Cognitive Aspects of Public Toilet Design

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Abstract

This paper reports ongoing EPSRC[1]- sponsored research to understand how 'away from home' (public) toilets feature in disabled people's participation in urban public life. After tracing the origins of accessible toilets, it will examine the technological responses currently in use in many public toilets and evaluate these designs with respect to people with cognitive disabilities. The paper concludes by pinpointing challenges that need to be resolved by designers, before the goal of 'an inclusive public toilet of the future' can be realized.

1 The Origins of Accessible Toilets

At present, many of the UK's public toilets are not accessible to people with physical, sensory or cognitive impairments. Kitchen & Law (2001) have argued that this situation severely limits disabled people's access to the city and its resources. Since 1979 purpose-designed unisex public toilets have been available under the RADAR[2] scheme, in which specifically adapted toilets for people with disabilities are locked and can only be used by those who have access to the appropriate key[3]. This scheme has been considered controversial from the outset because it does not guarantee that everyone who needs the accessible facility will also have a key. Meanwhile, providing a 'disabled toilet'[4] somewhere in the town centre meant that ordinary public toilet facilities need not be universally accessible. The approach epitomised the UK attitude to access and social inclusion that was prevalent at the time, which was to assume that 'normal' provision for 'able bodied' members of the general public should be supplemented by provision to serve the 'special needs' of 'the disabled'.

1.1 Current Toilet Design

The design of the RADAR unisex public toilet was predominately determined by the requirements of wheelchair users. The needs of this specific user group have continued to inform further design standards such as the British Standard BS8300 (Figure 1) and Approved Document M (ADM) of the Building Regulations. More recently, the Centre of Accessible Environments has produced 'The Good Loo Design Guide' which has included specific toilet design solutions for people with visual impairments. However, inclusive design implies a broader consultation with people from a wide scope of disability and other user needs. The Inclusive Design of Away From Home (Public) Toilets in City Centres research looks beyond the issues of access, to areas of universal needs for safety, privacy, cleanliness, comfort and dignity whilst using the public toilet.

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[2] Royal Association for Disability and Rehabilitation
[3] Members of the public can purchase their own key or are invited to 'ask for the key' when needing to use a RADAR locked toilet.
[4] Strictly speaking, toilets for disabled people should always be referred to as 'accessible' toilets rather then 'disabled' toilets, as the latter could be deemed offensive and stigmatising. However, in the 1970's and 1980's, the term 'accessible toilet' was not in common currency. Pre 2004 legislation referred to 'toilets for disabled people' and many disabled people still use the term 'disabled toilet' today.
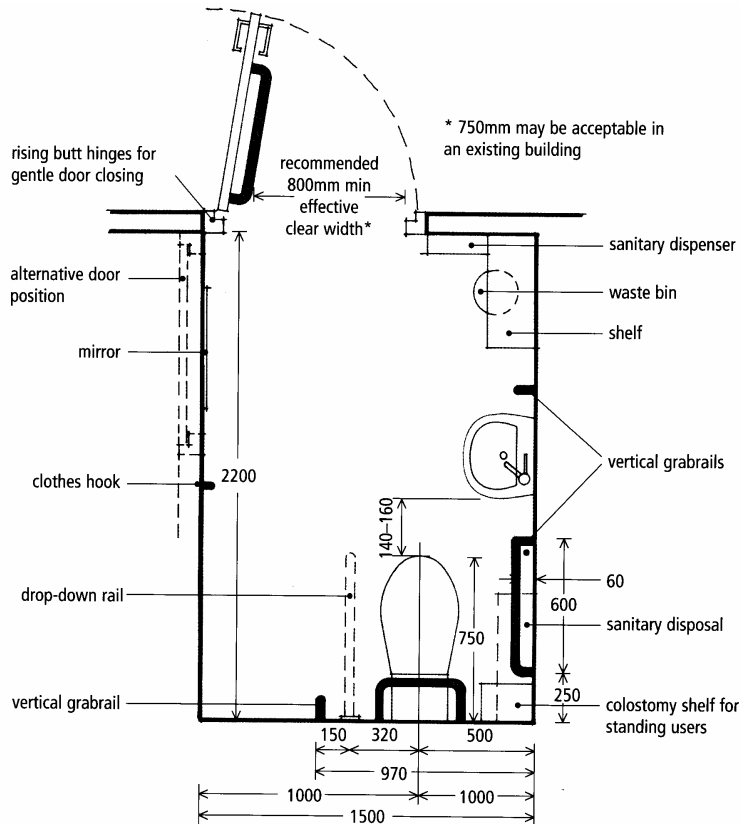
Figure 1: BS8300 (2001)

1.1.1 BS8300

BS8300 (2001) sets the standard for accessible toilets, updating earlier versions that were based on the RADAR unisex facility. Unlike previous standards, BS8300 was based on systematic research into disabled people's needs (Feeney, 2003). This included measuring basic body sizes and capabilities but the bulk of the research, which took place over a four year period from 1996-2000, was conducted through a programme of experimental trials. These included objective measures, such as using a specially constructed rig to plot the reach of 150 ambulant disabled and 150 wheelchair users, and subjective measures of comfort in respect of the height of fixtures and fittings such as toilet seats, wash basins and grab rails. The main objectives of the laboratory experiments were to verify the standards for a representative sample of disabled people and to permit the costs and practicality of different design solutions to be balanced against the proportions of people accommodated. These studies have been criticised for placing too much emphasis on restricted mobility, whilst paying insufficient attention to the needs of people with sensory and cognitive impairments or with hidden disabilities such as diabetes, bladder and bowel problems.

For many disabled people the accessible toilet has become symbolic of their access to the city, and although many 'accessible' away from home toilets can be found in UK cities, there continues to be major discrepancies between the design of the facility and the specific needs of a large number of users. The introduction of Part 3 of the Disability Discrimination Act (DDA) in October 2004, ensures through legislation that disabled people should be able to physically access services. This will have far reaching ramifications in the current design and management of UK public toilets. As a result, every design aspect of the toilet facility, from the entrance to the exit, furnishings, fixtures and fittings will have to be rethought. Due to the inaccessibility of many existing public toilets, many of those controlled and managed by local authorities are closing, creating a dearth of public toilets that affects everyone.

1.2   Users

Figures representing the number of people with disabilities in the United Kingdom vary widely, depending on the source, but what can be inferred from the available data is that a significant percentage of the population may be considered to have an impairment which, "has a substantial and long term effect on [their] ability to carry out normal day to day activities" (Disability Rights Commission (DRC), 2002, p119). In 2002, one conservative estimate reported that 12-13% of the UK population (5 million people) has some form of impairment (Oxley, 2002), whilst a current estimate by the Disability Rights Commission suggests that one in five adults in Great Britain is a disabled person (DRC, 2002). Additionally, many other groups report that current public toilet provision is inadequate, including women, adults with babies or young children, anyone who needs to be accompanied by a carer, all those coping with a relevant medical condition, older people, as well as people with a physical, sensory or cognitive impairment. Some people may even be excluded, or further excluded from using current provision because of their ethnicity or faith affiliations.

1.3   Cognitive Impairments and the Built Environment

It is currently estimated that over 700,000 people in the UK have some degree of cognitive impairment associated with dementia, and this number is projected to rise to over 1.2 million by 2040 (Cox, 1999). Although physical impairment and dementia is following a demographic trend and is rising in aging societies, the emphasis on design within the built environment continues to focus more on the barriers "between psychomotor capacities and the organisation of space than between psychological capacities and the organisation of space" (Blackman et al, 2003, p.359). It is estimated that 80% of people with dementia live in their own homes, with approximately a quarter living alone. A third of people living in their homes are considered to have a severe form of dementia (Blackman, 2003).

As a degenerative impairment, the cognitive functions of people with dementia are unlikely to improve. In contrast people with learning disabilities can, with interventions, learn to adapt to the built environment. It is currently estimated that there are 160,000 adults in the UK with severe and profound learning disabilities and between 55,000 and 75,000 children with moderate or severe learning disability (Department of Health, 2004). With medical advances increasing the survival of older people and infants, the populations of people with degenerative and congenital cognitive impairments are likely to increase.

Imrie and Kumar (1998) have found that many disabled people associate their homes with safety and security. In contrast, the environment outside of the home is associated with danger and inhospitableness. For many people with dementia, feelings of disorientation and loss of way finding ability may keep people indoors, extending their feelings of isolation[5] and constraining their autonomy (Blackman, 2003).Nevertheless, research with older people has highlighted the importance of wider access to the built environment as being instrumental in their psychological, social and physical wellbeing (Robson, 1982). However, the many barriers older people encounter effectively restrict their activities. Barriers may include, uneven paving surfaces, poor lighting, heavy traffic, no shelter or seating and a lack of public toilet facilities. For older people with dementia these barriers are likely to be intensified (Blackman, 2003). Restrictions to access of the built environment for people with learning disabilities have also been noted by Imrie & Kumar (1998). Environments that are not easy to navigate, and without essential supporting facilities such as public toilets, may also effectively isolate and confine those with learning disabilities to the space of the home, thus, developing a supporting built environment is essential for people with all aspects of cognitive disability to ensure that their wider spatial scope is not restricted.

1.4   The Second Nature of Toileting

For many people, using the toilet does not require much thought concerning each action they make within the space. After the initial conscious cue of the need to use the toilet, the use of the space, from opening and closing doors, using the toilet, flushing after we leave and washing our hands, can be considered almost an unconscious activity and 'second nature'.

Freund (2001) notes that impairments brought about by aging may shift how a person experiences one's body such that routine and everyday activities become increasingly difficult. The changes in the body may make previously

unconscious movements and actions painful, difficult and noticeable. Equally movement and action in previously friendly spaces may become more difficult and lead to the space becoming 'unfriendly, potentially dangerous and uncomfortable' (ibid, 2001, pg 699). Drawing from Radley (1996), Freund suggests that using spaces with ease is not a mechanistic ergonomic problem, but one of an 'embodied relationship to physical artifacts and environments' (ibid, 2001, pg 699). The unconscious and 'second nature' aspect of toileting may become impossible due to a lack of available or familiar facilities that are easy to locate and comfortable to use, and thus the public toilet and, by extension, the city becomes an unfriendly space and one to be avoided.

Familiarity with the function and form of the toilet space is developed primarily within the home. For people with degenerative and congenital impairments, the familiarity with the domestic design of the toilet acts as a signal for the appropriate behaviour within this space. The target-hardened design and appearance of toilets provided for public use may be perceived as confusing or even threatening by people with cognitive impairments.

1.5 The Inclusive Design of Away From Home (Public) Toilets in City Centres

Previous research (Goldsmith, 1976, 1997; Greed, 2003) has consistently pointed to a range of design issues in respect of mainstream public toilet provision that differentially adversely affect women and children. The situation is even worse in respect of disabled people. An inaccessible built environment may be inconvenient for disabled people but, as Goldsmith (1976) has pointed out " at public lavatories this could induce a crisis". He has further observed that "among disabled people, the accessibility of public lavatories is of greater importance than for any other building type", (p.356).

Research currently being undertaken at University College London aims to broaden previous consultation processes to include many different groups of public toilet users. The research is consulting a wide verity of community and support groups to establish the level of comfort, safety, cleanliness, hygiene and privacy they experience in current facilities, and to identify changes in design that would lead to a more suitably designed public toilet. Preliminary investigations with toilet providers has revealed that little is know about certain 'able-bodied' groups including families with young children, as well as people from minority ethnic and faith communities. Consultation with disabled people is being extended to include those whose disability is hidden, such as those who have continence concerns, and people who have sensory and cognitive impairments.

1.5.1 The Design Matrix: Personas, templates and toilet audit tool

Data gathered from focus groups and individual semi-structured interviews are being collated and constructed into design tools called 'personas'. Personas are narratives based on the collective biographies of user's experiences within the built environment. They are fictional accounts that describe what it is like to have a particular disability, be a carer, an older person, a parent with young children and/or a member of a minority community. The persona tells a story of what people would like to do in the city and how either good or bad provision affects their use of the city without reducing the user to a stereotype. Each persona will 'voice' the design failings of toilet facilities and provide suggestions for future toilet designs that meet their requirements. In addition, personas reach beyond the ergonomic considerations that restrict the use of toilets, by describing the psychological impacts many users experience when faced with inappropriate facilities. As well as providing an engaging reference for professionals, personas also serve as a communication tool that keeps the relevant user issues at the centre of the design process whilst allowing an aura of anonymity. This can be considered a crucial element in communicating, what some may consider, 'embarrassing' details of their toileting needs.

The desired design solutions for each persona will be translated into a design template that will specify an appropriate design solution. The templates will highlight the success or failure of current toilet designs and will be ranked in accordance of the number of personas each accommodates. Templates will provide information on how current facilities can be modified to accommodate the largest proportion of users. Where users can not be accommodated by a mainstream or customised design, a new template will be created that is tailored to the particular needs of the persona.

In collaboration with access consultant Vin Goodwin, the research team have built a toilet audit tool. Based on established design recommendations, this tool enables users involved with the research to audit toilets that may, or

may not, be suitable for their needs. The toilet audit tool will also enable the research to identify common features of good and bad design within these facilities, especially concerning the placement of grab rails, the toilet flush and other aspects of fixtures and fittings.

Together, personas, templates and the toilet audit tool will form the core of a design matrix that highlights specific needs within toilet facilities, that a wide spectrum of users may share. In identifying common design considerations that are shared between users, the research will identify areas of good and bad practice in the design and management of public toilet facilities. In addition, the personas and templates will provide tools for architects, planners, designers and providers to consult when planning toilet facilities for all[6].

1.6   Toilet Troubles [7]

Although a vanishing aspect of the built environment, many of the remaining public toilets in the UK are not well designed for contemporary needs. The dwindling numbers of available facilities are currently restricting many people's lives, especially those who need to use toilets frequently. Users have reported that the lack of provision limits the amount of time they can spend out of the home. However the sense of a lack of provision may be increased by certain facilities that are 'unfriendly' and for people with cognitive impairments 'too complicated' to use. In addition, a history of an ambivalent attitude towards public toilets in the UK has resulted in facilities that are not located in well used, accessible environments. The history of public toilets consists of facilities hidden underground or positioned in segregated, 'out of the way' locations that are difficult to find and in some instances can also feel threatening to users (Greed, 2003).

1.6.1   Way Finding & Signage

For people with dementia, incontinence is a major problem (Namazi & Johnson, 1991a). The maintenance of independent toileting has been an important aspect of design guidelines for indoor environments, such as day centres and residential care homes. Essential aspects in maintaining toileting independence include making facilities easy to locate and identify through signage. Previous research identified that adequate signage using the word "toilet" "rest-room" or a graphic of a familiar household toilet increased usage. In the UK the current sign for the accessible toilet is a pictogram of a person using a wheelchair, (Figure 3) [8]. This symbol may not be easily recognized by a person with dementia as an appropriate facility for them to use. Older people have reported that they would not consider using the 'disabled' facilities, even though the use of grab rails and accessible hand washing facilities such as levered taps may make toileting more comfortable.

Figure 3: Sign for accessible toilet

Although standard facilities may be signified by signs representing the appropriate gender, it is increasingly common for smaller businesses to provide an 'accessible toilet' signified by the wheelchair pictogram as their only toilet facility. In addition many UK public toilets are known and signposted by varied terms these include "WC" "Public Conveniences" and "Lavatories". The lack of cohesion concerning the name of facilities could further confuse the person with dementia as well as users who are unfamiliar with the English language. Clear signage of

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[6] The proposed design matrix outlined here contrasts with the `toilet lab` approach taken in Japan. On a recent visit to Toto International, Japan's leading toilet manufacturer, the flexibility of design and testing that was enabled by the lab approach could be greatly enhanced by the use of the proposed design matrix.

[7] Unless otherwise referenced, this material has been obtained from primary research undertaken by Vivacity 2020: Inclusive Design of Public Toilets in City Centres.

[8] Indeed, in the UK this symbol is also widely used to denote separate entrances, parking spaces and general services for disabled people.

toilet facilities would help all users, but would be significantly helpful for those who need to find toilet facilities quickly as well as people with dementia and learning disabilities who may experience difficulties with way finding.

1.6.2   High Stimulation

Carers of children with learning disabilities such as autism have reported that toilet facilities can be, to the autistic child, "an adventure playground". Toilet facilities can be highly stimulating for autistic children with 'shiny' buttons to push, and taps to turn on. Where the autistic child needs help toileting, the accessible toilet with it's many fixtures and fittings including the red alarm cord can distract the child from the task in hand and result in increased levels of agitation.

Research with people with dementia also reveals agitated behaviour in high stimulation environments such as bathrooms and toilets. Over stimulation may impair a person with cognitive impairment's ability to concentrate (Day et al, 2000). Auditory distractions such as those from hand drying technologies may also be a source of distraction and agitation.

1.6.3   Lighting and Visual Contrast

People with dementia share similar visual deficits to people with visual impairments. These include difficulty with colour discrimination, depth perception, sensitivity to contrast and irritation from glare (Croonin-Golumb, 1995; Brawley, 1997). Design guides for dementia environments advise strategies to reduce glare, minimizing confusion with depth perception and increasing colour contrast and closely follow guidelines for the design of space for people with visual impairments.

Many public toilets have 'blue' lights installed as a deterrent against illegal substance use in the facilities. The blue lights make it difficult to locate veins for injecting substances (Flemen, 2003). However, this form of lighting also makes distinguishing colour contrast difficult for people with visual impairments, so that they are less able to navigate the space of the facility. In addition, people with colostomies and urostomies have reported difficulty assessing if they have adequately cleaned their stoma, and people with diabetes have found these environments difficult to assess if they have successfully injected themselves with insulin.

For people with cognitive impairments the effect of the blue light may be twofold; firstly by diminishing the colour contrast of the facility, and secondly by creating an unfamiliar and over stimulating environment. It may deter some users from entering the toilet at all, and a proportion of those who do will be at an increased risk of not being able to successfully use the facility. Unsuccessful use could mean that the user soils themselves or their clothes and leaves the toilet in a state that is unacceptable to subsequent users.

1.6.4   Door Locks

For the comfort, safety and dignity of most users of public toilets, the first and possibly most important aspect of using the toilet will be to close and lock the cubicle door. In recent designs of cubicles, especially those on 'accessible' trains, a three stage electronic door lock has been introduced, (Figure 4). This mechanism involves pushing the first button to close the door followed by activating a second button to ensure the door is locked. This two stage operation effectively separates two closely related operations. To open the door a third button is pushed which unlocks *and* opens the door. Although instructions for the operation of the door lock are clear (and also provided in Braille), the need to pause and read in order to lock the door may cause difficulties for people with cognitive impairments as well as non-English speakers, and lead to embarrassing and distressing situations.

1.6.5   Toilet Flush

There are a number of designs currently on the market for toilet flushes. In accessible toilets it is recommended that the flush can be used by a closed fist or elbow. For some users such as children with autism and people with learning disabilities, the act of flushing may be considered as the 'reward' for successful toileting, the act involving the action of flushing as much as the consequence of this action. New technologies of sensor-flushes actively remove

the need to touch the flush and are operated by waving hands across the sensor (Figure 5). For people with cognitive impairments such as dementia, the replacement of the 'traditional' flush mechanism with a hands free sensor flush, removes a familiar aspect of the toileting act and may cause dis tress to a person who can not understand why they can not flush the toilet.

Figure 4: Three stage electronic toilet door lock

Figure 5: "Hands free" sensor flush.

1.6.6   Hand Washing Facilities.

Recent developments in the design of hand washing facilities (Figure 6) include all-in-one systems that dispense soap, water and the air for drying. This fixture can be complicated for people with cognitive impairments to use. The lack of identifiable fixtures such as a free standing sink and taps, may signal to the user that there is no place to wash their hands. In addition inserting hands into a 'hole in the wall' may feel unfamiliar and cause agitation.

1.6.7   Automatic Public Conveniences (APC's).

The Automatic Public Convenience (APC or *Superloo*) (Figure 7), is replacing much of the traditional provision around the UK. The APC is fully automated and will often consist of technological innovations such as an automatic door and locking system, and 'all-in-one' sensor operated hand washing facilities. Many user's dislike APC's and perceive the facilities as a 'last resort' and not 'a positive choice'. Recent research in Clerkenwell, London (Bichard *et al*, 2004) found that women over 45 would not use these facilities for fear of being locked in or being unable to see who might be waiting outside. Respondents reported finding the facilities too complicated to use and were put off by "all the instructions". For people with cognitive impairments all aspects of the APC could be considered a cognitive challenge.

Figure 6: Automatic hand wash unit

Figure 7: Automatic Public Convenience (APC)

1.7   Conclusion

For people with learning disabilities or dementia many aspects of the toilet may act as a cue for appropriate behaviour. The familiarity of a door lock, the handle of a flush, the shape of a tap may all act as objects that focus the user on the use of the toilet. The replacement of such familiar objects with hi-tech solutions may effectively distract or confuse those with impaired cognition, and lead to an avoidance of perceived unfamiliar and unfriendly spaces. More importantly, many hi-tech toilet solutions would not be suitable for a public space that is often the target of vandalism and willful destruction.

There is a need for designers to understand precisely why each of the fixtures and fittings in an accessible WC cubicle has been specified. This is a particular challenge for designers of APC's, but even in the familiar standard toilet block, the numerous technological 'advances' in fixtures and fittings, coupled to the 'technisation' (Freund, 2001 pg 699) of the routine of using a public toilet facility may prove too complex for many users, especially those with cognitive impairments.

The inclusive design of an 'away from home' toilet superficially presents itself as a mere technological affair, where successful design can be reduced to a matter of 'getting the specification right'. In reality, wherever the designer attempts to intervene in the design process, the inclusive design of public toilets unveils fundamental social processes that not only regulate relationships between different user groups but also cross the boundary between acceptable and unacceptable behaviour. As accessible toilets become more commonplace there remains a danger that the needs of the more visible disabilities will be accommodated but that the requirements of people with a hidden disability such as impaired cognition will be overlooked, thus denying them equality of opportunity in accessing public life.

1.8   References

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