Institution: BRUNEL UNIVERSITY (H0113)

Unit of Assessment: 34 – Art and Design: History, Practice and Theory

Title of case study: Design Bugs Out (DBO) commode

1. Summary of the impact (indicative maximum 100 words)

"We've currently made a 40 per cent reduction on last year's infection figures … the commode is definitely part of that", said an Infection Prevention and Control Clinical Nurse Specialist for Scarborough and North East Yorkshire NHS Trust. The commode referred is the result of a joint effort between Brunel University, Kirton Healthcare and PearsonLloyd, in responding to the Design Council's 'Design Bugs Out' competition. Designed for thorough cleaning, easy maintenance, and patient dignity, the commode has been widely exhibited in the UK and Europe, and was shortlisted for the BRIT Best Design of the Year (2009) award. Now over 2,000 have been sold to more than 60 hospitals in the UK.

2. Underpinning research (indicative maximum 500 words)

Hospital acquired infection (such as MRSA) was estimated to cause up to 5,000 deaths per year and costs the National Health Service in England as much as £1billion a year. In 2008, the Department of Health commissioned the Design Council to launch a nationwide competition to re-design furniture and equipment making it easier to keep clean and reduce exposure to healthcare associated infections. Brunel University joined Kirton Healthcare (manufacturer) and PearsonLloyd (design company) to enter the competition and the team was selected to redesign the commode and the patient chair. We undertook in-depth research into the equipment's use and the needs of patients and staff in hospitals. By benchmarking products, visiting hospitals, observing equipment in use, and interviewing patients and hospital staff, we were able to identify a wide range of issues to consider for the re-design task. Role-plays were carried out in simulated hospital wards at Brunel University, involving the collaborating designers and the manufacturer (Figure 1).

Fig.1 Research conducted at Brunel University: commode use scenario simulation

Findings from these research elements allowed the identification of issues that would have been difficult (if not impossible) to recognise by typical in-house research (e.g. examining current products), such as inter-relationships between staff and cleaning processes. The findings were then used to inform the re-design, and working prototypes (Figure 2) were produced in April 2009.

Fig.2 Commode prototypes

The primary requirements for the new commode model were to ensure that it was easy to clean,

easily maintained and ergonomic. But the research carried out by the Brunel team went far beyond the practical concerns of cleanliness and comfort. All relevant procedures were investigated (e.g. dismantling, storage, sterilisation – Figure 3) and all stakeholders' needs were identified. For example, the new model was also designed to take up less room in hospital sluices, an important consideration which would not have been apparent without the research.

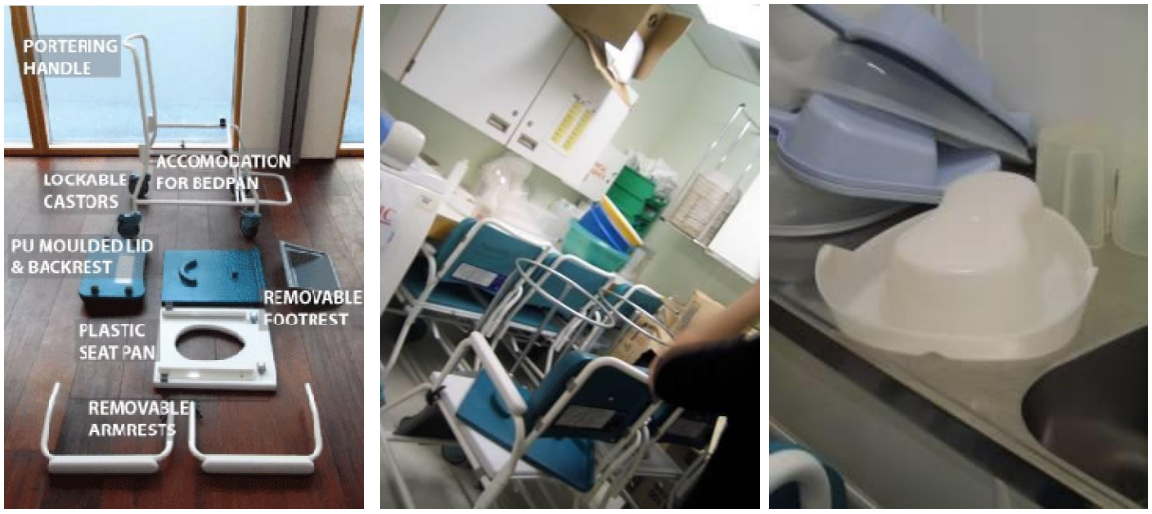

Fig.3 Brunel research on commode-related procedures

The Brunel research team was led by Dr Hua Dong (then a lecturer, joined Brunel in 2006), and the key researchers included Chris McGinley (PhD student, enrolled in Sept 2008) and Farnaz Nickpour (Research assistant, joined Brunel in May 2008)

Fig. 4 The BDO team at the Design Council

The Brunel team's contribution to the DBO project included identifying, gathering, analysing, and presenting data (user data, contextual information, specialist knowledge) to the design and manufacturing team to inform the design definition, specification and concept generation. As the design team had little existing knowledge about commodes, the research conducted by the Brunel team was instrumental to inform the final design.

The DBO commode was a huge success. As an Infection Prevention and Control Clinical Nurse Specialist for Scarborough and North East Yorkshire NHS Trust, said, "We saw them (the commode prototypes) and just went 'we want them, where do we get them from?'" "Within a couple of weeks we'd ordered 120 units and I think we were the first hospital in the country to introduce them, and the response from staff on the wards was fantastic." "For the last few months we've actually cancelled our pulp delivery and that's mainly because people like the commode so much they're taking people to the toilet rather than leaving it by the bedside. From a patient dignity perspective it's fantastic and it has saved the Trust a significant amount."

The research outcome included 1 journal paper, 2 conference papers, 1 article for an international newsletter, a number of conference presentations, and exhibitions.

3. References to the research (indicative maximum of six references)

Dong H., McGinley C., Nickpour F. and Cifter A.S. (2013), "Designing for designers: Insights into the knowledge users of inclusive design" Applied Ergonomics (article in press) http://dx.doi.org/10.1016/j.apergo.2013.03.003. (REF 2).

Dong H. and McGinley C. (2009) "Design Bugs Out; reducing heathcare-related infections in hospitals" 17th World Congress on Ergonomics, IEA2009, Beijing, 9-14 August 2009.

Lakey J., McGinley C., Nickpour F. and Dong H. (2010) "Design bugs out in hospitals". Inclusive Design Research in Action, Design for All newsletter special issue 5(6), June 2010, Design for All Institute India, pp62-65

The "Design Bugs Out" grant was awarded to the Team composed of PearsonLloyd Design, Kirton Healthcare manufacturing, and Brunel University, for the period of Oct 2008-April 2009. The sponsor is the Department of Health and the Design Council. The value of the grant was £50k.

4. Details of the impact (indicative maximum 750 words)

The key beneficiaries of this impact case study are in the commercial and health sectors. To date, DBO commode has been sold to more than 60 hospitals in the UK, and contributing to a significant reduction in hospital infections. As an infection specialist commented "The CQC(Care Quality Commission) who regulate us and assess us against the hygiene code have been in and carried out a thorough audit and they're very happy with the commodes."

The commode has been exhibited in the Design Council and Design Museum, as well as Made in Brunel Show and the Danish Design Centre. It was shortlisted for the BRIT Best Design of the Year (2009) award. It is now manufactured and sold by Kirton Healthcare and has proved to be a most successful product for the manufacturer in the last few years.

The project started from scratch in September 2008 when the NHS Purchasing and Supply Agency and the Design Council joined forces to launch a competition for the design of hospital furniture and accessories that would help reduce the frequency of healthcare associated infections. It was the panel's idea for designers, manufacturers and researchers to form teams to tackle the issues. The Brunel team met Kirton Healthcare at the Design Council in the "Design Bugs Out" (DBO) briefing event and we decided to team up with PearsonLloyd Design to answer the design briefs on "commode" and "patient chair". As the designer's existing knowledge of the commode was little, the research conducted by the Brunel team proved instrumental in helping defining the problem and suggesting design directions, which led to successful prototype in April 2009.

The commode prototype was then taken on a national tour of selected hospitals for trial, and since 2010 it has been manufactured and sold by Kirton Healthcare. To date, over 2,000 DBO commodes have been sold. They prove to be effective in infection control in hospitals, raising the profile of the manufacturer in the healthcare sector, and driving up sales. The design company PearsonLloyd also gains new recognition of its competence in the healthcare sector.

The Designer from Kirton Healthcare said “Brunel’s input to the project has been instrumental.”

The Senior Designer from PearsonLloyd commented, “the collaboration between Brunel and us has been extremely helpful and informative for this project.”

The interview of Dona Winter, an Infection Prevention and Control Clinical Nurse Specialist for Scarborough and North East Yorkshire NHS Trust explains the effectiveness of the DBO commode in the Kirton newsletter (A):

“There are obviously other commodes out there and some claim to have bugs designed out, but they simply aren’t as good as the Kirton. I always say they’re the Rolls Royce of commodes. We do random swabbing to test cleaning and so far results have been really good. The main benefit to the staff is the ability to clean the commode properly by turning it over easily and doing the underneath rather than dismantling it. Every reservoir of infection has been designed out.”

“The innovative Kirton top-loading commode pan eliminates gaps and openings, preventing waste contaminating any hard-to-reach parts of the commode. The depth of the pan is greater than current commode pans to accommodate more waste, reduce splash back and provide a better patient experience.”

“A patient obviously has to feel comfortable on a commode and one of the benefits we’ve seen of this product is that our pulp usage has decreased. I can’t give exact numbers but I know for the last few months we’ve actually cancelled our pulp delivery and that’s mainly because people are liking the commode so much they’re taking people to the toilet rather than leaving it by the bedside. From a patient dignity perspective it’s fantastic and it has saved the Trust a significant amount.”

“The solid construction of the commode has also made a difference at Scarborough. ‘It doesn’t sound like a commode, rattling about in the middle of the night disturbing everybody,” “It’s very silent when you’re pushing it. The manoeuvrability of it is fantastic; the brakes don’t stick on and you don’t have to use loads of pressure to get them on or off. Everybody loves it. But overall for us the main thing is being able to clean every single part of the commode properly and easily.”

The research associated with the DBO commode has been disseminated through journal and conference papers, as well as popular articles in international newsletters.

The beneficiaries of the project include patients in the manufacturers, patients, medical staff and the NHS more generally.

5. Sources to corroborate the impact (indicative maximum of 10 references)

A. DBO Kirton Healthcare 2012 Issue One:

http://www.kirton-healthcare.co.uk/documents/kirton/userinstructions/10073-Kirton-DBO.pdf

B. Report in the public domain:

Inclusive Design Research in Action, special issue newsletter for the Design for All Institute

http://www.designforall.in/newsletter_june2010.pdf (p60)

Corroborating contacts:

1) **Contactable:** Designer, R&D, Kirton Healthcare: The contact can corroborate the research impact on the design of DBO commode and its impact on health professionals and users.
2) **Contactable**: Partner, PearsonLloyd: As a person who was responsible for the project at PearsonLloyd, the contact can corroborate the value of Brunel research on the design of DBO commode and its impact on health professionals and users.