Involving Clinical Staff in the Design of a Support Tool to Improve Dental Communication for Patients with Intellectual Disabilities

Rachel Menzies
School of Computing
University of Dundee
Dundee, UK, DD1 4HN
+44 (0)1382 386540
r.menzies@dundee.ac.uk

Daniel Herron
School of Computing
University of Dundee
Dundee, UK, DD1 4HN
+44 (0)1382 386539
d.herron@dundee.ac.uk

Lesley Scott
NHS
Kings Cross Hospital
Dundee, DD3 8EA
+44 (0)1382 596990
lesleyscott4@nhs.net

Ruth Freeman
Dental Health Services Research Unit
University of Dundee
Dundee, UK, DD1 4HN
+44 (0)1382 381710
r.e.freeman@dundee.ac.uk

Annalu Waller
School of Computing
University of Dundee
Dundee, UK, DD1 4HN
+44 (0)1382 388223
awaller@dundee.ac.uk

ABSTRACT
Communication within clinical settings is crucial for successful clinical practice. However, this is challenging when the clinician interacts with patients with Intellectual Disabilities (ID) who may have communication difficulties or find it difficult to understand the treatment process. The "Stories at the Dentist" project aims to develop a support tool to improve clinical communication between clinicians and patients with ID. This paper outlines a design workshop undertaken as part of a user centered design process.

Categories and Subject Descriptors
D.2.10 [**Software Engineering**]: Design – *methodologies.*

General Terms
Design, Human Factors.

Keywords
Communication, Clinical, Dentist, Design, User Centered Design, Intellectual Disabilities, Learning Disabilities.

1. INTRODUCTION
Communication within clinical settings is fundamental to successful dental and clinical practice [1]. However, this can be challenging when the clinician is interacting with patients with intellectual disabilities ID. For patients with ID, visiting the dentist may result in feelings of anxiety or stress [2].

Additionally, patients with ID may have little control over their own dental care [3] as they are often unable to communicate with dental staff and to effectively articulate their opinions or fears. Such individuals may be cut off from healthcare in ways that patients without disabilities are not.

Considerable emphasis is placed upon communication skills within dental clinical practice in the United Kingdom, both during undergraduate study and subsequent professional training [4]. Effective communication has clear clinical importance as it allows dental practitioners to gain valuable information from patients, such as their medical history and consent for treatments. Current strategies in dental communication with patients with ID includes the use of simplified vocabulary, symbol and image based information and social stories, such as that used by NHS Plymouth in their information booklet entitled *"Going to the Dentist"* [5].

The "Stories at the Dentist" project aims to develop a computer-based support tool to help people with ID to more fully understand dental procedures, with the aim of improving communication and thus reduce anxiety for both patients and clinicians. This will enable patients to be more involved in the decision making process and to have more control over their own dental care. In this paper, the design of the support tool interface is considered with respect to the implications that this has on the development of the software application.

2. WORKSHOP
As part of a user centered design process, a number of design activities are being conducted with different participant groups comprising clinical staff, patients with ID and their families/care staff. This paper focuses on a Design Workshop, which was held at the University of Dundee in order to investigate the potential interface of the support tool. Clinical dental staff from local special care dentistry settings were invited to take part in this

workshop. Further workshops will be held to gather input from other participant groups.

2.1 Participants
A total of 11 members of local clinical dental staff attended the workshop; 4 dentists, 6 dental nurses and 1 dental therapist. All participants were female.

2.2 Materials
Example prototypes were developed by the research team to initiate discussion. A Sony HandyCam HDR-CX155 video camera was used to record the session. In addition, three design packs were provided which contained: images of iPads with blank screens, wireframe videos and image placeholders of varying sizes, navigation buttons, felt tip pens, post-it notes, scissors glue and colored cardboard.

2.3 Methodology
Participants attended the design workshop as an evening session, which was video recorded with the consent of participants. A 30-minute interactive presentation entitled *"Communication in the Dental Surgery"*, was given by a Senior Dental Officer, who is involved in the project as a research partner. This presentation served as a stimulus to encourage participants to consider specific patient case studies and the challenges faced when dealing with patients with ID.

The participants then split into three groups, and were provided with a design problem: to design an interface that would assist them in their interactions with patients with ID. The researcher presented example prototypes, which served to indicate the method of paper prototyping, and to encourage the participants to be as creative as they wished in their designs. Participants were encouraged to employ 'blue-sky thinking', and not to consider the technological viability of their solutions.

Participants were given 30 minutes to develop their ideas, with the support of researchers, and after this time, presented their ideas to the larger group. This allowed for a period of discussion, whereby the participants were invited to compare and contrast their ideas in order to identify similarities and differences. The group discussed the reasons for these before ending the session.

2.4 RESULTS
During the workshop, participants indicated that the introduction of a support tool would have a positive impact in the care of patients with ID. The following issues were raised during discussions between the participants and were represented in the interfaces developed during the workshop.

2.4.1 Prior to visiting the dentist
Patients with ID often require a great deal of preparation for visiting the dental environment. This can include photographs of the dental surgery, videos of the dental chair being operated, and an indication of what may happen during their visit. This was considered to be very important in reducing the anxiety and stress associated with a visit to the dental clinic.

2.4.2 On arrival at the dentist
When patients with ID arrive at the dental clinic, it is important that the clinical staff build a rapport in a timely manner. For this reason, it was suggested that the interface would have an option for dental staff to find information about the patient's likes and dislikes, as well as information about their previous dental experiences. The information held in the system about previous dental experiences should include both positive and negative incidences. This will allow clinicians to identify areas of potential difficultly for a patient, and will also allow the clinician to focus on areas of previous success in order to develop the patient's confidence and ensure continued success within the clinical environment.

2.4.3 During the dental appointment
During the dental appointment, effective communication between the patient and clinician is vital. In particular, this communication ensures that the patient is fully informed of their care choices and can take control of their own dental care. Given the importance of this communication, it is imperative that the information given by clinicians is presented to the patient in the most appropriate manner. For example, some patients may be capable of reading simplified sentences, others may need a voice over, and others may require symbols or images. The system should be aware of the abilities and needs of each patient and therefore display the information in the correct form. This customization will reduce the workload of clinical staff and will benefit the patient greatly.

In addition to the presentation of information from the clinician to the patient, the clinician should be able to gather information about the patient's opinions and concerns regarding different treatments. This will help the patient to raise any concerns that they may have, and in turn, will allow clinicians to explore further the reasons for these concerns. These concerns may then be addressed by the appropriate presentation of information, by, for example sound files of the various dental instruments, images or animations of dental procedures.

The most important aspects of communication from the patient were identified as being *"yes"*, *"no"* and *"stop"*. Clinicians advocated strongly for the inclusion of a software option that outlined how the patient typically communicated such things. This could be completed with the patient prior to the appointment, if appropriate, or by a carer. The provision of a communication board that allowed the patient opportunities to indicate this was also desired. Again, this should be presented in a format best suited to the patient.

3. CONCLUSION
The communication between clinician and patient is paramount to good clinical care, but can often be disrupted in the care of patients with ID. The development of a tool to support dental communication between clinicians and patients with ID was well received by clinical dental staff. A number of requirements for the software development phase of this project have been identified and will be combined with feedback from other participant groups. Participants predicted that such a tool would have a positive impact in the care of patients with ID.

4. REFERENCES
[1] Freeman, R. and Humphris, G. 2006. *Communicating in Dental Practice: Stress-Free Dentistry and Improved Patient Care.* Quintessence Publishing Co. Ltd., London.
[2] Vaz, I. 2013. Visual Symbols in Healthcare Settings for Children with Learning Disabilities and Autism Spectrum Disorder. *British Journal of Nursing*, 22(3), 156-159.
[3] King, S. 2011. Clear Information Can Cut Inequalities in Learning Disabilities. *Nursing Times*, 107, (4), 22-24.
[4] General.Dental.Council. 2011. *Preparing for Practice: Dental Team Learning Outcomes for Registration.* General Dental Council.
[5] NHS Plymouth. 2010. *Going to the Dentist.*