The unseen barriers of the built environment: navigation for people with visual impairment


Published in:
Town Planning Review

Document Version:
Publisher's PDF, also known as Version of record

Queen's University Belfast - Research Portal:
Link to publication record in Queen's University Belfast Research Portal

Publisher rights
Copyright 2023 The Authors.
This is an open access article published under a Creative Commons Attribution License (https://creativecommons.org/licenses/by/4.0/), which permits unrestricted use, distribution and reproduction in any medium, provided the author and source are cited.

General rights
Copyright for the publications made accessible via the Queen's University Belfast Research Portal is retained by the author(s) and / or other copyright owners and it is a condition of accessing these publications that users recognise and abide by the legal requirements associated with these rights.

Take down policy
The Research Portal is Queen's institutional repository that provides access to Queen's research output. Every effort has been made to ensure that content in the Research Portal does not infringe any person's rights, or applicable UK laws. If you discover content in the Research Portal that you believe breaches copyright or violates any law, please contact openaccess@qub.ac.uk.

Open Access
This research has been made openly available by Queen's academics and its Open Research team. We would love to hear how access to this research benefits you. – Share your feedback with us: http://go.qub.ac.uk/oa-feedback

Download date:03. May. 2024
The unseen barriers of the built environment: navigation for people with visual impairment

The visually impaired community often finds the built environment difficult to navigate. Elements of street design such as street furniture, bollards and shared space are some of the problems that contribute to a hostile built environment. This article aims to investigate how the built environment affects people with a visual impairment through questionnaires, focus groups and interviews conducted with visually impaired people and built-environment professionals. A majority of visually impaired respondents stated the built environment was difficult to navigate, with several issues identified. These issues need to be addressed to create more inclusive spaces and places for all.

**Keywords**: urban design, disability, visual impairment, accessibility, inclusivity

**Introduction**

Our spaces and places are fundamental to the social, environmental and economic aspects of our lives. The ability to navigate and enjoy these places and spaces is important to everyone; however, people with disabilities and impairments can find them challenging. In particular, people with a visual impairment often find navigating around the built environment difficult. There are many prominent issues which make our towns and cities hostile, including street clutter; road crossings and pavement maintenance. This can in turn affect the mental and physical well-being of people with visual impairment.

This study aims to identify issues for visually impaired individuals while navigating the built environment, and how professionals perceive and address these issues. This study was conducted in Northern Ireland, where there are over 55,000 people living with a visual impairment. Professionals were from the Belfast City Area and representatives of the visually impaired community were from across Northern Ireland.

For the purpose of this article, visual impairment is defined as any level of visual loss. Visual loss is not linear but is on a spectrum and can manifest at varying levels and patterns due to the myriad of different causes of visual impairment. People who identify as having a visual impairment are often referred to as being part of the visually impaired community as this covers all levels and causes of visual impairment.
The places in which we live inevitably affect our health and well-being (Barton, 2016; London, 2020) as they are the setting for our everyday lives. The ability to actualise the affordances offered by the built environment is dependent on the physical and socio-economic accessibility of these spaces (Broberg et al., 2013). This ability to move and travel freely allows for social networking and the generation of social capital (Jones and Jain, 2006). This in turn provides people with continued opportunities to create and sustain social relationships and access employment, all of which prevent social exclusion (Jones and Jain, 2006). Therefore mobility and movement are often described as being core to people’s identities, life experiences and opportunities (Imrie, 2000).

Sui et al. (2020, 107) correlate the quality, developmental and civic status of a city with the inclusiveness of its public spaces: ‘It is crucial to consider how inclusiveness is factored into the design of public spaces so that different kinds of users are able to enjoy the convenience and welfare provided by them.’ For the majority of the population moving through and spending time in the built environment is easy and second-nature. Unfortunately, for many people with disabilities there are barriers to moving through the built environment. Cities are becoming increasingly fragmented due to the rapid global trends of urbanisation (Afacan and Afacan, 2011). This causes problems with inequality and exclusion of some members of the public, especially those who are considered disabled. Often it is clear that most built environments have been designed for the ‘average human being’ (Hahn, 1986), the ‘universal body’ with standardised measurements and movements (Franck, 2007b), or more specifically ‘the average male’ (Criado-Perez, 2020), with little thought for those who require aspects of inclusive design.

It can be said that with insufficient consideration for inclusive design, public spaces and places are disabling by design (Imrie, 2012). ‘Architectural disability’ is a term popularised by Goldsmith (1997) to portray how physical design, layout and construction of buildings and places can present people with obstacles and barriers which make the built environment inconvenient, awkward or dangerous and may even inhibit some people from accessing it at all (Hanson, 2004). Inclusive and barrier-free design is not a new concept and has been discussed and implemented for over forty years (Afacan and Afacan, 2011). Unfortunately, design ideas and implementation of inclusivity are often based on one particular type of impairment, namely wheelchair
users, rather than addressing the wider issue of multiple impairments. In addition, inclusive design is traditionally focused on meeting or satisfying minimum legal accessibility standards rather than addressing the true problems (Afacan and Afacan, 2011).

While it is clear there are physical barriers within the built environment, these physical barriers can create social barriers, namely social exclusion, and can increase social differentiation (Soldatic et al., 2014). Changing the built environment to a space that is inclusive for all, and designed ‘from the body’ for people of different sizes, needs and desires (Franck, 2007a), can help to develop sustainable communities which maximise independence and participation for everyone in society (Afacan and Afacan, 2011).

The disability community is very active in campaigning for progression of inclusive design and barrier-free movement. The origin of the umbrella term ‘universal design’ was due to the pioneering campaigning of those in the disabled community (Weisman, 2000). This has created a narrative for inclusive or universal design of cities with the definition of inclusivity changing alongside increased public awareness of sustainable practices (Boys, 2014). This change is forcing public-governance and built environment-professionals, such as planners and architects, to think of an environment for all as they are challenged by a push for new definitions, designs, strategies and an all-inclusive city. While universal design is thought to help enhance ‘performance and participation’ from people with disabilities, they often result in bespoke designs which are inaffordable by many councils (Imrie and Luck, 2014). Imrie and Luck (2014) also argue that universal design may not manage unrealistic expectations of designers to anticipate and interpret everyone’s needs.

In recent years, the design community has witnessed some success of the development of design approaches which take into account the ‘diversity of human abilities and conditions’ (Heylighen et al., 2017, 507). Despite this positive move in the right direction, cities and towns adopting these practices remain, as a rule, limited (Heylighen et al., 2017).

Navigating the built environment with visual impairment

‘All too often, disabled people find their lives needlessly restricted by features of the built environment’ (House of Commons, 2016, 3). People with disabilities, including people with a visual impairment, deal with this increasing problem daily. In 2018 it was estimated that more than 2 million people in the United Kingdom were living with a visual impairment (ONSNI, 2015; Pezzullo et al., 2018). By 2050, it is predicted, the number of people with a visual impairment in the UK will double to over 4 million (RNIB, 2018). The importance of sight is evident, with 78 per cent of people stating that their sight was the sense they feared losing most, as compared to 7 per cent stating they feared losing their hearing (RNIB, 2017). The social significance, fear of
living with an impairment and public ignorance of visually impaired communities, can influence the experience of people with a visual impairment in public spaces and places (Butler and Bowlby, 1997).

Vision is especially important for navigation around our cities and towns. Traditionally, vision and visibility have been recognised to have a hegemony over the other senses when considering the experiential elements of urban life (Classen, 1997; Pallasmaa, 2006; Low, 2012; Borer, 2013). When in outside environments we use vision as it gives us a sense of power and distances us from the body’s sensations and needs (Franck, 2007b). In addition, traditional architectural analysis and urban design are based around a visual concept of space (Dischinger, 2006). This often means that in order to make these spaces accessible we must look at it from a different perspective (Dischinger, 2006). The ability to navigate freely and safely is of the utmost importance to everyone in our built environments. Without this, many people refrain from leaving their homes, which causes many societal problems. People with a visual impairment are often perceived as having a navigational aid to help them navigate through our spaces and places. Despite this public perception, a majority of people with visual impairment do not use ‘traditional’ navigational aids such as canes or guide dogs. Only 2 to 8 per cent of those who are visually impaired use a white cane (Winter, n.d), and there are around five thousand guide dog partnerships in the United Kingdom (Hendley, 2018).

Regardless of whether a person with visual impairment uses a navigational aid, moving around cities is often a nerve-wracking experience (Guide Dogs et al., 2014). Gustafson-Pearce et al. (2005) have described wayfinding through a complex environment as being fraught with dangers, both actual and imagined, for the visually impaired user. It is often important to people with visual impairment to pre-plan their trips (Gustafson-Pearce et al., 2005); therefore people with a visual impairment often rely on cities and towns being predictable (Guide Dogs et al., 2014). Minor inconveniences such as roadworks can be worrying and dangerous to someone with a sight impairment and can have long-lasting effects, such as a resultant decline in confidence, causing them to refrain from going out alone again. Without this independent mobility, people with visual impairment are often affected both physically and emotionally, which impacts their quality of life. Imrie (2000) stated that moving around the built environment often served as a constant reminder to disabled people of their corporeal identities.

People with visual impairment have an impairment of the key sense which allows gathering of geographical information about where they are and how they can move around (Van Hoven and Elzinga, 2009). People with visual impairment often avoid pedestrian-unfriendly places and spaces and areas which are unfamiliar (Lehrer, 2011). The literature shows many examples where anxiety and stress are increased by fear of encountering factors or events which they do not have sufficient knowledge of or control over (Gustafson-Pearce et al., 2005).
The unseen problems in our hostile built environment

The environment affects whether people with a visual impairment can travel both safely and independently (Havik et al., 2015). Unfortunately, our environments are often described as hostile (Imrie, 1996) and ‘disabling by design’ (Imrie, 2012). Many visual-impairment charities and the visually impaired community have stated that spaces and services are often designed without proper consideration of those they serve (Guide Dogs et al., 2014). Lehrer (2011) highlights the difficulty people without visual impairment have imagining potential issues faced by people with sight loss in our built environment. Small details such as the height of kerbs and where furniture is placed on the pavement are often not considered in designing streetscapes. This is often why the literature criticises design of built environments as ‘illegible for the blind traveller’, as there are a number of obstacles (Ungar, 1996).

In the built environment, there are several obstacles on streets which are often ‘unseen’ by people with visual impairment, making navigating or avoiding them difficult. Some of these problems include street furniture, dropped kerbs, street cafés and on-street advertisement boards. Many of these features are found on multiple streets throughout the UK. Some other problems which are ‘non-permanent’ and problematic due to their unpredictable nature are parked cars on pavements, wheelie bins and uneven or broken surfaces.

Shared space is becoming increasingly prominent worldwide and is defined as an urban design approach which aims to minimise the segregation of pedestrian and
road users (Project for Public Spaces, 2017). The removal of demarcation and delineation between pedestrians and cars has been shown to increase pedestrian safety and reduce vehicle speed while keeping the area aesthetically pleasing. Shared space also aims to emphasise the place function rather than the traffic function of the built environment (Havik et al., 2015). However, shared space is often contested due to the safe navigation of people with a visual impairment. This is a more recent design idea being implemented in the UK and can cause multiple problems for people with visual impairment. Unfortunately, these areas are less predictable and depend on eye contact as the main social interaction to maintain safe navigation (Havik et al., 2015). The absence of conventional kerbs and delineation poses problems for those with visual impairment as they often rely on kerbs to navigate safely (NFBUK, 2016). Guide dogs also require a kerb height of at least sixty millimetres in order to recognise the road (a conventional kerb is traditionally 120 millimetres). Visually impaired people who use a cane also rely on kerbs as a navigation technique. Therefore shared spaces can be frightening for people with visual impairment even if they are familiar with them (NFBUK, 2016). The issue of shared space and visually impaired users is widely recognised, with many visual-impairment charities such as Guide Dogs, Vision 2020 and RNIB campaigning for improvements or alternative means of navigation for those with visual impairment. In London in 2017 there was a high-profile crash on the Exhibition Road shared-space scheme. After the incident, local Labour Party MP for Kensington, Emma Dent Coad, asked people to rethink shared-space design as it has made people more vulnerable as opposed to improving the pedestrian experience (Mairs, 2017). Locally, in Northern Ireland, there has been a judicial review of the subject of developing a public-realm scheme in breach of Section 75 of the Equality Act (Equality Commission for Northern Ireland, 2014).

Isolation and exclusion

For many people with visual impairment, restrictions on their mobility and movement are of great importance in their daily lives (Imrie, 2000). Visual impairment is recognised as an established risk factor for loss of independence (Gallagher et al., 2011) and is one of the four most significant causes of loss of independence for older people (Guralnik et al., 1999). The Cities Unlocked project (2014) suggests that 180,000 people with visual impairment rarely leave their homes due to anxiety and vulnerability. In addition, once confidence is lost, it is extremely difficult to get back, even after one isolated incident (Guide Dogs et al., 2014). Often people with visual impairment do not like to travel by themselves (Turano et al., 2004) and are met with barriers such as embarrassment, violence or abuse towards them and negative reactions in public places (Schneider et al., 2012). Some people see disability as a social burden and something which they have to deal with privately (Imrie, 2000). This all leads to social
isolation and the exclusion of those with sight impairment, which causes mental, emotional and physical problems.

Policy

Despite this clear problem, there is a paucity of legislation and guidance in force across the UK for accessibility for disabled people, especially those with a visual impairment. The Equality Act 2010 terms disabled people as a ‘protected group’ and describes that disabled people should not be at a disadvantage when it comes to street movement. It also recognises the need for inclusive design and ‘living streets’. The Equality Act seeks to introduce proper access audit schemes to ensure an audit of all designs for all stakeholders and introduce a test of reasonableness. Not implementing these features is a failure to implement Public Sector Equality Duty of Equality Act (Rye, 2010; Equality Act 2010).

Despite this, the Equality Act 2010 does not apply in Northern Ireland and there is only supplementary guidance on inclusive streets. Much of the legislation is outdated, including the Chronically Sick and Disabled Persons (Northern Ireland Act) 1978, which sets out that all planners and developers should consider those with a disability before acting. In Northern Ireland, regional planning policy remains a responsibility of the Department for Infrastructure (formerly the Department of the Environment), but most planning functions were devolved in 2015 to 11 new councils. Since the transfer of planning responsibilities to the new councils, they have been preparing new development plans, which will supersede the existing regional planning policy statements following formal adoption.

In Northern Ireland, the Development Control Advice Note 11 – ‘Access for people with disabilities’ – includes some very dated guidance on disability and the built environment and does not give intricate detail on inclusive design; this was withdrawn in 2019 and has not been replaced.

The key regional planning strategy in Northern Ireland is the Strategic Planning Policy Statement (SPPS), which has very few direct references to disability. The SPPS references the need to create ‘safe pedestrian environments’ and to collaborate with groups with regard to any health problems; arguably this is a reference to inclusive design for all (DOENI, 2015). In contrast, the SPPS has a section dedicated to ‘creating and enhancing shared space’, something which is still contested. It should be noted that the shared-space concept relates specifically to the ethno-national division in Belfast City rather than to the more universally understood urban-design meaning. This is the first explicit reference to shared space in a Northern Ireland planning policy document but it lacks adequate clarification on how spaces can be shared and by which users.
Materials and methods

Research question

How do built-environment professionals consider the needs of the visually impaired in planning policy and practice?

Aim of the study

This study aims to identify issues for visually impaired individuals while navigating the built environment, and how professionals perceive and address these issues.

Methodology

The study was subject to the School of Natural and Built Environment’s full ethical review. No ethical issues were raised.

Quantitative and qualitative data were collected through questionnaires, focus groups and interviews. Questionnaires were the primary data collection method, followed by focus groups and then interviews. Focus groups and interviews were completed alongside questionnaires to provide a local context and further discussion on the challenges facing people with visual impairment.

Questionnaires were distributed via word of mouth to visually impaired individuals. They were produced as an online questionnaire with multiple-choice questions for ease of response. Online questionnaires allow the use of visual aids such as screen readers and text enlargement/contrast. In addition, the questionnaire was trialled by five visually impaired individuals to assess the accessibility.

Questions for the questionnaire were determined using issues identified in previous literature, e.g. street clutter, cars parked on pavements (Kitchin et al., 1998; Havik et al., 2015; Project for Public Spaces, 2017; NFBUK, 2016; Ungar, 1996). Questionnaires contained 18 multiple-choice questions; the first 12 were yes/no answers and the final six were on a nuanced Likert scale from strongly agree to strongly disagree according to how much the respondents agreed/disagreed with the statement. In order to gain responses from a large number with differing patterns and levels of visual impairment, questionnaires were distributed to individuals with a range of visual impairment. Responses from questionnaires came from multiple geographical contexts; therefore a local context to the issues was required.

Focus groups were completed to allow planners, policy makers, urban designers, researchers and sight loss charities to have an open conversation about the potential issues and challenges faced by people with a visual impairment. The multidisciplinary
focus group allowed open conversations between professionals and people with visual impairment. The visually impaired participants of the focus group based in RNIB, Coleraine allowed for an open conversation among many individuals with varying levels of sight loss. People with different levels and patterns of sight loss will face different challenges with navigation.

Two focus groups were conducted, one with multiple stakeholders and one with representatives of the visually impaired community. The multidisciplinary focus group included Department of Communities regeneration staff (who are responsible for the largest public-realm schemes in Northern Ireland), stakeholders, a representative of the visually impaired community and planners and representatives from the Guide Dogs for the Blind Association. The visually impaired representative focus group included individuals from all backgrounds, with varying levels of vision and a spectrum of diagnoses across a wide range of ages.

Interviews were conducted with eight planners in Belfast City Council to discuss the issues presented by visually impaired people in the questionnaires and focus groups. In addition, potential solutions to address these issues were discussed.

The data from the self-administered questionnaire responses were entered into the SPPS statistical package. The data were analysed for frequency and statistical significance using SPPS Version 26.

The focus groups and interviews were transcribed and analysed using Braun and Clarke’s (2008) thematic analysis methods. This involved steps to familiarise the researcher with the data, generating initiation codes and searching for themes before reviewing the themes and finalising the main themes and sub-themes. Three main themes were interpreted from the data: potential issues, potential aids and how participants felt. From these three main themes, twelve sub-themes were identified: streetscape feature, inclusive design, consistency and enforcement, improved streetscape design, guidance and regulations, and pre-consultations. The most common themes highlighted by both the interviews and the focus groups were inserted into a table to compare aspects of discussion from focus groups and interviews.

**Results**

Responses were collected from 108 questionnaires; of these 108 responses, 106 (98 per cent) were fully completed; two (1.9 per cent) were incomplete (one only had a gender response while the other answered only the first four questions).
Table 1 illustrates the demographics, age and gender identity, and type of visual loss for respondents to the questionnaire. A majority of responses were collected from females (70.4 per cent), while 29.6 per cent of respondents were male. In addition, most respondents fell into the 46–65 age group; however, responses were received from across all age ranges. Children under 18 years were not included in the study. Specific diagnosis was not asked for in the questionnaires; however, pattern of visual loss was recorded. A majority of respondents reported having both peripheral and central visual loss (39.8 per cent), closely followed by peripheral visual loss (35.2 per cent) and then central visual loss (13 per cent). Hemianopia (loss of half of the visual field in each eye) was identified by 5.6 per cent of respondents, while 5.6 per cent stated they did not know their pattern of visual loss and 0.8 per cent did not respond. A majority (77.8 per cent) indicated they had loss of night vision (poor vision at night or in a dimly lit area). This means that these respondents would find it very difficult to navigate the built environment at night or in dim light.

How big is the problem?

It is often public perception that ‘visual mobility aids’ are used by all those who have a visual impairment; however, only 39.8 per cent stated that they used a cane and 13.9 per cent stated that they had a guide dog. It is important to note that these percentages are higher than in previously cited articles, such as by Winter (n.d). Over half of respondents (56.5 per cent) stated that they were not confident in navigating, and a large proportion (75.9 per cent) stated that they found the built environment difficult to navigate. In addition, many (59.3 per cent) stated that they sometimes required assistance when navigating the built environment.
In the final section of the questionnaire, participants were asked to indicate how much or little they agree with a statement on a Likert scale from strongly agree to strongly disagree. The results are shown in Table 2.

<table>
<thead>
<tr>
<th>Question</th>
<th>Strongly agree</th>
<th>Agree</th>
<th>Neutral</th>
<th>Disagree</th>
<th>Strongly disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>My sight loss affects me going out alone</td>
<td>32.4%</td>
<td>41.7%</td>
<td>8.3%</td>
<td>13%</td>
<td>2.8%</td>
</tr>
<tr>
<td>Going out into the built environment creates feelings of fear and anxiety</td>
<td>25.9%</td>
<td>46.3%</td>
<td>13.9%</td>
<td>10.2%</td>
<td>1.9%</td>
</tr>
<tr>
<td>Street clutter causes problems</td>
<td>46.3%</td>
<td>35.2%</td>
<td>9.3%</td>
<td>7.4%</td>
<td>0%</td>
</tr>
<tr>
<td>Cars parked on pavements</td>
<td>60.2%</td>
<td>23.1%</td>
<td>7.4%</td>
<td>7.4%</td>
<td>0%</td>
</tr>
<tr>
<td>Areas of shared space</td>
<td>53.7%</td>
<td>35.2%</td>
<td>6.5%</td>
<td>2.8%</td>
<td>0%</td>
</tr>
<tr>
<td>Poor lighting</td>
<td>61.1%</td>
<td>26.9%</td>
<td>9.3%</td>
<td>0%</td>
<td>0%</td>
</tr>
</tbody>
</table>

Many participants, 74.1 per cent, agreed that their visual impairment affects them going out alone into the built environment, while 72.2 per cent agreed that going out into the built environment creates feelings of fear and anxiety. An overwhelming 81.5 per cent stated that street clutter was an issue and 83.3 per cent agreed that parked cars on pavements were also an issue. Two of the biggest issues for the visually impaired community seemed to be shared space (88.9 per cent) and poor lighting (88 per cent).

A one-way ANOVA analysis was conducted using type of visual loss as the dependent variable. Table 3 shows the mean of each significant variable and its statistically significant p value. No statistical significance was found between gender and type of visual loss. Despite this, there was a statistical difference found between type of visual loss and age (p = 0.003) and type of visual loss and night vision loss (p = 0.00).
Interestingly, there was also a statistical significance found between type of visual loss and going out alone into the built environment ($p = 0.001$). Some identified problems were also found to be statistically significant: parked cars ($p = 0.004$) and shared space ($p = 0.001$).

**Analysis of interviews and focus groups**

The results from the focus groups were compiled into three main themes: potential issues, potential aids and how participants feel. This was then further divided into twelve sub-themes. A table was compiled of the most common themes and sub-themes in interviews and focus groups.

**Table 4  Thematic analysis of focus groups and interviews (two focus groups and eight interviews)**

<table>
<thead>
<tr>
<th>Themes</th>
<th>Sub-themes</th>
<th>Focus groups</th>
<th>Interviews</th>
</tr>
</thead>
<tbody>
<tr>
<td>Potential issues</td>
<td>Balance in design</td>
<td>- Successful public realm relies on balancing multiple stakeholder opinions</td>
<td>- There are problems with control after the schemes – specifically problems with pavements</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- There are conflicting drivers in disability accessibility, wants and needs</td>
<td>- Problems with consistency across council areas, public-realm designs and maintenance</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Disabilities sometimes contrast with each other</td>
<td>- Enforcement of maintenance after the scheme is an issue</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Need for inclusive design</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Highlighting Section 75 for equality</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Inclusive design</td>
<td>- The issue isn’t being raised enough within the community</td>
<td>- Problems with enforcing rules around A-boards</td>
</tr>
<tr>
<td></td>
<td>Public/professional awareness</td>
<td>- There’s not enough being done to help people with a visual impairment</td>
<td>- Design guidance is often a material consideration</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Different council areas have different approaches to street design and policy</td>
<td>- There is a need for consistency throughout councils</td>
</tr>
<tr>
<td></td>
<td>Ingrained issues</td>
<td>- The Troubles have made Belfast inaccessible</td>
<td>- Different departments in the same building control different parts of the streets – lack of consistency</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Lack of control after the scheme due to multiple stakeholders being in charge of the landscape</td>
<td>- Problems with balancing multiple stakeholder needs and the streetscape – especially important now with the need for barriers due to terrorism</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- There are a lot of ‘grey areas’ of who is responsible for what aspect of design and maintenance</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Cost has a big impact on how professionals can implement designs</td>
<td></td>
</tr>
<tr>
<td>Themes</td>
<td>Sub-themes</td>
<td>Focus groups</td>
<td>Interviews</td>
</tr>
<tr>
<td>--------</td>
<td>------------</td>
<td>--------------</td>
<td>------------</td>
</tr>
</tbody>
</table>
| Streetscape features | Problematic streetscape features: | - Lighting  
- Bollards  
- Street clutter  
- Shared spaces  
- Cost  
- Bicycles  
- Need for drainage of standing water  
- Cafe culture/street cafes  
- Thresholds of businesses  
- A-boards (advertisement boards) – illegal and unauthorised but this is not enforced  
- Open/shared space can be an issue due to lack of delineation  
- Raised kerbs – both hindrance and a help  
- Loud noises  
- Gaps in the building line take away safety for the visually impaired  
- Cyclists  
- Floating bus stops | |
| Potential aids | Street furniture | - Furniture line would be good for street regulation  
- Perch seats could allow people to rest without taking up too much space on the pavement  
- Flush thresholds with streets mean there is less chance of trips and falls  
- Shared space – kerbs are too small to be recognised by canes or guide dogs  
- Contrasting kerbs and crossings could help identify these potential hazards  
- Technology is key for people with a visual impairment to navigate  
- Extended/continuous tactile paving or ‘guttering’ could help with safe navigation  
- Bannisters to the very last step would be helpful and prevent trips and falls  
- More rigorous regulations should be available and consistently implemented  
- Long-term commitment by government agencies is required for all schemes and future designs | - There is a need for good design guidance for bollards  
- The use of trees to deter parked cars could be a good deterrent while enhancing the public realm  
- Street furniture regulations would benefit everyone; however, this is hard to implement  
- A design guide aimed at helping visually impaired users can benefit everyone |
The results from the focus groups and interviews show that professionals, charities, members of the visually impaired community and researchers had differing views about the difficulties of navigating cities for the visually impaired but agreed on many aspects. While the interviews were conducted solely with planning professionals in Belfast City Council, the interviews reflected very similar views to the focus groups. Below we discuss some of the most prominently discussed sub-themes within the focus groups and interviews.

**The potential issues**

Focus groups and interviews identified that a successful public realm often relies on balancing interests, especially as there are so many conflicting drivers. It was noted that this can often be difficult as ‘everyone is unique’ and ‘disabilities contrast with each other sometimes (disharmony within disability)’. The focus group recognised that a design guide aimed at helping visually impaired users ‘can benefit everyone’.

The focus groups were based around Belfast City and the town of Coleraine in Northern Ireland. It was recognised that Belfast is a ‘difficult and hard city’ and has been made ‘inaccessible by the Troubles’. While this may contribute to the inaccessibility of Belfast as a city, there are multiple other problems which affect a visually impaired person’s ability to navigate. It was also established in the multidisciplinary focus group that there are ‘two types of journeys – successful, stress-free and
The unseen barriers of the built environment encouraging and those that are a chore’. Depending on which journey a visually impaired person has, this can affect their enjoyment of the built environment from then on.

Another key issue discussed, primarily in the interviews, was of multiple parties in charge of built environments and the lack of consistency and enforcement. It was recognised that there are multiple agencies/departments in charge of the same streetscape, and this can lead to inconsistencies. Different council areas also follow different rules and design ideas, with areas being described as not ‘uniform throughout Northern Ireland’. There are many ‘grey areas as there are multiple agencies controlling the streetscape’ and there are ‘too many companies doing the same job’. The focus groups recognised the essential need for ‘long-term commitment required by government agencies and all other agencies’. Issues with ongoing maintenance of the built environment were discussed in both interviews and focus groups, with one participant stating that there needed to be ‘longevity of the scheme’. It was stated in the focus group that ‘parties who dig up roads need to obtain a solution’. Maintenance of current public-realm schemes should be monitored and issues with streetscape features such as A-boards (advertisement boards) should be enforced. It was noted that ‘A-boards are illegal and unauthorised, but no one really does anything’.

Streetscape features which affect people with visual impairment navigating the built environment were also extensively discussed. Some common problems were lighting, street clutter, shared spaces, cyclists and A-boards. This was reflected in both the interviews and the focus groups.

Potential aids
From the previous literature, it was established that some changes could be implemented in the built environment to make it easier for those with a visual impairment to navigate, such as bright markings and street regulations. A majority of respondents (77.8 per cent) stated that bright markings would help them to navigate the built environment, while an overwhelming 90.7 per cent stated that having regulations of where street furniture should be placed on pavements should be implemented. Around half of participants (50.9 per cent) stated that they felt that pedestrian crossings were not adequate in towns and cities. The results from the questionnaire also correlate with some of the aspects and issues discussed in focus groups and interviews.

Some potential aids which were discussed in both focus groups and interviews were regulated furniture lines, delineation in shared space, and the use of contrast. It was recognised that street furniture regulations could create a safe walking place for people with visual impairment while also being beneficial to everyone. Guidance and regulations were discussed extensively in both focus groups and interviews. It was noted that ‘guidelines are being made by each council and are not in uniform’ and therefore are not robust throughout Northern Ireland. In addition, the fact that design
guidance is a material consideration and not always a key consideration in design was discussed at length. Planners in focus groups and interviews recognised that often health and well-being were not a key consideration and were not mentioned until ‘three-quarters of the way through most documents’. Comments also indicated that there is ‘too much flex in the current regulations’.

How do participants feel?
Best practice was discussed through the focus groups and interviews and one of the key messages was that ‘consultation, consultation, consultation is key’. The group felt that in order to have an effective pre-consultation, multiple stakeholders such as individuals from the visually impaired community, sight loss charities and built-environment professionals should be included and consulted. Visually impaired participants stated that it was essential for more inclusion in pre-consultation events to ensure that visually impaired individuals ‘feel valued as being part of the community’. Pre-consultation public notices need to be accessible to all because if a visually impaired person cannot read the public notice they often ‘miss out but are some of the most affected’.

Many built-environment professionals also felt that design needs to be ‘inclusive, distinctive, value-for-money, maintained, beneficial to society and of a high quality’. Designers also need to prioritise best practice and inclusive design and take a ‘balanced approach’ despite there being ‘conflicting drivers’.

Discussion
The potential impact
It is clear from the results that navigation of the built environment is challenging for visually impaired users. The results from this study reflect some of the literature and show that nearly 75 per cent of respondents agreed to some extent that their vision loss affected them going out alone into the built environment (Guide Dogs et al., 2014). In addition, 72 per cent agreed that it creates some feelings of fear and anxiety (Gustafson-Pearce et al., 2005). These results reflect the true extent of the problem in the visually impaired community. Despite the reported difficulties, only 53.7 per cent of respondents used a ‘traditional’ mobility aid such as a guide dog or cane. This could be due to the visually impaired community feeling embarrassed using these aids and not wanting to stand out as being different. Evidence in the literature shows that individuals with visual impairment are often a target of verbal and physical abuse – perhaps the help of a cane is not worth the stress and anxiety that social barriers place on an individual (Schneider et al., 2012).
The unseen barriers of the built environment

The potential issues

There were many common problems identified in the study and respondents stated that the main identified issues highlighted in the literature, i.e. shared space, lighting, cars parked on pavements and street clutter, were a real problem (Kitchin et al., 1998; Guide Dogs, 2010; Norgate, 2012; Havik et al., 2015). Shared space was overwhelmingly a particular concern, with 88.9 per cent agreeing. Shared space, although potentially a good design in other aspects, does create a concern for many individuals with a visual impairment. Some suggestions from the RNIB in their current inclusive-journeys campaign include inclusive crossings, accessible kerbs and correct and consistent tactile paving markings within the shared-space design. While cars are not the only concern in shared-space design, from the literature we know that advancing technology and electric cars are becoming an increasing concern in shared-space environments due to the low level of noise they produce (RNIB, 2017). Some other concerns in these shared spaces include alfresco dining and bicycles, which also produce low-level noise.

Focus groups and interviews also raised problems, with many departments/companies being involved in the same street space without effective communication with each other, causing inconsistencies and inaccessible environments. It should be noted that planning and regeneration powers are in separate government departments and councils assume a role in urban regeneration schemes without the formal devolution of these powers from the regional assembly. Greater collaboration between stakeholders in government departments, councils and inclusivity pressure groups is necessary to ensure that more accessible spaces are designed and developed. This collaboration could be achieved through monthly multi-stakeholder meetings which allow for open conversation between professionals. For example, departments, councils, representatives of different communities and other built-environment professionals could talk about previous and upcoming schemes. Each stakeholder could give their opinion in order to make spaces and places which are welcoming to all. This, however, will require all departments, disability charities, councils and other stakeholders to be open and honest about their opinions with the built-environment professionals implementing these suggestions in future and ongoing schemes.

Improvements for the future

There is also an essential need for ‘best practice’ when it comes to street design, implementation and aftercare, which at present is not being uniformly implemented. Focus groups and interviews highlighted that in Northern Ireland, especially since the devolved government, there are differing design approaches, regulations and implementations. This can be particularly problematic for visually impaired users as they cannot travel throughout Northern Ireland following a consistent accessible design.
In order to create more accessible places throughout Northern Ireland there need to be more robust guidelines across the region.

In correlation with this there is a clear need for maintenance of the scheme after its implementation. Issues were raised with companies digging up roads and streets and not restoring them to the way they were before. This often creates inconsistencies in design and affects everyone from the look of the schemes to problems such as change in paving colour and texture and sometimes uneven paving. In order for a scheme to have longevity and remain effective, enforcement of accurate maintenance of the scheme after the installation needs to be robust. This enforcement should be rolled out to issues such as A-boards, which are problematic to many people, especially now in the pandemic with the need for social distance. These A-boards should not inhibit space on our pavements and so enforcement needs to be implemented across Northern Ireland.

Some of the potential solutions discussed throughout the focus groups and interviews could be incorporated into guidelines to offer stakeholders options for improving the built environment for visually impaired users. Practical changes such as bright markings on pavement edges and hazards and drainage for any standing water can be implemented and will not greatly affect the built environment for other users. Regulations on pavements to create furniture lines and a safe space on the pavement for people to walk will improve the area not only for visually impaired users but for everyone. Interviews with planners and urban designers showed that this could be very difficult to implement given cost implications and other factors; however, they noted the importance of furniture lines being implemented in new public-realm schemes.

Overall, one of the key discussions from the focus groups was the importance and need for pre-consultations before urban designers and planners complete plans for any public-realm changes or schemes. Collaboration is not a new concept but how it takes place varies significantly throughout the world and for different projects (Strickfaden and Devlieger, 2011). It was recognised by the focus group, as in the literature, that it is not possible to make everyone happy with a design as there are often conflicting views and priorities, especially when it comes to the needs of different groups of the disability community (Husbanken, 2002). Despite this challenge, the visually impaired community felt that there was not enough education and knowledge amongst built-environment professionals on visual impairment to create more inclusive places. The community wants to be involved in the design and requests that pre-consultation notices be made accessible to all individuals so that the community can be heard.

It is suggested that pre-consultation/continuous consultation with a wide variety of stakeholders is key in designing and creating an inclusive environment for all. Another viable option is for all proposed changes and new public-realm designs to go through an Inclusive Mobility and Transport Advisory Committee (IMTAC) audit. The IMTAC committee has a maximum of 18 members, 50 per cent of whom must be
older or disabled people. Representatives from the Department for Infrastructure, the Consumer Council, Disability Action, the Equality Commission and Translink can also observe meetings (IMTAC, 2021). IMTAC is the committee in Northern Ireland; MACS and DPTAC are the equivalents across the UK. These measures should be implemented across the board as standard. Pre-consultation and accessibility walking audits can be completed by all designers, planners and built-environment professionals in the first instance as it is already considered best practice. Heylighen and Bianchin (2020) state that a deliberative approach will provide built-environment professionals with the conceptual framework to understand why the involvement of various stakeholders can be beneficial in design practice. It is also suggested that a deliberative approach rather than an advisory board is preferred. Therefore there should be a prerequisite of pre-consultation before implementation of any public-realm scheme.

Pre-consultation can take many forms depending on what is appropriate for the scheme. Recently, in health services, the Public Health Agency launched the 10,000 More Voices survey in order to ‘shape’ their service and improve it (Public Health Agency, 2019). This survey asked for opinions from patients, staff and care homes, allowing for reports and quality improvement in different services. Pre-consultation could take this form and ask for multiple stakeholder opinions via a survey. This may be the best way under current COVID-19 circumstances.

Alternatively, pre-consultation could take the form of a meeting prior to beginning the design of a project. As per the National Planning Policy Framework, early and meaningful engagement is essential (Ministry of Housing, Communities and Local Government, 2021) therefore this should be completed in the early stages. At this meeting a presentation of initial ideas by design consultants, architects and planners should be presented to multiple stakeholders. Stakeholders include the general public, local organisations, business, charities, people from disability communities, people from vulnerable communities and anyone this project might involve. These stakeholders can then provide opinions and answer any queries the design team may have. These suggestions and opinions should be taken on board by the design team in the finalisation of the design.

In addition, many academics see the value of including various stakeholders in design consultancy and also embedding stakeholder consultation into education as new designers and planners come into their careers (Strickfaden and Devlieger, 2011). By implementing education and knowledge of different stakeholder needs and opinions at the forefront of their careers, they can make more conscious decisions on plans and designs in the future. Many universities now bring in speakers from charities and advocates of disability groups to discuss what they may find difficult with towns, cities and building design.
Future issues and the impact of COVID-19

Given the issues presented in this article, we expect that the current COVID-19 pandemic has further exacerbated some of these problems with lockdown restrictions and current spatial-distancing guidelines in place across the world. While this study was conducted before the pandemic we expect that lockdowns and the lifting of restrictions will be particularly difficult for people with a visual impairment and future research should be conducted on this.

Some of the problems include people with a visual impairment often needing companions for daily tasks such as shopping, which can make social distancing a challenge (BBC News, 2020). In fact, spatial distancing in itself with a visual impairment can be a challenge as without full vision, one is often not able to be aware of how close one is to other people. In addition, many countries now require the wearing of masks in enclosed areas, restaurants and even in some streets. Masks, while essential from a public-health aspect, can often impede a person’s visual field, further creating more navigation and social-distancing problems for people with a visual impairment. With all of these issues in mind, RNIB conducted a survey, which received 471 responses. The survey showed that 21 per cent of respondents reported rationing food because of fear and increased difficulty of going out. The survey also showed that only 14 per cent of respondents now get their own shopping, as compared to 28 per cent pre-lockdown (RNIB, 2020). In addition 25 per cent stated that they don’t have anyone else who can get their shopping in their household (RNIB, 2020), with nearly half (49 per cent) getting someone to get their shopping in contrast with 18 per cent pre-lockdown (RNIB, 2020).

Furthermore, with restrictions lifting and countries trying to kick-start their economies, pavement cafes and alfresco dining are becoming more popular. Local councils are encouraging businesses to apply for pavement cafes and alfresco dining to facilitate a reopening of urban centres. While outside dining may be essential for rebuilding the economy, it often means more clutter on the pavements, which is problematic for people with a visual impairment. Many charities and companies have therefore called for government action on safeguarding people with a visual impairment. Sight loss charities such as RNIB, Guide Dogs, Vision UK, Visionary and the Thomas Pocklington Trust are petitioning for easier access to groceries and for visually impaired people to get the essentials they need (RNIB, 2020). The RNIB have also introduced a campaign for information for all, challenging the government and businesses to make updates more accessible for all. The Inclusive Mobility and Transport Advisory Committee (IMTAC) have produced a basic guideline document for inclusive infrastructure in response to COVID-19 (IMTAC, 2020). The document includes some guidelines on things such as street clutter, extension of pavements, street cafes and inclusive-design aspects of the built environment.
The current COVID-19 pandemic has further highlighted the need for built-environment professionals to create inclusive places, providing robust guidelines and design ideas. From the study it was clear that built-environment professionals agree that there is a problem and that there is a need for inclusive design; professionals also agree that a successful public realm is a balancing game and that not everything will suit all users. From the results of focus groups and interviews, it is clear that although professionals and the visually impaired community are in agreement in terms of the need for improvement and inclusivity in our built environment, there are many different departments, councils and stakeholders who deal with differing parts of our built landscape, which can lead to difficulties in executing a cohesive plan. Without overall legislation and tougher guidelines, not everyone will implement the necessary steps across the board. There is also a requirement for robust guidelines for the replacement of inclusive pavement design after necessary building, road and infrastructure improvement works are completed.

While this project deals with some of the underlying issues for people with visual impairment in the built environment and some issues specifically relating to Northern Ireland, there needs to be more research conducted on the topic in the future. Future research into specific eye diseases and patterns of vision loss should be conducted. In addition, more in-depth interviews with built-environment professionals from different areas and backgrounds should be conducted to gauge a fuller understanding of the challenges at hand.

**Conclusion**

To conclude, correlations between this study and the literature show that there are issues and challenges in our towns and cities which significantly affect people with a visual impairment. Local contextual issues can make these environments even more difficult to navigate with a visual impairment. Some changes could be implemented in the future to improve our changing streetscapes to make them less hostile and more inclusive. Guidelines and legislation clearly state the requirement of a formal pre-consultation meeting or public consultation to include stakeholder opinions in the design of a scheme. This will allow any issues with the design or implantation of the scheme to be assessed and improved upon, to allow for multiple stakeholder deliberation, and also for striking a balance that gives greater consideration to more vulnerable public-space users. A community response is required to highlight problems in public-realm schemes and robust guidelines and legislation need to be created and implemented to make our towns and cities more inclusive. This will also prevent any inconsistency with the design and planning process across council areas and schemes.
In addition, robust guidelines for people with a disability and the problems they face should be created. Outlining potential serious issues which are made in streetscape design can allow for better knowledge among planning professionals. These guidelines, however, should be required to be discussed and implemented in all schemes in order to create accessible environments for all. This essential shift to all-inclusive built environments can happen if everyone works together to reshape our public spaces.

References


VAN HOVEN, B. and ELZINGA, M. (2009), ‘Bikes are such a nuisance: visually impaired people negotiating public space in Groningen’, European Spatial Research and Policy, 16, 131–44.
