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CHATTERBOX: A MULTI-DISCIPLINARY APPROACH TO CO-DESIGN

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ABSTRACT

How might Design approaches developed by a multi-disciplinary team support and improve communication between Dental Health Support Workers and socioeconomically disadvantaged families?

Children living in Scotland's most deprived communities suffer from higher levels of tooth decay than children living in more affluent communities (Macpherson et al., 2012). Despite improvements in Scottish children's oral health through national oral health programmes (www.child-smile.org), non-attendance at dental appointments is considerably lower in areas of greater social deprivation (Deas et al., 2010).

As part of a wider research programme to explore the barriers to accessing dental care and to promote child dental registration, dental researchers partnered with designers and developed a tool to enable effective communication between vulnerable families and Dental Health Support Workers (DHSWs).

The communication interface tool that emerged through a co-design and prototyping process was a 'boundary object' (Griesmer et al, 1989) called CHATTERBOX. CHATTERBOX is a visual tool that assists effective communication and helps parents and DHSWs build stronger relationships through the development of a better understanding of the complexities of the daily routines faced by vulnerable families.

CHATTERBOX has been implemented in two of Scotland's Health Boards. Initial evaluations suggest that the intervention results in better adherence with oral health behaviours.

CHATTERBOX acts as a communication interface and visual platform to [i] help parents identify and speak of their problems and consider potential solutions and [ii] to enable DHSWs to tailor their support to the expressed and felt needs of vulnerable families, facilitate relationship building and thus improve the families' access to dental care.

Keywords: Healthcare, Co-design, Communication

1 INTRODUCTION

This paper discusses an interdisciplinary innovation process undertaken by dental health researchers and service designers to address oral health inequalities.

Oral diseases are a global problem affecting 3.9 billion people worldwide, with 35% of the world's population suffering from untreated tooth decay in permanent teeth ([Marcenes et al., 2013](#)). Although tooth decay is entirely preventable, it remains one of the most common chronic diseases in childhood, affecting 10% of children world-wide. Dental caries or tooth decay is a disease of deprivation and so, children who are socio-economically disadvantaged have a higher burden of the disease. This is as a consequence of increased exposure to multiple risk factors (e.g. confectionary) and reduced access to protective resources (e.g. fluoride toothpaste) ([Watt & Sheiham, 1999](#)).

Until recently, Scottish children's oral health was considered the worst in Europe, but improvements in decay experience has been a result of the national oral health promotion programme for children in Scotland, called Childsmile (www.child-smile.org) ([Merrett et al., 2008](#)). Although Childsmile has helped in promoting child dental health ([Scottish Executive, 2005](#)), major oral health inequalities remain. Children living in Scotland's most socio-economically deprived areas still continue to suffer from much higher levels of dental caries than those from more affluent areas ([MacPherson et al., 2012](#)). Even when dental care is provided free of cost, families who are socio-economically disadvantaged are less likely to take their children to the dentist, compared to more affluent families ([Hughes, Duderstadt, Soobader, & Newacheck, 2005](#); [Ismail & Sohn, 2001](#); [MacPherson et al., 2012](#)). Conceptualised as a social gradient in oral health, the persistence of this health inequality may be explained partially by a pattern of dental attendance characterised by pain only attendance, and a lack of dental health information and support to maintain oral health throughout life ([Donaldson et al., 2008](#)) ([Mc Grath & Bedi, 2001](#); [Pienihakkinen, Jokela, & Alanen, 2005](#); [Savage, Lee, Kotch, & Vann, 2004](#)).

As part of a wider programme to explore the barriers experienced by vulnerable families when accessing dental care and to promote child dental registration, dental researchers partnered with two service designers to develop a 'boundary object' which could support and enable effective communication between vulnerable families and Dental Health Support Workers (DHSWs) to occur.

2 DESIGN IN HEALTHCARE

Traditional and paternalistic approaches to health care, where health professionals prescribe treatments to promote patient behaviour change, is known to increase awareness, but is poorly related to behaviour change ([Rollnick, Kinnersley, & Stott, 1993](#)). Patient centred approaches ([Barry & Edgman-Levitan, 2012](#)), which emphasise patient empowerment and participation ([Britt, Hudson, & Blampied, 2004](#); [Miller & Rollnick, 2002](#)), provide a platform for patient decision and choice. Thus, when health care users are empowered to make such informed choices, the health professional's support is

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based on tailoring care to suit the patient's preferences and needs. The basis of such user participation and tailoring of health care needs, revolves around effective communication between provider and user. Therefore, patients' expressed and felt needs must be given priority and become an integral part of the design of health promotion interventions.

Advances in design reflect this patient-centred approach. Sanders and Stappers (2008) describe the patient-centred approach as using *'the creativity of designers and people not trained in design working together in the design development process'*. Through the implementation of design techniques, a greater and deeper appreciation of the perspectives and opinions of care users can be garnished.

3 THE DESIGNERS ROLE

We use the term *'design'* to describe an approach which is rooted in *'co-design'* (Sanders and Stappers, 2008). This approach uses many of the methods and tools the reader would recognise as design: visualisation, prototyping, producing tangible artefacts, but additionally include the input and insights of the people who will use the end product or service. Kimbell (2013) describes *Design for Services*, as an alternative to the *'problem solving'* approach taken by engineers and other more traditional design approaches arguing that what is designed is not an *'end result'* but:

'rather a platform for action with which diverse actors will engage over time'.

So, rather than focussing on the form and function of a product or service, the designer seeks to understand the needs and behaviours of a wide range of people involved in using the product or service.

The designers worked closely with dental health professionals to understand the context in which the CHATTERBOX intervention would be used, to understand the environment, barriers and communication styles that would best suit both vulnerable families and the DHSWs who would use CHATTERBOX to facilitate their conversations.

The strength of this design-led approach is that it allows the designers to produce quickly low-fidelity prototypes, which can be critiqued by those that will use them and then use this feedback to inform the next iteration of the CHATTERBOX intervention.

4 DAPER PROJECT

As part of the Childsmile Programme, Childsmile Practice aims to link families to NHS Dental Services by the time the child is six months old. On the birth of an infant, all families are visited by a community nurse, a Health Visitor (HV). The HV assesses the child's degree of risk of developing tooth decay. The at-risk mother and baby are referred to the DHSW. (S)he arranges to visit the family in their homes and provides advice on diet and toothbrushing with a fluoride toothpaste, to help the mother care for her children's teeth. The DHSW will also assist with finding a local dentist for the family to attend for preventive and routine dental care (www.child-smile.org). In Scotland, children receive free dental treatment up to age 18 under the auspices of the National Health Service

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(NHS). Despite this only 47.2 % of 0-2 year olds are currently registered with an NHS dentist (ISD, 2013) and it is estimated that 32% do not attend for dental treatment (Deas, Kidd, & Brewster, 2010).

The DAPER project (Developing an inventory to Assess Parental concerns and Enable child dental Registration) was a three part study aimed at understanding the barriers that prevented vulnerable parents and their children from engaging with Childsmile Practice. Its aim was to find ways to support vulnerable parents access dental care for their young children (Chambers & Freeman, 2010, 2011; Nanjappa & Freeman, 2013). In-depth interviews with vulnerable mothers from across Scotland discovered that feeling isolated from health services, perceiving the dental surgery was not a family friendly place, finding it difficult and expensive to travel with young children on public transport, feeling depressed, not feeling settled in their homes due to difficult neighbours or not being happy, prevented mothers from accessing dental care for their children (Chambers & Freeman, 2010).

A positive relationship based on effective communication between the parent and health care provider, that takes into account the felt concerns of parents, provides the basis for health professionals to deliver supportive advice tailored to the specific needs of the family. This positive patient-provider relationship is known to improve client health behaviours and to increase adherence with health care messages and recommendations (Martin, Garske, & Davis, 2000; Nanjappa, Chambers, Marcenes, Richards, & Freeman, 2014; Wanyonyi, Themessl-Huber, Humphris, & Freeman, 2011). Therefore, it was envisioned that by facilitating open and honest or effective communication between DHSWs and vulnerable families, felt concerns or worries specific to the family could be identified. Through this communication process, the DHSW with the parent would make informed decisions of how ready the family was to engage with dental care and consequently tailor an intervention to compliment the needs of the family. It was realised that there was a requirement for a communication interface which would enable socially excluded or vulnerable parents to talk about their everyday lives, communicate their dental related concerns and difficulties to the DHSWs and subsequently consolidate the relationship between them. Therefore, the aim was to develop a communication toolkit to enable effective communication between parent and DHSW to promote child dental attendance.

5 CHATTERBOX

Discussions between dentists from Dundee Dental School and designers from Duncan of Jordanstone College of Art and Design lead to the development of a 'boundary object' (communication tool), based upon interactive storyboarding. The storyboard went through a series of iterations, user testing, stakeholder meetings and evaluations and resulted in a uniquely designed, participatory toolkit, CHATTERBOX (Figure 1).

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Figure 1- CHATTERBOX toolkit

CHATTERBOX consists of a set of bespoke tools: a timeline base, reusable activity cards and appointment postcards (Figure 1). The activity cards are pictorial representations of common everyday activities that families engage in and of factors that were identified as part of the wider DAPER project (Chambers & Freeman, 2010) as influencing families' dental attendance patterns. Seventy-two activity cards are separated into categories and colour coded to simplify selection. Nine blank cards allow for parents to describe other concerns not already represented. Relevant activity cards are selected by parents and placed on the timeline base to construct a visual narrative of an average day for each family (Figure 2). The DHSW initiates a structured conversation using the populated timeline to identify where, when and why problems occur. Once the problems are identified, parents, with support from the DHSWs, find a solution, thus placing the power with the parent (Nanjappa and Freeman, 2013).

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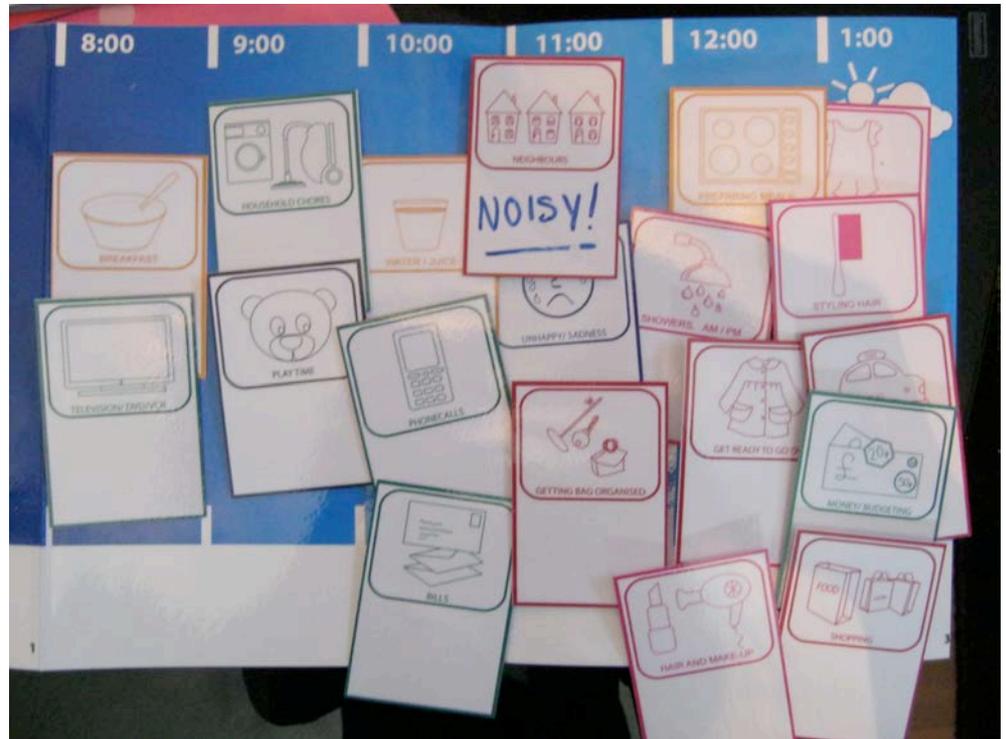


Figure 2- Example of a populated timeline portraying a family's narrative

The CHATTERBOX intervention adopts a bottom-up approach, where oral health care is tailored around the specific requirements of individual families, as expressed by the parents themselves. CHATTERBOX serves to encourage parents to express their concerns, and with support from the DHSW becomes a platform to empower parents by allowing them to identify their own solutions. Tailoring support according to parent's needs, keeping in mind how ready they are to adopt the message to attend with their children for dental care, will minimise resistance to change and improve the likelihood of family dental attendance (Britt et al., 2004; Rollnick et al., 1993) By examining key aspects of a typical day, the parents are supported in determining any negative repetitive patterns which may be occurring. These situations could have a number of potential causes, for example: poor sleep routine, lack of self-organization, dietary problems, mental health concerns, lack of support, isolation, substance misuse, and so on. CHATTERBOX supports parents by providing a safe and unbiased platform through which they can disclose as much or as little as is comfortable to them.

6 THE PILOT

CHATTERBOX was piloted with nine families who were visited by DHSWs in two Scottish NHS Boards, between June 2012 and July 2013. Families identified as requiring additional support to enable child dental registration and attendance participated. Training workshops that focused upon basic communication

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techniques and the implementation of CHATTERBOX to elicit parents' concerns were conducted prior to the home visits.

Direct observation of five home visits and dental attendance by six of the nine families visited suggests that using CHATTERBOX to talk about their daily lives helped parents to bring up problems they felt were preventing them from taking their children to the dentist. CHATTERBOX became an effective platform to support parents in identifying problems, options and potential solutions. CHATTERBOX enabled DHSWs to tailor their support according to the needs of the families (Figure 3) and facilitated relationship building, which improved the family's likelihood of attending for dental care.

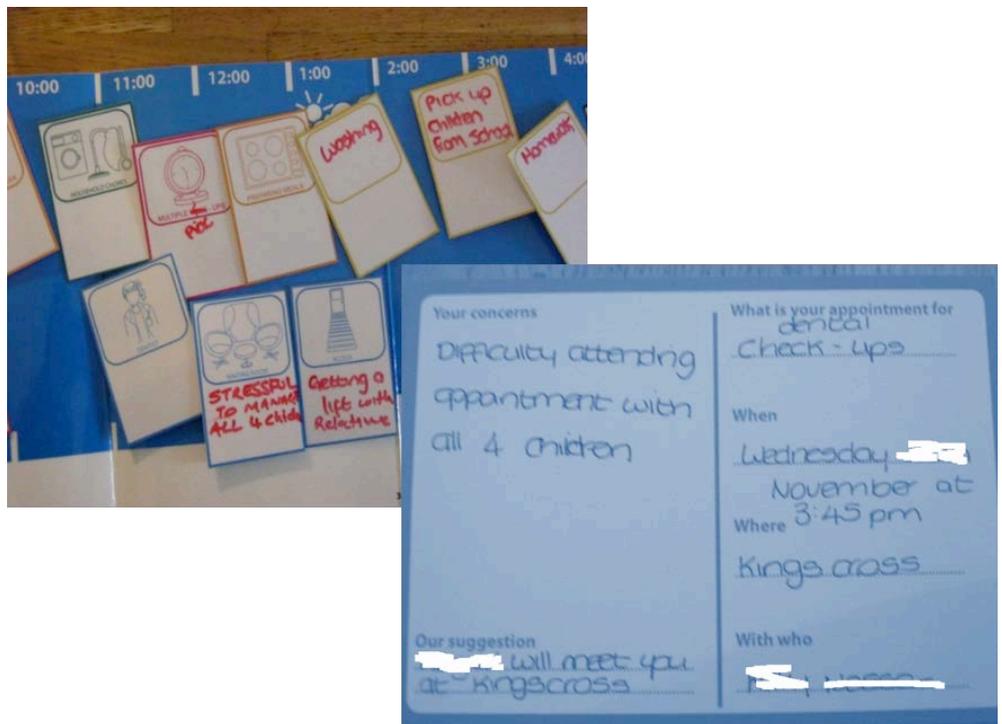


Figure 3- Example of a populated timeline depicting a mother's concerns about managing four children together in the dentist's waiting room and the appointment postcard describing the DHSW's suggestion to meet the mother at the dental hospital and sit with the children in the waiting room while the mother accompanied one child at a time into the dentist's surgery.

Although parental response to CHATTERBOX was positive, far fewer families were visited in their homes by DHSWs than was anticipated during programme planning. Low levels of recruitment into the study highlighted the difficulty in accessing vulnerable families in their homes (Nanjappa and Freeman, 2013).

7 CONCLUSION

CHATTERBOX has been implemented in two of Scotland's Health Boards. Initial evaluations suggest that the intervention results in better adherence with oral health behaviours. CHATTERBOX allowed parents to gain a picture of their daily activities and talk about problems they felt were preventing them from taking

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their children to the dentist. CHATTERBOX became a platform to help develop the parent's ability to identify, consider solutions and eventually solve their own problems. It enabled the DHSWs to tailor their support to the needs of the families and facilitated relationship building, which improved families' access to dental care.

In conclusion, interdisciplinary engagement between service designers and health professionals enabled evidence based health research to underpin a design intervention to address a very specific problem, poor child oral health in deprived communities in Scotland.

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