Responsible Innovation in the Inclusive Classroom: a Case-Study

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ABSTRACT

Through a case-study of a research project on inclusive classrooms from a social justice perspective, we aim at highlighting the potential of technological probes to research values and develop consensus. We argue that: 1) The use of probes in school activities helped participants elaborating on their priorities; 2) They can enable researchers to give a shape to their standpoint, opening their choices to examination; And 3) they can support changes in values. We give a particular consideration to discourses surrounding the probes and their deployment.

KEYWORDS

values, value-sensitive design, conflicts, theory

INTRODUCTION

Stilgoe et al. [13] describe the Responsible Innovation (RI) as follows: "*Responsible innovation means taking care of the future through collective stewardship of science and innovation in the present.*" They argue this can be achieved through anticipation, reflexivity, inclusion and responsiveness. As Frauenberger et al.[7] highlight, however, there is no universal agreement regarding the research and innovations that are desirable. A main issue then is to research and understand the values at play [8], values being hereby defined as judgments guiding human conduct, following Dewey [5].

But as Dewey further argues, this is not enough: there is no well laid-out path to improve the world we live in. The best we can do is to achieve a democratic consensus of what to do next, knowing there will always be frictions. We have to act and take imperfect decisions that work in the here and now, while trying to predict their effect on the there and later. This case-study highlights how we used probes to investigate these values with a view to create both a consensus and a way forward.

Figure 1: Pictures from the qualitative inquiry, depicting a rehabilitation session, a braille notetaker, a blind pupil in a mainstream classroom and an assistant dog.

THE CASE-STUDY

The case study presented in this paper is a five-year participatory research project aimed at developing technologies to support the inclusion of children with visual impairments in mainstream classrooms, focusing on the teaching of geography and spatial skills. The research stems from a concern for social justice: inclusion of all children in mainstream classrooms is a civil right granted by the UN convention, but in practice, there still are inequalities preventing disabled children to thrive and achieve the same outcomes as their peers. The hypothesis behind this project, which is also at the heart of educational policies of the last decades [4], is that technologies lessen inequalities by supporting all pupils through personalized learning.

Within this project, we conducted a qualitative inquiry into primary school visually impaired pupils' experiences of schooling [1]. We aimed at implementing the Responsible Innovation framework, guided by an ethics of care [9]. To do so we invited all research participants to express values about general education as well as educational technologies. This led us to investigate the appropriateness of designing technologies to address the issue of inclusion in classrooms. In addition to observations and interviews, we designed probes explicitly embodying a set of values to elicit further value conflicts but also explore possible consensus.

RESEARCHING AND UNDERSTANDING VALUES

There are many methodological issues with understanding values for HCI, despite the fact value-sensitive approaches [8] are now well-established. For a start, values can be mediated explicitly [7] or implicitly, e.g. in the tools chosen and the organization of the design process [3, 11]. Values, especially when implicit, might not be understood the same way by all parties, and not all parties feel like they have the legitimacy to participate in discussing and deciding about values.

By probes, we refer to technological probes, prototypes placed in the field for "*understanding the needs and desires of users in a real-world setting*" and "*inspiring users and researchers to think about technologies*" [10]. They are little used as tools to elicit and understand values.

We used wearable and portable audio-recorders as probes at various stages of the design process. This began organically, as one child research participant used the researchers' audio recorder during an interview to play at being a researcher and interviewing himself. We then used these audio recorders to understand how children and carers differed in the value they attributed to the sonic experience of the school and in learning. This in turn elicited new discussions on the value of embodied and aesthetic experience at school and the risk of distraction from learning. As we were looking at differences of values in frictions and disagreements between individuals and groups, probes can help reveal new ones.

Figure 2: This image depicts the consumer grade audio recorders we used as probes. They serve both to collect material and to highlight the importance of the auditory experience during geography lessons. Notice the tangible buttons supporting independent use.

MAKING DECISIONS BASED ON CONFLICTING VALUES: EMBODYING THE RESEARCHERS' STANDPOINT

Further in the research project, we noticed that values we had associated during the analysis with the concept of social justice actually referred to two different concepts of social justice. The first was *economic redistribution* by trying for all children to achieve the same educational outcomes. The second was *cultural recognition*, i.e. the recognition of visually impaired people as a cultural group whose specificity should be acknowledged and supported. This would include defending that not everybody will be able to attain the same outcomes, but should be supported in their life choices. Our analysis suggested most participants leaned foremost towards the first concept but that it could impede the goals of inclusive education.

We thus decided to test design based on that finding and our own interest for cultural recognition. The ways the researcher's standpoint and own values shape the process and outcomes of design are often hidden in the final product [12]. Probes on the other hand were an excellent way to embody our standpoint when this could hardly be done in a theoretical manner with children this age. We introduced another version of the audio-recording probe as a way for visually impaired children to show their own ways of learning geography, their own spatial experiences [2]. The probes become our participation to framing the problem, though they remain open enough that they can lead to something else entirely.

BUILDING A NEW CONSENSUS

For our standpoint and focus on supporting cultural recognition to eventually convince participants, a new consensus needs to be developed. In this case, the teacher we partnered with was eager to try something new but adamant it should meet her own goals and metrics, that it proved "*better actual learning*," in line with her understanding of social justice. As for the children, they had strongly opposed the idea that they could feel part of a non-visual culture, that they could get a positive sense of identity from disability. Indeed, they mostly perceive this as stigmatizing, not as a way for them to better advocate for their needs to be met. Probes were an efficient way to negotiate another way of doing, in a complex environment, without draining too many resources. We were careful of the language used to introduce them: we referred to impact on learning as measured by standardized tests but also emphasized even show there can be something special they could teach to their non-disabled peers. One reviewer's comment on a publication of this project was that this was not sensitive to values or participatory because we were forcing an understanding of disability and social justice on our participants. At the contrary, we would argue that, given inclusive classroom policies still in effect marginalize disabled children [6], the participants hint at, but did not have much time to explore, alternative approaches to social justice in the classroom. Probes were an invitation, that could

be taken up or not, and for which uses are not yet entirely defined. Proposing synthesis of ethical problems through the building and careful description of probes could be a way for HCI researchers and practitioners to foster Responsible Innovation practices and mindset in society.

CONCLUSION AND PERSPECTIVES

This case-study illustrates how Responsible Innovation can be interpreted on a small scale as an impulse to rethink research goals and what counts as innovation, and why we might want to explore the use of probes for this kind of work. It does not however address wider issues at stake (such as educational and disability policies), and the long work of resources building, advocacy and expertise sharing that goes into scaling up situated initiatives and innovations. However, we wish to highlight one element for HCI researchers: the importance of discourses surrounding the probes, that consolidate the values going into their design. In our own research, we found this aspect too little discussed, as if objects and their values were entirely legible by themselves. Instead, more careful examinations of how they are introduced and how this influences uses, visions of the future and further innovations.

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