



# Using a bespoke situated digital kiosk to encourage user participation in healthcare environment design



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## ARTICLE INFO

### Article history:

Received 14 March 2015

Received in revised form

4 August 2016

Accepted 5 August 2016

Available online 7 October 2016

### Keywords:

User participation

Technology

Healthcare

Design

## ABSTRACT

Involving users through participation in healthcare service and environment design is growing. Existing approaches and toolkits for practitioners and researchers are often paper based involving workshops and other more traditional design approaches such as paper prototyping. The advent of digital technology provides the opportunity to explore new platforms for user participation. This paper presents results from three studies that used a bespoke situated user participation digital kiosk, engaging 33 users in investigating healthcare environment design. The studies, from primary and secondary care settings, allowed participant feedback on each environment and proved a novel, engaging “21st century” way to participate in the appraisal of the design process. The results point toward this as an exciting and growing area of research in developing not just a new method of user participation but also the technology that supports it. Limitations were noted in terms of data validity and engagement with the device. To guide the development of user participation using similar situated digital devices, key lessons and reflections are presented.

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## 1. Introduction

Improving patient and staff experience of healthcare services and environments has become commonplace in both research and policy (Bate and Robert, 2006, 2007; Hasvold and Scholl, 2011; Span et al., 2013; Couter et al., 2009). These improvements have involved different stakeholders in on-going discourse about personal experiences of healthcare as well as how services and environments might be improved. This is important since healthcare environments have a profound impact on patients, staff and visitors, with positive design contributing to enhanced physical and psychological status as well as productivity (Dalke et al., 2006; Ulrich, 1991; Devlin and Arneil, 2003).

### 1.1. User participation

Involving the user through participatory methods such as

participatory design/ergonomics, co-design, experience-based design, cooperative design, and action research aim to remove traditional barriers between researchers, designers and users in the design of systems, environments and technology. These methodologies generally evaluate people's tacit knowledge for understanding experiences and developing artefacts, systems, or new ways of working (Spinuzzi, 2005) within a specific context (Halloran et al., 2009). Vink et al. (2008) remark that it is through these processes that the context (through understanding a group's norms, language and concerns of the different actors) is therefore critical to successful design interventions.

Participatory ergonomics (PE) is an approach which promotes improved design ideas and solutions, and contributes to systemic outcomes of value to both organizations and individuals (Wilson et al., 1997). PE approaches provide tools (use of paper prototyping, work groups, simulations) for people to articulate their tacit knowledge, which is otherwise inaccessible - in a similar vein to participatory design (Hall-Andersen and Broberg, 2014; Broberg et al., 2011; Spinuzzi, 2005). Such methods provide successful and balanced discourse between members involved in the PE process. This builds trust and bidirectional communication between

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the researcher or designer and participants (Dearden and Rizvi, 2008).

There is however, scope to develop digital tools to facilitate PE to mediate dialogues between the researcher/designer-participant and participant-participant in contexts that may be difficult to get these actors together, for example healthcare. Barriers for conducting research in healthcare include issues of manpower shortages, family commitments, shift patterns, and research activity compromising work (Loke et al., 2014). Therefore, digital facilitation of the participation process provides a way to negotiate these problems and potentially engage with a greater range of hospital users. We call this approach ‘situated user participation’; the act of involving a user of an environment in the design process mediated through a digital device (Fig. 1). Such a device locates itself as a boundary object in the design process. It is used as a means of transferring and sustaining knowledge when stakeholders are dispersed, and acts as a design object to enable participants to design with, not just comment on (Hall-Andersen and Broberg, 2014; Broberg et al., 2011). This is depicted in Fig. 1.

## 1.2. Digital technology and user participation

Several studies demonstrate the effectiveness of digital technology for involving users in a similar manner with application ranging from political voting (Taylor et al., 2012), civic engagement (Hosio et al., 2012) through to assessment of nutritional values in food (Reitberger et al., 2014). In this last example, a situated display along with its mobile application allowed a more informed choice about people's shopping to create healthier buying habits. These applications demonstrate how situated devices are playing a larger role in the world around us – even when grocery shopping. Reitberger et al. (2007) remarks there are a multitude of displays providing touch-points and information. Using situated devices to encourage discussion and participation on a topic is not new in healthcare. DiRocco and Day (2011) used a computer kiosk for patients to give immediate electronic feedback on service provider information about patient experiences. The overall response rate from the digital feedback was 50% (1923/3850) compared to their existing response rates of around 19% per quarter for paper based postal surveys.

In the appraisal and improvement of healthcare environment design this is of particular importance. If a device is situated within the environment in question people can use the context of their surroundings to inform their comments; they are in the ‘here and

now’ of the space. However, little work has looked at using situated devices in healthcare to appraise and develop these environments. The approach offers significant potential as participatory methodologies are tied to technological and organizational developments (Halskov and Hansen, 2014). This may not only complement the existing approaches of, for example Experience Based Design (NHS, 2013), but may be used to shed new light on how the physical healthcare environment is experienced with this information to be used by estates managers and designers.

## 1.3. Aim

A bespoke situated participation digital tool was developed as part of a large-scale research project investigating participation in healthcare environment design. The aim of the device, termed digital kiosk, was to increase the ease of user participation in the appraisal, design, and development of healthcare environments. The research question underpinning the work was defined as: ‘how do users interact with and perceive a bespoke situated digital device to encourage participatory design of healthcare environments?’ The paper answers this by reporting on three studies describing users' perceptions and interaction with the developed kiosk. To guide the development of user participation using similar situated digital devices, key lessons and reflections are presented.

## 1.4. Research design

Investigating the use of the kiosk involved three steps:

- I. Development of the computer kiosk: This section provides the rationale and development process of the kiosk.
- II. In use: This section details three studies in which the kiosk was used. This includes the evaluation of an emergency department, the development of design recommendations for a new Wellbeing Centre within a large UK hospital, and the appraisal of a health centre environment.
- III. Discussion of use: This section describes user's perceptions of the kiosk and also insights relating to its use based on the results of the three studies.

## 2. Development of the computer kiosk

The purpose of the computer kiosk was to act as a tool to gather data from participants. As discussed, existing methods used within participatory design require a facilitator to be present, so the kiosk

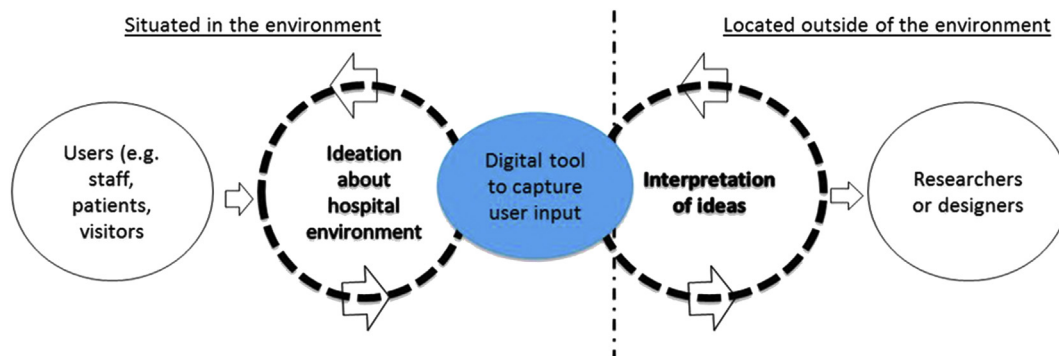


Fig. 1. The location of the digital tool as a boundary object in user participation process.

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