as participatory while bringing my own goals to the table and having surplus knowledge about potential methods.

Longer term, I plan to conduct further exploratory case studies in which I evaluate more established and functionally oriented technologies according to their experiential quality for autistic children. Additionally, I would also like to take a closer look into enjoyable technologies for other disabilities and how my conceptual work applies to allistic contexts.

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