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Interpersonal expression in the special educational needs classroom: An experience-centred design case study

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ABSTRACT

This paper describes our Experience-Centered Design (ECD) enquiry into the current and potential role of digital photography to support interpersonal expression in a class of children (aged 11–15 years) at a mixed special education needs school. Presented as a case study, we describe five classroom-based creative workshops that engaged pupils with a broad range of complex special needs, and classroom staff. From these workshops, we generated a set of qualitative considerations for the design of digital photographic tools to support interpersonal expression in this setting. Additionally, we present the evaluation of a photo-sorting system we developed in response to our workshop findings and evaluated in the school over a period of 12 months. Our case study demonstrates how an ECD approach can guide a creative interaction design process in a special education needs setting, supporting interaction designers in empathising and responding pragmatically to the complex and dynamic interactions at play between the stakeholders. We further discuss design research approaches to user groups in such settings, and consolidate our insights about conducting research through design for social inclusion.

1. Introduction

Increasingly, special needs schools in the UK are using Information Communication Technology (ICT), including digital photographic tools, to support the delivery of their curricula and everyday expression in teaching and learning [1]. Such schools are therefore a relevant but currently underexplored setting for interaction design research [2]. In this paper, we report on a case study led by an interaction design research team that explored how photographic practices can support and enhance interpersonal expression amongst pupils and teachers at a UK school for children with a broad range of special educational needs. A central aim of this study was to generate qualitative considerations for the design of novel digital photographic tools for use by teachers and pupils in this kind of setting. A key concern within the research team was to use practice-based design methods to develop a tacit understanding of the 'real-world' needs, desires and experiences of our stakeholders in using photographic tools on an everyday basis.

The study formed part of a project funded by the Research Councils UK, exploring how digital technology may deliver social benefits to support and sustain communities that may otherwise be marginalised (http://www.side.ac.uk), with stakeholders in special needs schools being identified as a relevant community to engage with. The Special Education Needs (SEN) Code of Practice (2001) [3] defines children as having special educational needs if they have a *learning difficulty* which calls for *special educational provision*to be made for them. The broader term of *disability*, as defined by UK Government legislation (The Equality Act 2010), is having a physical or mental impairment with a substantial, long-term adverse effect on a person's ability to perform normal everyday activities. For the purpose of this paper, we draw upon the term Special Education Needs and Disability (SEND), used within this legislation, to describe the research population engaged in our study.

The *social* function of digital photography to support and enhance communicative environments, including educational ones (e.g. [4–6]), leisure (e.g. [7–9]), and even healthcare (e.g. [10]) is well documented in research fields relating to the study of Human–Computer Interaction (HCI). The social function of photography as a means of expression in *SEND classrooms*, however, is a currently underexplored setting for HCI and related research

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[2,11]. Interaction design research for SEND settings has only recently been reported in the related literature [12–17]. The SEND classroom arguably poses particular design challenges relating to the complex needs of pupils as well as the resources and strategies that teaching staff members use to support them, and the *practical* constraints necessarily imposed by the SEND school as an institution. Also, as we emphasise herein, it is important to ensure that pupils and staff can contribute to the research and design process, both to support their self-advocacy as stakeholders and ensure that any subsequent designs are effective and responsive to the setting and population for which they are intended.

Our case study sought to explore this challenging design space. Over the course of five 'Creative Photography' workshops, our research team employed an Experience-Centred Design (ECD) [18] approach to understand how photographic tools may be developed to support and enhance interpersonal expression between pupils and staff in a SEND classroom. In this paper, we report the qualitative findings of this study, demonstrating in the process how our ECD method was efficaciously put into practice to develop a novel 'Photo-sorting System' for use in a SEND school. We further report on our evaluation of this prototype to empirically ground our research understanding and design insights. A key proposed contribution of interest to the child–computer interaction research community is the account of our tacit understanding, as a design research team, of the SEND setting, guided by ECD. Furthermore, our case study contributes a set of wider considerations for interaction designers interested in developing photographic tools for SEND classrooms and related learning contexts.

2. Background

Before describing our case study, we first set out the rationale for why photography, conceptualised in terms of technologies and practices, has social value in SEND settings. We highlight some of the previous work that has explored the use of digital interactive technologies in the lives of children with SEND, and discuss previous approaches to designing for the SEND classroom.

2.1. Digital photography for the developing self

In recent years, HCI researchers have given increased consideration to children as a distinct user population [5,14,19–23]. Children are rapid adopters of emerging technologies, including photographic tools, and are pioneering their use in innovative ways [11]. When considering the *social* functions of these technologies, older children (8–18 years old) are a particularly interesting user group because they are at a key developmental stage for identity-formation and self-expression to others [24]. At this stage, their perceptions of self-image in relation to others may be a delicate concept mediated significantly by photography.

This social psychological phenomenon arguably gains new significance when considering the photo practices of older children with SEND [2]. These children often face difficulties in communicating their views, emotions, and experiences, leaving them with limited agency in decisions that affect their lives [ibid]. In such cases, photography has been found to serve as a useful vehicle for fostering self-advocacy and social understanding [25].

The concept of using photography to support social communication and expression – including storytelling – is also well established in the HCI literature [4,8,11,24]. It is also drawn upon more widely in clinical research to this end; for example, Levin and colleagues [10] describe the development of 'Aphasia Talks', a photography class designed to promote self-advocacy in stroke survivors with communication difficulties.

2.2. ICT design for children with SEND

There has been recognition in the past decade of the importance and benefits of ICT more broadly in the lives of children with SEND [2,12,13]. ICT is also found to have a clear social function for this population; the European Agency for Development in Special Needs Education's 2010 review of innovative HCI practice in SEND defines the role of ICT as enabling people to learn social development skills to facilitate their full and equal participation in education [26]. This endeavour is most relevant to the social context of the SEND *classroom*, as reflected in the notion of the equitable classroom [27]. Adding to this complexity is the school policy on the production and distribution of photographs; in a SEND context, children's vulnerability makes issues of privacy and disclosure a priority [28], with implications for ICT support.

Recent HCI studies that address design for children with SEND have tended to focus on specific forms of disability and impairment [9,15,16]. This can be seen in the ECHOES project [14]: whilst offering insights into the design of interactive systems for all children with SEND, the enquiry nevertheless focused on children in the autistic spectrum in a dedicated setting. In other work, Kientz and colleagues [29] discuss the benefits of pervasive technologies for children with autism from the perspective of caregivers. Mixed educational needs' contexts have been considered, however; Foss and colleagues reveal the complexities of such contexts in their documentation of a Cooperative Design enquiry with older children at a school supporting mixed learning and communication needs [13].

Our case of the SEND mixed ability classroom focuses on teaching pupils with a *broad* spectrum of needs including combinations of both cognitive and physical impairments, including issues with mobility, dexterity, social, behavioural and emotional control, as well as profound communication difficulties [2]. Our case further engages staff *and* pupils as stakeholders, thus providing multiple perspectives on the context. By highlighting previous studies focusing on specific impairments, we demonstrate the relative novelty of our objective, aligned with [13], to explore a mixed ability SEND setting from multiple stakeholder perspectives.

2.3. Children's participation in design research

There is a small but growing literature in HCI on the participation of children in interaction design processes. An early exploration of children's involvement as such by Allison Druin suggested four potential roles for them, of User, Tester, Informant, and Design Partner [30]. Within Druin's framework, the child as *User* involves their use of a technology being studied by an adult to inform its development. Within this role, the child has limited agency in the appropriation of the tool and its development, although their involvement in the research is most easy to manage. The other roles capture a greater degree of involvement from the child in design research and development. As *Tester*, the child may offer direct feedback on technology use to the researchers in response to direct questions. This is intended to be empowering, although the child remains uninvolved with the original design; they are responsive to it. Children act as *Informants* when they inform the original design process, with the adult researchers 'in charge'. And as *Design Partners*, children are equal research stakeholders and involved in the design process throughout. Druin promotes the Design Partner role as one that is aligned with and broadly inspired by the values of Participatory Design (PD) [ibid].

More recent studies have addressed how different levels of ability, and the contexts in which they are located, determine the types of contribution a child with SEND can make [15,16], and how their orientation to the design process may be structured and interpreted [13–15]. For example, Guha and colleagues [15] take