

# Inclusive Smartphone Interface Design in Context: co (re) designing the PIS

**Paul Magee, Gillian Ward, Louise Moody, Annette Roebuck**

Accepted manuscript deposited in Coventry University's Repository

**Original citation:**

Magee et al., " Inclusive Smartphone Interface Design in Context: co (re) designing the PIS", *Studies in Health Technology and Informatics*, 242 (2017): 195-198.

<http://dx.doi.org/10.3233/978-1-61499-798-6-195>

ISSN: 0926-9630

Publisher: IOS Press

**Copyright © and Moral Rights are retained by the author(s) and/ or other copyright owners. A copy can be downloaded for personal non-commercial research or study, without prior permission or charge. This item cannot be reproduced or quoted extensively from without first obtaining permission in writing from the copyright holder(s). The content must not be changed in any way or sold commercially in any format or medium without the formal permission of the copyright holders.**

# Inclusive Smartphone Interface Design in Context: co(re)designing the PIS

Paul MAGEE<sup>a,1</sup>, Dr Gillian WARD<sup>a</sup>, Dr Louise MOODY<sup>b</sup>, Dr Annette ROEBUCK<sup>c</sup>

*a Coventry University Centre for Technology Enabled Health Research*

*b Coventry University, Faculty of Arts and Humanities*

*c Coventry University, Faculty of Health and Life Science*

**Abstract.** User-context optimises smartphone interface-design. Neglect of user-context during development, delays or prevents marginalised-consumer benefit. Working with People with Learning Disability (PWLD) to develop interfaces refined by communication-need will improve User-Experience (UX). In research, a Participant Information sheet (PIS) discloses planned study-activity. This paper explains co-creation of a PIS based on communication-need of PWLD.

**Keywords.** Inclusive, smartphone, interface, co-design, context, communication-need

## 1. Introduction

Part of daily life, smartphones are embraced globally by 3.6 billion users [1]. The UK is regarded as a 'smartphone society' with 33% of internet users choosing their smartphone as the point of access [2]. For consumers, smartphones represent significant personal investment. Purchase can be a barrier for PWLD given low employment, despite 65% of PWLD preferring to be in paid activity [3]. Smartphones are familiar tools in the modern workplace. However, some smartphone tools exclude PWLD with little indication that research has been conducted into smartphone needs of this community. Searching academic literature results in few studies involving PWLD but none leading the design of smartphone interfaces. If interaction occurs, smartphone developers may choose not to disclose evidence.

## 2. Context in Co(laborative)-creation

Context has influence on solution development. It is argued that co-development reveals insight from typically hidden experiences (Magee et al, 2016)[4]. Socially inclusive co-creation methods support the intersection of real experience and a development process. Co-creation shares leadership of the output to avoid the stigma associated with traditional assistive technologies; identifying not only what is needed but importantly, aspirational [5]. With origins in Kurt Lewin's 1946 study of Action Research (AR) and 1960's Participatory Action Research (PAR) [6], Co-creation encourages development of user-centred solutions, from those outside of the historically typical development professions [7]. As a process, co-creation is non-linear and unpredictable [6]. A frequently used term, co-creation uses almost limitless creative methods [7].

## 3. Study

---

<sup>1</sup> paul\_magee77@yahoo.co.uk

### 3.1 Co-researchers

Consultation on communication-need and advice is provided by communication-experts at Communicate2u; a social enterprise working with PWLD co-researching issues as representatives of a marginalised user group. Collaborative-research is at all stages of a wider study, not only 'when required'. Advice covers the design of the study and preliminary administration, such as the Participant Information sheet (PIS).

### 3.2 The PIS

For any research study it is vital to clearly indicate the activity involved in order to fully inform intended participants. Working with PWLD as co-researchers in this study presents two issues in relation to the PIS.

Firstly, an assumption that information conveyed using a typical University document would be read by the participants whom would supply an appropriate response to the researcher. This is not necessarily so. Secondly, c2u Co-researchers are providers of experiential knowledge as representatives of PWLD. Based on consultation with c2u, the standard PIS was an inadequate source of research relevant information, communicated at an inappropriate level of complexity. As an early model for developing holistic solutions with PWLD, the PIS needed to be co-(re)-designed.

### 3.3 Setting the scene to collaboratively re-design the PIS

Previously c2u had discussed the implications of research such as the importance of confidentiality. The collective devised a research narrative performed in song; a fun element, maintaining interest and reminding co-researchers about research implications. Following group performance a collaborative task informally engaged teams of 5 members to design research badges, worn to signify research roles. Each team presented a badge design to the larger group, resulting in two main themes:

- A computer to signify use in research
- A smartphone to connect with the study

Following this design task, a pre-produced Participant Information Sheet (PIS) based on a typical University format was used as a discussion point to establish:

- Linguistic clarity
- Preferred pictorial representations
- The preferred physical format of PIS

In a relaxed environment, the researcher (R1) met with individuals and groups from c2u to explain the purpose of a PIS and that feedback would help to design a new PIS. The importance of feedback from PWLD at this stage was to specify communication material, required by communication-need. The intention of discussion with PWLD was to clarify linguistic and pictorial elements of a redesigned PIS that would responsibly deliver information sensitive to communication-need. During discussion, R1 recorded co-researcher comments (Figure's 1 to 3) directly on a shared PIS. The comments were recorded in a cumulative format.

Co-Researcher Number CR1	Comment	Context
CR1.1	"Where are the pictures?"	Unable to read. Accustomed to using easy-read icons
CR1.2	Wanted simple images or photographs of people as this would be easier to relate with	Offered ideas for the type of images based on own knowledge
CR1.3	Coventry University logo	To add authenticity
CR1.4	Photo of the researcher on list (PIS)	As a visual reminder of the person for those people that are not good at remembering faces or names
CR1.5	Photo of the University	Assuming that it is one single building
CR1.6	Photo of the team at Coventry University	As 1.3
CR1.7	Photo of office where the research will be developed	As 1.3
CR1.8	People holding hands to illustrate support	Photo suggestion

Figure 1. Co-Researcher 1 (CR1) feedback.

Sections of the PIS that were concise received positive feedback; particularly those presented in one sentence. Whilst CR2 expressed similar opinions over use of imagery with consistent distribution on a page.

Co-Researcher Number CR2	Comment	Context
CR2.1	Images on right hand margin of page, linked to the description	Confident reader, preferred consistency
CR2.3	Font size should be quite large for easier reading	PIS shown had 12pt font
CR2.4	Preferred 'bullet-point' lists	Struggled with larger blocks of text
CR2.5	Preferred lots of detail, rather than minimising for the sake of comprehension	Confident enough to ask for explanations
CR2.6	Did not like long documents full of text	As 2.4
CR2.7	Images need to be in line with 'that' text	Direct link
CR2.8	People with LD using a smartphone	Image suggestion

Figure 2. Co-Researcher 2 (CR2) feedback.

Points [CR2.4 and CR2.5] raise information communication challenges. Whilst use of bullet points may appear to be concise and clear, the shortening of information to a suitable size may result in a lengthy list format, to provide information at a relevant depth.

Co-Researcher Number CR3	Comment	Context
CR3.1	Include background about researcher, although recognised that personal life would not be included	Added "whatever you're comfortable with"
CR3.2	Include researcher interests/hobbies	To better relate with
CR3.3	Plain English descriptions	Possibly having experienced similar health message based documents
CR3.4	Email address of researcher preferred	CR3 thought that PWLD may have difficulty making a phone call but could spend more time typing an email
CR3.4	Phone number of researcher/supervisor for carer/parent	If needed to address a concern

Figure 3. Co-Researcher 3 (CR3) feedback.

To improve the clarity of each PIS entry, communication experts (C2U) were consulted to suggest an image or icon of which two were distinct:

- People holding hands to illustrate support
- PWLD using a smartphone

The researcher enquired further about the latter suggestion, "how *would* PWLD look using a smartphone?". This prompted some thought and the comment, "oh, yes, it would just be a person with a phone". There appears to be some expectation of visual difference between literature for PWLD and the general population. A perceptual disparity of learning-disability observed from within the community, perhaps resulting from experience of the more typical LD documentation.

### 3.4 Document format

A PIS was presented on 2 separate A4 pages, side by side. A double-sided print was not shown but the visibility of some text through light stock material may have been an issue. There was a general dislike of multiple pages.

Asking about the usability of sheet format, size and orientation based on a standard A4 sheet of printer paper; the conversation began about what happens with the sheet, each claiming to fold it. The researcher then showed 3 different size sheets and rotated each to illustrate different orientations, (Fig 4).

Of all the formats shown, a booklet met with the most positive reception. Separating information into 4 sections across the 4 'sides' of a booklet, made the meaning easier to gather. A 5 booklets format was explained to be more easily handled than an A4 print. Use of a large font was also recommended.

Paper size	Orientation
A4	Landscape / Portrait
A4 (resulting in an A5, 4-sided booklet)	Landscape folded in 2 along longest edge
A5 single sided	Landscape / Portrait
A6 postcard	Landscape / Portrait

Figure 4. Document format and orientation.

Suggestion of credibility towards a printed booklet may relate to professional appearance, presenting a more reliable source than an A4 print. It is reasonable to assume experience of professionally printed documents related to the management of support and care that have previously required great attention and an appreciation of importance. Assuming that this relationship is correct, the PIS should confirm that there is no impact upon the individual co-researcher's support in any way resulting from this study. This concern was not highlighted by the contributors but recognised by the researcher on reflection.

### 3.5 Acquiescence

A 4th co-researcher (CR4) preferred to remain mobile during discussion. CR4 would take a seat, listen and respond to the enquiry or explanation before leaving again. CR4 seemed satisfied that the PIS was correct, as it was. Whilst not conclusive this might be considered acquiescence bias, suggesting that the type of enquiry used in this instance may not be effective for some PWLD.

## 4. Summary

The complexity of some communication-needs may suggest that abstract concepts such as confidentiality are inherently difficult to communicate, especially with few icons or images. Consequently, it can be unclear whether concepts are understood or merely accepted. A group exercise was designed to learn ways to communicate meanings of sections of the PIS but not to pre-define a design then request agreement. The exercise is a prototype collaborative working model. As a result, the booklet design stems from the co-researcher's specification.

In summary of the PIS content:

- PWLD generally require clear, concise, well-written information
- PWLD do not generally require slimmed-down information
- Concise information in sections improves readability
- Images must locate with communicated text
- Font size is important but relative to page size
- A5 size Booklets are preferred

Working with PWLD elicited unexpected results. Collaboration emphasised the importance of engagement at all stages. The learning outcomes of the task are summarised as:

- Informal atmosphere was more comfortable for co-researchers
- Co-researchers needed the freedom to participate intermittently
- Small group tasks provided focus
- Priority should be on clarity of images, with relative sophistication
- Flexible communication methods accounted for the group's needs
- The presence of acquiescence bias may limit feedback from some co-researchers

Whilst the resulting PIS design is led by complex communication-need, it is accessible for all research participants.

## References

- [1] GSMA, (2015). 'Global Mobile Economy Report 2015'.  
[http://www.gsmamobileeconomy.com/GSMA\\_Global\\_Mobile\\_Economy\\_Report\\_2015.pdf](http://www.gsmamobileeconomy.com/GSMA_Global_Mobile_Economy_Report_2015.pdf). Accessed 28 07 2016.
- [2] Office for National Statistics, (2015). 'Internet Access - Households and Individuals: 2015'.  
<https://www.ons.gov.uk/peoplepopulationandcommunity/householdcharacteristics/homeinternetandsocialmediausage/bulletins/internetaccesshouseholdsandindividuals/2015-08-06> Accessed 21 04 2016.
- [3] Emerson, E., Davies, I., Spencer, K., Malam, S. (2005) 'Adults with Learning difficulties in England 2003/4'.
- [4] Magee, P., Ward, G., Moody, L., Roebuck, A. (2016) 'Co-Creating Smartphone Interfaces with People With Learning Disabilities to enable all users'. Wellbeing Conference, Birmingham City University.
- [5] Etgar, M. (2008) 'A Descriptive Model of the Consumer Co-Production Process'. *Journal of the Academy of Marketing Science* 36 (1), 97-108.
- [6] Baum, F., MacDougall, C., and Smith, D. (2006) 'Participatory Action Research'. *Journal of Epidemiology and Community Health* 60 (10), 854-857.
- [7] Burns, C., Cottam, H., Vanstone, C., Winhall, J. (2006) 'Red Paper 02; Transformation Design'. Design Council