Resident participation in the evaluation of external accessibility requirements in housing estates

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Keywords

Accessibility, Housing estates, Environment, Attitudes

Abstract

Accessibility is now a major issue in the design and maintenance of housing estates. This paper considers the reasons why this issue has emerged and the main obstacles to accessibility encountered by housing estate residents. Focusing on a mature estate in South Belfast, Northern Ireland, investigates the obstacles to accessibility experienced by the residents in order to produce a hierarchy of impacts. Residents were surveyed on a number of issues including location, roads and pavements, transportation, level change, wayfinding, safety and security, and public areas. It was discovered that obstacles relating to wayfinding created the greatest problems for residents; however, attitudes towards accessibility varied according to the age of the respondent. The study concludes that accessibility should be introduced estate-by-estate dependent on a resident profile in order to maximise resources and advocates the adoption of a co-ordinated interagency approach.

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Facilities
Volume 18 · Number 1/2 · 2000 · pp. 45–55
 · ISSN 0263-2772

Introduction

The issue of accessibility is becoming increasingly important for the providers and managers of social housing. This is underlined by the introduction of legislation such as the Disability Discrimination Act (1995) in the UK and the proposal to extend the accessibility requirements of the Building Regulations to housing in England and Wales. At the same time, the link between social housing and social exclusion is gaining greater recognition by governments (DETR, 1999) and other institutions and has been described as occurring where housing processes deny certain groups control over their lives and reduce access to wider citizenship rights (Somerville, 1998).

Most of the research into housing accessibility, such as lifetime homes standards (Joseph Rowntree Foundation, 1991) and barrier-free housing (Scottish Homes, 1995) has focused on the accessibility of the interior of the dwelling or the immediate external environment. However, regardless of the level of accessibility, a person with mobility problems is unlikely to benefit if the external environment is inaccessible. It is now accepted that buildings and external environments should be healthy, safe and user-friendly, and flexible enough to accommodate a range of needs (Pickles, 1998). Universal accessibility aids independent living and therefore reduces the social exclusion experienced by people with mobility problems, including wheelchair users, elderly people, pregnant women or people with young children, people with sensory or cognitive problems, and those with temporary injuries, among others. Visitability is also an important concern for residents (Edge *et al.*, 1998; Martin, 1992).

Another critical development is the realisation of the value of user participation in social housing design (Edge *et al.*, 1998), such as the Tenant Compacts recently announced by the government (DETR, 1999). Kernohan *et al.* (1992) describe several types of information which end-users can provide for building designers and managers and note that the value systems of users and designers are often in direct opposition. Indeed when access issues are discussed in the context of

Received October 1999
Accepted December 1999

housing, it is local voluntary groups, rather than the actual residents, which are usually consulted (Barnes, 1996).

Housing associations and other social housing organisations are obliged to maximise the accessibility of existing estates, often with limited resources. However, if accessibility requirements are incorporated into routine maintenance programmes through careful planning, many of the financial costs can be reduced. Research commissioned by the Joseph Rowntree Foundation (Bonnett and Walliman, 1996) has demonstrated that many lifetime home standards can be incorporated into older homes during routine repair programmes at little or no extra cost. Bonnett and Walliman note that, with the majority of houses in the UK dating from the first half of the century, and with one in four households including an elderly person or a person with a disability, this approach will become increasingly important.

It is in this context that a major research investigation has been undertaken into the external accessibility of a housing estate in South Belfast, Northern Ireland[1]. At the core of the research is a survey of the residents of the estate, which comprises approximately 50 per cent private ownership and 50 per cent social housing. The survey is designed to examine whether or not residents acknowledge the obstacles to accessibility found in many accessibility auditing checklists (Fearns, 1993) and to prioritise the obstacles in order of their impact on the residents, to ensure the effective allocation of resources.

Best practice in relation to obstacles to accessibility

The literature on external accessibility focuses on the following themes: location; roads and pavements; transportation; level change; wayfinding; security and safety in public areas.

Location

Location is a critical factor in housing suitability, especially for those with mobility problems (Pickles, 1998), and can have a great impact on levels of stress and satisfaction among residents. A survey of council tenants in Gateshead found that satisfaction with their home was determined more by location rather than housing type or condition (Ineichen, 1993). In this context, developments must be sited to allow residents to feel part of the local community, with easy access to facilities and well served by public transport with connections to work, social and leisure opportunities (National Housing Federation, 1998). In particular, developments should be within approximately 1km of local shops, a telephone box, a primary school, a health facility and a park or open space and within approximately 0.5km of a bus or train route with access to secondary schools, cultural and entertainment facilities, leisure centres and commercial centres. Furthermore, the Housing Corporation's sustainability index recommends that new developments should be located within ten minutes' walk of the following facilities: post offices, banks and building societies, public phones, doctors, dentists, schools, places of worship, pubs and clubs, and libraries (Dwelly, 1998).

Roads and pavements

Important accessibility issues regarding pavements include such physical characteristics as width, crossfall, the nature of the surface, manholes, gratings and other trip hazards, upstands, dropped kerbs and street furniture. In relation to roads, the factors to be taken into account are parking, transport and traffic management as well as maintenance of the roadways. The following principles are typical of the available guidelines in relation to pavements: obstacles should be as far away from the walking route as possible; every unexpected obstacle on the walking route should be marked by means of contrasting colours and/or differences in texture (DETR, 1998); resting areas should be provided along a walking route (Wijk, 1996a); surfaces should be level and firmly fixed with no protruding paving slabs to trip over or puddles to avoid; and wider pavements improve the quality of life for people with prams, buggies and shopping bags as well as wheelchair users (Palfreyman, 1997). In relation to parking, the key issues include the distance between parking spaces and the most likely destination should be as short as possible; the number of accessible parking spaces should be maximised; "improper use" should be discouraged by markings, signs or posts; entrance and exit areas should be finished with a non-slip, even layer; automatic installations should be

mounted between 850mm and 1,100mm above the street; signposting should be provided (Wijk, 1996a); and car ports by entrance doors should be provided where possible (NIHE, 1995).

Transportation

Road systems and pedestrian walkways should be designed to maximise accessibility and to minimise travel distances. Public transport planning should be integrated with the processes of estate planning and should reflect the needs of the community. The National Housing Federation (1998) considers that all provision for transport (roads, cycleways, footpaths, car and bike parking) must meet residents' needs for safety, security and convenience, and be on a human scale. Social landlords should, as far as possible, ensure road design and layout places the needs of pedestrians and cyclists before those of the car. Safe cycle routes should be provided. In relation to transport stops, Wijk (1996a) makes a number of recommendations, including that stops and vehicles should be adapted to each other to avoid level change; the stop should be free of obstacles; the stop should be situated as close to the most likely destination as possible; information displays should be visible and comprehensible from a distance; and a non-slip and even finish should be used for the exit and entrance surfaces.

Level change

Level changes introduce mobility barriers and safety risks in the external environment and should be avoided if at all possible. Steps and excessive gradients produce problems for everyone, not just those using mobility aids or pushing prams or trolleys.

Again, a series of recommendations has been proposed by Wijk (1996a) and the National Housing Federation (1998). These include resting and passing places should be provided in hilly areas; slopes should be finished with non-slip, even and uninterrupted surfaces; differences in level of 20mm or more should be avoided, rails should be mounted on both sides of ramps which cover a difference of level of more than 250mm; high and low handrails should be mounted on both sides of stairs and make them extend 300mm or more beyond the first and last riser; handrails should be designed so that they offer good support and so that it is clear where they end. Handrails should continue on landings; adequate lighting should be installed and every riser indicated by contrasting finishing. The beginning and end of stairs with tactile finishing should be marked; a ramp or lift should be provided as an equivalent facility in addition to stairs.

Wayfinding

Good circulation and wayfinding design is essential to accessible housing estates. Well-designed wayfinding aids visitors and service providers. Adequate signs and street names may prove crucial in case of emergency. Indeed it is essential that emergency services can negotiate a development easily and quickly. Directional and street signs are the most common aids to wayfinding. In this respect signs with simple symbols should be used; signs should contrast with their background; adequate lighting with important signs and markings should be provided; signposting should be installed alongside the walking route; signposting for individual groups of disabled people should be avoided as much as possible (Wijk, 1996a).

Security and safety in public areas

In many studies involving user participation, issues relating to crime, security and anti-social behaviour have been of paramount concern for estate users (Smith, 1997). Good design may inhibit crime and vandalism and reduce fear among the community by reducing the level of what Coleman (1985) describes as "confused space". Another issue is the necessity of a clear distinction between public and private space (Harriott and Matthews, 1998). The National Housing Federation (1998) considers that residents must be able to enjoy reasonable privacy in their homes and gardens, and feel safe in the public areas of the development. In this context, the Federation provides a range of guidelines and principles to maximise safety and security, which attempt to achieve a balance between safety and privacy for residents and visitors. Key considerations include: the orientation of dwellings should reduce impact of external noise and avoid overlooking habitable rooms but should allow natural surveillance of unexpected visitors; pedestrian routes should be open and designed to enhance security; play spaces should be in plain view; the lighting scheme should ensure visual security; grouped

parking spaces should be clearly identified with the dwellings they serve and should be overlooked by their dwelling; adequate lighting should be provided.

The legislative and administrative background

Housing authorities have been responsible for the special needs of people with disabilities since the Chronically Sick and Disabled Persons Act (1970). Growing pressure from disability groups has ensured that legislation is becoming increasing stringent regarding disability rights. The Disability Discrimination Act (1995) affects anyone who provides goods, facilities or services to the public, whether for profit or without charge. It is illegal to refuse to serve someone who is disabled or to offer a disabled person a service which is not as good as the service being offered to others, or on different terms. Similarly, it is illegal to make it impossible or unreasonably difficult for a disabled person to use the service or goods. Where a physical feature of a service provider's premises makes it impossible or unreasonably difficult for a disabled person to avail of a service, the provider must take reasonable steps to remove or alter the feature; provide reasonable means of avoiding the feature; or provide a reasonable alternative method of service (Disability on the Agenda, 1996). In terms of property, it is illegal for anyone who sells or lets land or property (and their agents) to discriminate unreasonably against disabled people. For example a landlord cannot charge a disabled person a higher rent than anyone else or refuse to lease premises to a disabled person.

Concerning Northern Ireland, currently (1999) Part R of the Building Regulations relating to access for people with disabilities does not cover housing in the province. However, it has recently been announced that the English equivalent, Part M, will be extended to cover domestic buildings. It is widely expected that, in Northern Ireland, Part R will also be amended in the near future. The proposals are intended to allow occupiers to be able to invite disabled people to visit them in their own homes without undue hazard or inconvenience and be able to cope better themselves with reduced mobility (*Access by Design*, 1995). It should be noted that the proposed measures relate to the immediate environs of the dwelling only and, in the main, to the needs of wheelchair users. In addition, they relate to new build, not existing dwellings.

In Northern Ireland, the Housing Executive (NIHE) assumed control of all social housing in 1971, following a series of local government reforms. The Executive is currently responsible for managing 130,000 housing units and, in its Corporate Plan, is fully committed to the concept of Universal Accessibility. Indeed the NIHE pledges to "continue to promote high standards of design capable of meeting the needs of families as they progress through their lifecycle. This means that all dwellings must be designed with flexibility in mind and take into account physical access, security, fire safety, health and energy efficiency considerations". The NIHE also adheres to the principle of enabling older people to remain in their own homes for as long as possible (NIHE and NIFHA, 1997). However, the Housing Executive's portfolio of stock presents wide variations in levels of accessibility which reflect the age and nature of the stock; changes in design principles and building regulations; routine maintenance and upgrades; and the adaptation of individual houses in accordance with the specific access needs of the residents.

Research methodology

The literature on existing best practice in accessible social housing; the legal and social background to accessible housing; the particular needs of residents and their visitors; overcoming obstacles to accessibility and user-participation studies in relation to social and other types of housing provided an indication of potential impacts on accessibility. This informed the design of the questionnaire survey tool at the heart of the research. The survey seeks to obtain residents' opinions in relation to accessibility obstacles and then to rank the problems in terms of degree of severity.

The selection of a suitable case-study estate for the research was based on a range of criteria including: a thriving community with the potential for future development; no external improvements either planned for the near future or completed in the recent past; a

representative sample of house types; a diverse tenant profile in relation to age and social mix; and a mixed tenure.

Application of these criteria and consultation with the NIHE led to the selection of Belvoir Park housing estate, located in South Belfast, approximately 5km from the city centre. The estate is bounded on the south and west sides by a district distributor (outer ring) road and on the north and east sides by a peripheral local distributor road (Belvoir Drive). The outer ring road links the estate to two main arterial roads into the city centre. The construction of the estate began in 1962 and continued until 1973. Approximately 50 per cent of the dwellings are now in private ownership. In total, there are 1,421 housing units in the estate, comprising 637 houses (two and three bedroom); 223 bungalows (one and two bedroom); 383 flats (one and two bedroom) and 178 maisonettes (three bedroom).

The flats are located in 14 storey high rise blocks or in two-four storey low rise blocks. Parking is provided in lay-byes adjacent to houses and around blocks of flats. Service courts contain banks of garages. Some properties have in-curtiledge parking. Estate facilities are centred on the Drumart Drive area, an elevated part of the estate. These include a supermarket; a general store, a post office, an off-licence; a health clinic; a doctor's surgery; a dental clinic, a library, five churches, a primary school, an activity centre and a Boys' Brigade hall. There is also a Sheltered Housing complex on the periphery of the estate.

The estate is serviced by an Ulsterbus service every 20 minutes at peak times and otherwise at 30-minute intervals. There is also a limited local Easibus service on Mondays and Thursdays which is available four times a day.

As the total area of Belvoir Park Estate is too large for in-depth study, a sector within the estate was selected for the purposes of the study. This sector comprises approximately 600 housing units and features a selection of all unit types, including the two 14-storey high rise blocks of flats as well as the main shopping facility at Drumart Square. In order to provide a balanced survey across different tenures and age groupings, a sample of 200 households was interviewed for the investigation. The sample was selected at random; however, regular meetings with the management of the estate ensured that the profile of the residents was representative. To ensure that the sample did not become skewed, the survey was undertaken in the afternoon and early evening.

Questions included sections corresponding to existing NIHE questionnaires such as the Continuous Tenant Omnibus Survey to ensure that the sample remained representative of the population of NIHE housing estates and that the results could be extrapolated to other estates. In this respect, the survey sought information on household details, the dwelling, mobility and transport, use of leisure facilities outside the estate; use of facilities on the estate; the provision of services on the estate; delivery services; and accessibility impacts on the estate.

Before considering the results of the survey in detail, it is important to note that some respondents did not find many features of the estate to be a problem because the initial inaccessibility of their dwelling meant that they could not go out. Also several respondents, and in particular elderly or frail people, were unwilling to admit that a physical barrier was a problem, perhaps believing that to admit to a degree of difficulty was a sign of weakness on their part. These respondents were happier to identify obstacles such as speeding traffic, for example, that were more beyond their control. Others believed that the problems identified were the norm – "only to be expected on an estate". It can therefore be assumed that the figures provided in the "obstacles to accessibility" analysis, are conservative in relation to the degree of difficulty experienced by estate users.

Survey findings

Residents' profile

The distribution of dwelling type reflects the known characteristics of the estate with mid-terraced houses the modal property type (Table I). A significant percentage (circa 24 per cent) lived in bungalows with 15 per cent in end-terraces and 12 per cent in high-rise flats.

In terms of tenure, the results are representative of the known characteristics of the estate, with 45 per cent of the households surveyed owning their homes, while 54 per cent rent from the NIHE. Privately rented accounted for 1 per cent of the sample. The level of ownership is below the average for the

Table I Dwelling type

	Frequency	Percentage
Ground floor flat	12	6.0
Low-rise flat	9	4.0
High-rise flat	23	12
End-terrace	29	15
Mid-terrace	53	27
Semi-detached	8	4.0
Maisonette	19	10
Bungalow	47	24
Total	200	100

province (67 per cent) but high for a former public sector estate.

The 200 households surveyed represent a total of 410 residents, and incorporate a large number of single person households (42 per cent). A further 32 per cent of households contain two residents. Only 4 per cent of households had five or more members. Almost 25 per cent of heads of households were in the age band 71-80, while 50 per cent were over 60 years old. The latter statistic contrasts significantly with the Northern Ireland average of 35 per cent of households over 60 years of age (NIHE, 1996). Of the 42 per cent of residents who live alone, 70 per cent are aged 60 or over, and 70 per cent are female. In contrast, the 200 households surveyed contained only 62 children under the age of 15, 22 of whom were under five years of age. Belvoir Park has therefore a relatively old age profile reflecting an average length of residency of 15 years, although 5 per cent had lived in the same dwelling for 35 years or more. In relation to the gender structure, 54 per cent of heads of households were female.

Consistent with the age profile of the estate, 42 per cent of the population are retired or classify themselves as permanently sick or disabled, 41 per cent are in full or part-time employment or study while 13 per cent work from home, keep house or are unemployed. From these figures, it can be assumed that over half (55 per cent) of the population spend the majority of their time in and around the estate.

Given the age structure of the population, the incidence of mobility problems is prevalent with approximately 25 per cent of interviewees surveyed reporting some sort of mobility problem. This grouping has been further defined as follows (Table II).

Table II Incidence of mobility problems

Category	Percentage breakdown of population with mobility problems
Wheelchair users	6
People using other mobility aids	17
Blind or partially sighted people	3
Deaf or hard-of-hearing people	2
Elderly people	4
People with respiratory or coronary problems	22
People with learning difficulties or mental health problems	9
People whose first language is not English	1
People with temporary impairments or injuries	–
Pregnant women	–
Carers looking after someone with a mobility problem	7
Other	19
People with two or more of the above conditions	8

A substantial number (22 per cent) of residents who describe themselves as having a mobility problem suffer from respiratory or coronary conditions. These conditions are often described as "hidden disabilities" in the literature (National Rehabilitation Board, 1998) as it is usually not immediately evident that the person with such a disability has a problem. A further 23 per cent utilise mobility aids (the most common of which is a stick). Minimising the expenditure of energy is highly important for these residents. The access issues that may impact on them include wayfinding, gradients, traffic management, availability of parking and the provision of public transport. A substantial number of people with learning difficulties (almost 10 per cent) were surveyed – for this group of residents good wayfinding, and a logical estate layout in particular, are highly important as they can become easily disorientated (Martin, 1992). Carers are another, often forgotten, category of people who experience mobility problems. This group of residents (7 per cent) can expend much energy overcoming obstacles such as gradients, steps, a lack of dropped kerbs and pedestrian crossings.

When the distribution is examined in relation to age, it can be noted that the majority of people using wheelchairs or other mobility aids are 71 years of age or over. A

third of residents with respiratory or coronary problems belong to this age group. However, a number of respondents aged 15 and below had respiratory problems, mainly asthmatic. Learning difficulties or mental health problems were most prevalent in the 26-50 age group.

Obstacles to accessibility

Respondents were asked to rate whether anyone in their household or visitors to their home had experienced difficulties in relation to a range of access-related features (33 in total). These features, derived from the literature, included standard access checklists and the possible impacts identified through informal interviews with service providers on the estate. Respondents were given the choice of yes/no/sometimes/not applicable/don't know. They were also asked to rate the degree of difficulty on a scale of 1-5, where 1 represents very major difficulty and 5 very minor.

This permitted a ranking of the variables by age groups defined on the basis of the likelihood that their members would experience similar mobility characteristics (Table III).

Issues associated with wayfinding provoked a great deal of concern on the part of residents with 46 per cent considering that a lack of directional signs and the lack of maps were "major" or "very major" problems. The layout of the estate was also considered to be very difficult, which posed problems for the emergency services, indeed several individuals (15 in total) reported that ambulances had got lost on the way to their houses. In some cases it was reported that this had contributed to fatalities. Dwelling numbers and street names were thought to be particularly confusing: it was suggested that new tenants and residents should be given a map of the estate.

Many respondents (49 per cent) believe that speeding traffic is a "very major" or "major" problem, particularly late at night. Several residents (38 per cent) suggested that traffic calming measures such as ramps were required while others advocated reducing the speed limit and introducing police checks. Almost everyone surveyed recommended the installation of a pedestrian crossing at the primary school.

It is apparent that the steep gradients in the estate create difficulties for residents. Specific problems relate to travelling to local amenities such as the shops that are located on elevated ground and in moving around the estate in poor weather conditions. People with prams, the elderly and disabled experience particular problems. Several residents (10 per cent) commented that more handrails were required. It was also thought that better maintenance of the steps and better lighting were necessary. Furthermore, 36 per cent of residents believe that there is insufficient public seating, particularly for the elderly in hilly areas and at local amenities.

Only 5 per cent thought that rubbish collection was an issue, while a substantial percentage (44 per cent) believed that rubbish dumping was a problem. Particular areas of concern were around the maisonettes, at the flats and beside the dual carriageway. Residents noted that there were no litter bins by the chip vans or at the shops. Dog fouling was mentioned by many as a major problem. Several residents (29 per cent) thought that the vandalism of phone boxes (and vandalism in general) was a "very major" or "major" problem. The installation of CCTV cameras to protect against vandalism and car crime was advocated strongly. Vandalism of bus stops and graffiti on street signs caused particular difficulties. Noise levels in Belvoir, mainly due to loud music, children playing and traffic, present a nuisance to 22 per cent of residents.

There is only one play area in Belvoir Park Estate, which many residents thought was inadequate. Over 20 per cent reported that the play area was badly maintained. Other comments focused on the location of the play area beside a forest park, which was viewed as insecure with the vandalism and under-age drinking occurring in the play area. The lack of equipment, seats and bins, and the degree of litter were all commented on.

One quarter of the population thought that slippery surfaces were a problem on the estate – two-thirds of whom rated it as "very major" or "major". Areas at the school and Downhill Avenue were thought to be particularly difficult, with a number of people reporting that the estate was not gritted in icy periods. A substantial percentage (43 per cent) thought that leaves, snow and ice were a problem – 40 per cent of those categorising this as a problem described it as a "major" concern.

A significant percentage (22 per cent) of residents considered that their dwelling was too far away from parking spaces – a statistic

Table III Relative difficulty of accessibility features by age

Rank	Overall	Age 16-50	Age 51-70	Age 71+
1	Inadequate or non-existent directional signs	Speeding traffic	Inadequate or non-existent directional signs	Inadequate or non-existent directional signs
2	A lack of maps	Inadequate or non-existent traffic calming	A lack of maps	A lack of maps
3	The layout of the estate	The layout of the estate	The layout of the estate	Inadequate or non-existent street signs
4	Speeding traffic	Ease of use by the emergency services	Ease of use by the emergency services	The layout of the estate
5	Ease of use by the emergency services	Inadequate or non-existent directional signs	Inadequate or non-existent seating in public areas	Inadequate or non-existent seating in public areas
6	Inadequate or non-existent street signs	Traffic danger spots	Speeding traffic	Speeding traffic
7	Inadequate or non-existent seating in public areas	Lack of maps	Inadequate or non-existent traffic calming	Ease of use by the emergency services
8	Inadequate or non-existent traffic calming	Inadequate or non-existent street signs	Inadequate or non-existent street signs	Inadequate or non-existent traffic calming
9	Traffic danger spots	Inadequate or non-existent seating in public areas	Traffic danger spots	Traffic danger spots
10	Inadequate or non-existent pedestrian crossings	Vandalism of phone boxes	Inadequate or non-existent pedestrian crossings	Gradients of routes
11	Vandalism of phone boxes	Inadequate or non-existent pedestrian crossings	Vandalism of phone boxes	Inadequate or non-existent pedestrian crossings
12	Gradients of routes	Maintenance of play areas	Rubbish dumping	Rubbish dumping
13	Rubbish dumping	Fallen leaves, snow or ice	Gradients of routes	Fallen leaves, snow or ice
14	Fallen leaves, snow or ice	Steps	Fallen leaves, snow or ice	Vandalism of phone boxes
15	The maintenance of play areas	Gradients of routes	The maintenance of play areas	Slippery surfaces
16	Steps	Handrails	Steps	Steps
17	Handrails	Noise levels	Handrails	Distance of dwelling from parking
18	Slippery surfaces	Rubbish dumping	Slippery surfaces	Handrails
19	Distance of dwelling from parking	Adequate street lighting	Distance of dwelling from parking	Height of kerbs
20	Noise levels	Vandalism of lighting	Noise levels	The maintenance of play areas

that should be taken in context of the 50 per cent car ownership in Belvoir. Indeed, 59 per cent described this problem as "very major" or "major". Car parking, or the lack of it, is a major issue for Belvoir residents. Several have had difficulty obtaining designated spaces or in-curtilage parking. Many people remarked that visitor parking was a problem, particularly for elderly, frail or disabled visitors. Lack of secure parking was also a major concern. Additional parking at the school was seen as an important issue to individuals.

Distribution of accessibility impacts by age

When the results of the survey are analysed by age, it can be observed that there are certain

differences between the obstacles experienced by the under-50 years old age group and those in the age groups above (Table III)[2].

While wayfinding was viewed as a major problem by all three groups, speeding traffic and a lack of traffic calming were described as being most problematic by the younger group, who ranked it first. Both the 51-70 and the 71+ age group ranked this impact sixth. The under 50s also ranked traffic danger spots significantly higher than the over-50s. This may be due to considerations of child safety among the youngest age group and also patterns of usage of the estate as speeding traffic was reported to be a problem at night by many residents. The 16-50 age group is more likely to be absent from the estate during the day through work or other commitments than the older groups and therefore to be less aware of wayfinding issues, and more concerned with "night time" issues. This may also account for the concerns of this age group regarding the maintenance of street lighting.

There was also a difference in attitudes towards the perceived lack of seating in public areas, which was placed fifth by both elder groups and ninth by the youngest. As would be expected, the steep gradients in the estate created more substantial difficulties for those in the 71+ age group (10) than those aged 51-70 (13) and 16-50 (15). However, it is the youngest group that ranked steps highest (14). This may be because it is this age group that is most likely to encounter problems with steps with prams and buggies. The lack of handrails is also more important to this group.

Likewise, this group ranks the maintenance of the play area (12) above the 51-70 group (15) and the 71+ group (20). It emerged from the survey that many respondents visited the play area with grandchildren, which may account for the discrepancy in the ranking obtained from the older groups. This relates to the concept of visitability encountered in the current literature.

The ranking of accessibility features suggests some variation by age category. In order to test the association between the relative ranks, a non-parametric (Spearman Rank) correlation was computed.

In comparing the two older age groups, namely the 51-70 and the 71+ bands, a high degree of association is apparent in their relative rankings. The correlation coefficient ($r = 0.8135$) is statistically significant at the 0.001 level ($t = 7.788$). However, when the correlation coefficients of the younger age group, i.e. the 16-50 age band, are compared with those of the older groups, the correlations were considerably lower. In the case of the correlation with the 51-70 age band, the value of the correlation co-efficient was 0.5827. While this is still statistically significant, the strength of the correlation is lower and the corresponding value for t (3.992) is also lower. This pattern is further emphasised when the rankings of the 16-50 age group are compared to those of the 71+ age group. In this case, the correlation is weak with a value of 0.3383; furthermore, the value of the coefficient is statistically insignificant at the 0.05 probability level ($t = 2.001$).

The values of the correlation coefficients indicate that the rankings are significantly different between the younger and the older age groups, inferring that these categories have different attitudes towards, and experiences of, obstacles to accessibility.

Conclusions

Changes in legislation, a growing awareness of the rights of people with disabilities, an ageing population, and the introduction of initiatives to combat social exclusion are just some of the reasons why the issue of accessibility in housing is becoming increasingly important. At the same time, the value of user-participation in housing design and management has gained wider recognition, particularly as the customer focus moves towards the tenant.

This research approaches accessibility auditing from the perspective of the end-user rather than the professional surveyor, resulting in the development of a list of mitigation priorities peculiar to this estate. This list, derived from a review of the current literature, focuses on a number of accessibility characteristics: location, roads and pavements, transportation, level change, wayfinding, and security and safety in public areas. From the survey of residents in a Belfast estate above it was noted that wayfinding and traffic are the two main problems experienced by users. However, distinct differences between the problems encountered by the under-50s and the over-50s are apparent. Although the ultimate aim on new estates should be to maximise

accessibility for all residents this is not always possible on existing estates due to budgetary, spatial and time constraints. A thorough knowledge of the age and mobility profile of residents would enable housing managers to develop a ranking based on the model above to target scarce resources more efficiently and to respond to the immediate concerns of residents more effectively. It would also enable designers to create or develop resident-centred, user-friendly estates, that fulfil the needs of as many people as possible. In relation to financial resources, such results enable housing providers and managers and other groups to prioritise the measures required to improve accessibility by addressing the needs of different age groups and for patterns of usage of the estate.

This approach is a valuable means of supplementing the traditional auditing methodology. However, it is not sufficient on its own due to the limitations on the validity of responses noted earlier in this paper; namely, some people did not find many features of the estate to be a problem because the initial inaccessibility of their dwelling meant that they could not go out; others thought that the obstacle was a symptom of their frailty and, finally, some believed that the problem, although serious, was the norm.

This research has demonstrated that the level of existing accessibility derives from the interplay of many different factors. It can be argued, using examples from Table III, that the lack of adequate public seating is exacerbated by the gradients of the routes, particularly for elderly people, which in turn is linked to the problems posed by slippery surfaces, and in particular, the lack of gritting during the winter. Improved wayfinding and traffic management, for example, also aid the day-to-day operation of the estate from the perspective of both residents and service providers. It is evident that there are several different organisations involved in identifying and providing solutions to these problems.

Clearly, then, there is a need for a multi-agency approach to address the needs and problems identified on estates such as Belvoir Park. This would involve a co-ordinated approach by the many agencies involved in housing management, housing maintenance, roads departments, local councils, the emergency, caring and health services and public transport providers to deliver a coherent and seamless accessibility policy, which would be tailored to the specific needs of the estate.

Under the sections of the Disability Discrimination Act (1995) relating to the provision of goods and services that came into force on 1 October 1999, all the above agencies have a duty to avoid discriminating against their customers. By 2004, all providers of goods and services will have to remove the physical barriers that impede access to those goods and services for people with disabilities. Despite the magnitude of this task, there is little additional funding available. It is essential, therefore, that the relevant parties should co-operate to maximise scant resources, rather than working independently from, and perhaps in opposition to, other organisations. This co-operation could, potentially, extend to a pooling of financial resources. In this instance, a joint accessibility unit could be established that would ensure a synergy between the access policies of the various bodies, and the needs of tenants.

Indeed research has demonstrated that the financial costs of improving accessibility can be reduced by integrating accessibility measures into existing maintenance programmes.

Notes

1 In collaboration with the Northern Ireland Housing Executive (NIHE).
2 Where appropriate, the ranking awarded by each group is placed in brackets.

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Further reading

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