Does written language create barriers to transport for people with low literacy levels? Where are the gaps and how can we close them?

Introduction

The way information is presented to assist people on their journeys by public transport has a massive influence on how they choose to travel. This paper explores the way written language creates barriers to those with low literacy levels on our transport network – most noticeably rail. In the UK, 14% of people have learning difficulties (1 in 7)[1], with 16% of adults in England, or 7.1 million people, being described as having 'very poor literacy skills.'[2] Transport Planning has historically overlooked or not fully understood the needs of those with hidden disabilities and to create an equal network for all users this needs to change.

Most of our transport systems rely on travellers understanding written instructions to make the journey experience convenient, easy and in many cases enjoyable. From planning a journey to undertaking it, written language is apparent across the network. Hidden disabilities, such as low literacy levels, have been acknowledged within the last decade, along with physical disabilities. However, it can be quite hard to identify in the transport network where barriers to those with hidden disabilities lie.

Transport gives access to many amenities; employment, education, leisure and activities, with a strong correlation between access to transport and economic prosperity. Coupled with the correlation between high literacy levels and economic prosperity, lack of access to public transport, due to low literacy levels, equates to less opportunities for 7.1 million adults in England and widens the inequality gaps.

This research seeks to identify the gaps in how public transport information is presented to those with difficulties reading the written language. The scope of this research is the use of mainline train stations in England, from journey planning to navigating the station, but excluding the experience on the train. New Street Station is used as a case study with a focus on three areas: to identify the point in the journey at which the written language becomes a barrier; to determine if the alternative options are enough; and to recommend how to make the network more inclusive for those with low literacy levels.

As such the structure of this report is as follows:

- Section 2: Literacy Overview
- Section 3: New Street Station Overview
- Section 4: Using the Station
- Section 5: Potential Solutions
- Conclusions

[1] https://www.gov.uk/government/publications/dptac-position-on-non-visible-disabilities/dptac-position-statement-on-non-visible-disabilities (accessed November 2020)

2 . https://literacytrust.org.uk/parents-and-families/adult-literacy/ (accessed November 2020)

2. Literacy Overview

This section looks at the main literature surrounding equalities and design standards of railway stations. It gives a brief overview with and further references to design standards are throughout the remainder of the report.

Equalities

Equalities Act, 2010

The Equalities Act, 2010 legally protects people from discrimination, not only in the workplace but in wider society. It amalgamates previous anti-discrimination laws into a single Act and sets out different ways in which it is unlawful to treat individuals. The protection of the nine characteristics from discrimination at work, in education, as a consumer, when using public services, when buying or renting property, as a member or guest of a private club or association[3]. This includes transport as it is a public service.

The Act describes a disability as "*a physical or mental impairment that has a 'substantial' and 'long-term' negative effect on your ability to do normal daily activities*."[4] Learning disabilities can be referred to as a disability, with an example given of a man with borderline to moderate learning difficulties and disabilities (such as dyslexia and autism), and how the effects of these need to be considered rather than the underlying conditions themselves[5].

To adhere to the Equalities Act, 2010 therefore:

"The first requirement is a requirement, where a provision, criterion or practice of A's puts a disabled person at a substantial disadvantage in relation to a relevant matter in comparison with persons who are not disabled, to take such steps as it is reasonable to have to take to avoid the disadvantage."[6]

What this means

- The Equalities Act, 2010 states that those with both visible (such as physical) and invisible (such as mental health and learning difficulties) disabilities must not be discriminated against on public services including transport
- The equalities act acknowledges low literacy levels as a significant disability
- It does not, however, consider those who struggle with reading and writing due to language barriers (for example where travellers have a level of English as a foreign language or do not know the language at all)
- Public service buildings must make reasonable adjustments to the built environment to assist with disabilities, such as providing information in an accessible format. However, it does not determine a definition of 'reasonable' leaving this open to interpretation.

Design Standards

British Standards Institute, 2018, BS 8300 Design of an accessible and inclusive built environment. Code of practice

The Design of an accessible and inclusive built environment code of practice was developed in 2018 and comprises two parts: Part 1 – The External Environment and Part 2 – Buildings. Both parts are intended to be read in conjunction. It is important to note these documents are a form of guidance and there is no legal requirement to fulfil them.

Both parts of the Code encourage the building designers to produce a Design and Access Strategy to include an Inclusive Design Strategy. This will ensure that the principles of inclusive design are

[3] https://www.gov.uk/discrimination-your-rights (accessed November 2020)

[4] https://www.gov.uk/discrimination-your-rights (accessed November 2020)

[5] Office for Disability Issues, Equality Act 2010 Guidance, 2011, Page 10

[6] https://www.legislation.gov.uk/ukpga/2010/15 (accessed November 2020, section 20(3)

applied and integrated from the outset of a project. The Inclusive Design Strategy should explain how inclusivity will be addressed and implemented in the project from the outset.

Department for Transport 2015, Design Standards for Accessible Railway Stations

The Design Standards recognise the term 'disability' outlined in the Equalities Act, 2010. It also states that *"Following the guidance sections is not mandatory. However, this is best practice so it is strongly recommended that it is followed where possible"*[7].

Network Rail, 2015, Station Design Principles for Network Rail

The Station Design Principles guidance document was developed in 2015, setting out 12 principles for delivering station designs. It was developed to ensure that guidance keeps pace with legislation and policy, acknowledging *"the provision of safe, accessible and inclusive station environments are to be provided as a minimum"*[8].

A chapter has been developed: 'Accessibility and inclusivity' which outlines a Station Design Checklist:

Figure 1Accessibility Station Design Check List[9]

Accessibility - Station Design Check List

1	Are spaces free of clutter with appropriate tonal contrast between wall and floor surfaces?
2	Have escalators and lifts been located on or adjacent to desire lines with good natural surveillance?
3	Has provision been made for mobility buggies avoiding impacts on other station operations?
4	Is the station compliant with DfT code of practice?
5	Has advice been sought from a Network Rail or external accessibility consultant?
6	Has a diversity and inclusion assessment of the project taken place?
7	Can service information be accessed and understood by all users?

Question 7 is the most relevant to this research, however, it is not outlined how station operators should achieve this.

What This Means:

- There is ambiguity in the Equalities Act with the term 'reasonable adjustment' which depends on the interpretation of 'reasonable'. Hypothetically, it may be considered unreasonable, due to monetary constraints, to make adjustments based on baseline information showing not a high level of site users have low literacy levels. However, there may be low levels of site usage for those with low literacy levels, due to the site being inaccessible for them.
- The design standards outlined above do not hold accountability as they are guidance, codes of practice and principles, with no requirement to completely fulfil everything within them. Although it is best practice, would be frowned upon, and unlikely to pass planning permissions if these were not adhered to, not all elements may be addressed with the importance they require, leaving potential gaps in the network.

[7] DfT, Design Standards for an Accessible Railway Station, 2015, Page 13

[8] National Rail, Station Design Principles for Network Rail, 2015, Page 3

[9] Network Rail, Station Design Principles for Network Rail, 2015, Page 19

New Street Station Overview

This section of the report is informed by desk-based research and intelligence gathered from Birmingham New Street Manager. An interview was held with the New Street Station Manager, Patrick Power, on Tuesday 1st December 2020, to determine the facilities to make travelling by rail accessible by those with low literacy.

Why Birmingham New Street?

New Street Station is set in the heart of Birmingham, surrounded by a variety of city districts and mixed urban uses, a fusion of squares, modern shopping arcades, restaurants, museums and galleries. The Station building is host to Grand Central Shopping Centre and also has links to the wider area, being a major transport interchange in the city. It also has direct links with Birmingham International Airport meaning the station is utilised by potentially large numbers of people whose first language is not English and who may potentially struggle with the written information at the Station.

Short Significant History of the Station

Birmingham New Street Station was redeveloped and opened in 2015 due to the increase in demand. The previous station was designed to accommodate 640 train movements a day. By 2007, there were approximately 1,240 train movements a day and passenger trips were predicted to grow by 150% by 2035.[10] The redevelopment project was titled 'Birmingham New Street Gateway Project' (BNSGP).

One aim of BNSGP was to assist in the regeneration of the Southside area of the city. Whereas the previous station building acted as severance between Southside and the north of the city centre, BNSGWP new design would offer a 24/7 through route from the north to the south. This design, with a third exit to public buses and the Bull Ring Shopping Centre, divided the Station into three lounges. New Street has subsurface train platforms which introduced weight and capacity constraints to the Station redevelopment.

With the station work being completed in 2015, Station planning preceded the Codes of Practice, Design Standards and Design Principles explored in the previous section. There would have been a different iteration which would have been adhered to throughout the planning stages. This is the same with the Equalities Act 2010.

The Current Station

Due to the subsurface nature of the train platforms, costs of changes are significantly higher due to strict fire regulations. This increases the cost of changing elements of wayfinding during design stages can be difficult to mitigate and therefore potentially overlooked.

The Station has three main entrances/exits with the ability to interchange to a different transport mode for each, for example, bus and metro. It is commonly accepted that wayfinding in the Station is difficult, even for those who are fully abled. However, New Street management is looking to mitigate this through the development of a new Wayfinding Strategy, based on learnings from Airports.

The benefits this could include:

- Denoting zones more clearly, for example using more colour.

[10] Birmingham New Street Gateway Project, Reserved Matters Design and Access Statement, accessed: Document List (birmingham.gov.uk) (October 2020)

- Back lighting suspended signage
- Simplifying signage with less information
- Using consistent messaging about exits

Platform level will benefit from learnings from the London Underground system signage to interchange points and the different zones.

Some examples of Passenger feedback – National Rail Passenger Survey Spring 2019[11]

"As an infrequent transit traveller through New Street I still find the layout and names of areas totally bewildering and have never travelled without having to question the always helpful staff"

"Do not find station easy to navigate"

"I find it difficult to tell from the signs on each platform which exit to use to ensure I get a connecting train without having to go through ticket barriers"

Current Practice

Birmingham New Street Station recognises there are potential gaps in ensuring access for everyone, including by individuals with low literacy levels.

Measures exist to mitigate difficulties and ensure continuous learning and consultation with disability groups. Most predominantly this is through the Accessibility Forum which is chaired independently and has a diverse representation of all levels of ability.

Some successes of this group include:

- The Sunflower lanyard scheme (now well recognised due to COVID-19): originally adopted by New Street from Birmingham Airport. Birmingham New Street was the first station to use it to help identify people who may need assistance due to hidden disabilities. This is now being rolled out nationally.
- The Assisted Travel Lounge: pre COVID-19 Birmingham New Street staff were assisting approximately 300 people a day
- Changing Places: an area for people with disabilities to be able to change and shower. It includes hoist equipment. This facility was used regularly pre COVID-19.
- Partnerships: developed a partnership with Walsall College, which struggles to find real life work experience for some of its students with learning difficulties. Through this partnership Birmingham New Street has successfully offered work experience, with an individual now securing a full-time position at Network Rail.

Training for Staff

Staff training is on-going and includes assisting people with physical and hidden disabilities. It is acknowledged that there is more training given for those with a physical disability. The training covers, to an extent, assisting someone with low literacy levels. Currently, Station staff wear face coverings in line with COVID-19 guidance. However, this has introduced a communications barrier for people who are reliant on lip reading, for example those with hearing impediments. This will be mitigated by staff attending a British Sign Language course. Information can also be given on request in different formats, such as braille.

Assisting people where English is not a first language is not currently incorporated into staff training. However, Birmingham New Street benefits from an incredibly diverse workforce and relies on bi-lingual staff (where English is not their mother tongue) to assist passengers with low literacy.

Using the Station

This section has been written based on desk-based research, local station knowledge and a focus group. A focus group was held with adult learners of English as a foreign language on 9th December 2020, with the purpose of understanding where the barriers to transport are, due to written

[11] Provided by Patrick Powers, Birmingham New Street Manager

language, with a focus on New Street Station. The focus group interview discussed the process of taking a rail journey and the clarity of the symbols used at the Station with a view to identifying improvements. These learners do not represent all members of society with low levels of literacy. However, the focus group exercise sought to highlight issues faced by groups who struggle with written language.

Planning a Journey

Standards Box 1

- Accessibility information should be available in a range of formats, including large print, audio and braille.[12]

The participants in the focus group were divided. The first half of the learners preferred to go to the station to plan their journey and where they could ask someone if they could not find the relevant information. The second half preferred to plan their journey online. They believed it gave them more time to understand the trip details and they could print the information to look at again.

Existing ways to plan a journey are:

- Online journey planners
- Mobile phone journey planners
- At the rail station
- Phone app

No immediate barriers were identified when planning a journey. This seems due to being able to ask for information at the station in the case of the first half of learners. The second half booked online and were able to translate the page into a more familiar language. Overall, the members of the focus group needed time to plan their journeys and so spontaneity of using rail for journeys was unlikely.

Purchasing a ticket

Standards Box 2

- Ticket vending machines: The information on screen should be easy to read, understand and see.[13]

The focus group identified several challenges when purchasing tickets. There are several options for purchasing tickets and the group was divided in their preference, with no clear preferred option between buying the tickets at the station and ordering them online.

There was a consensus in how the ticketing machines worked. When the group was shown a picture of the 'home' screen of the ticketing machine, they all initially assumed they needed to touch the middle of the screen to start. However, the middle of the screen has an image of a button, with text directing the user to other buttons on the side of the screen. Therefore, touching the middle of the screen would not allow users to proceed with ticket purchase.

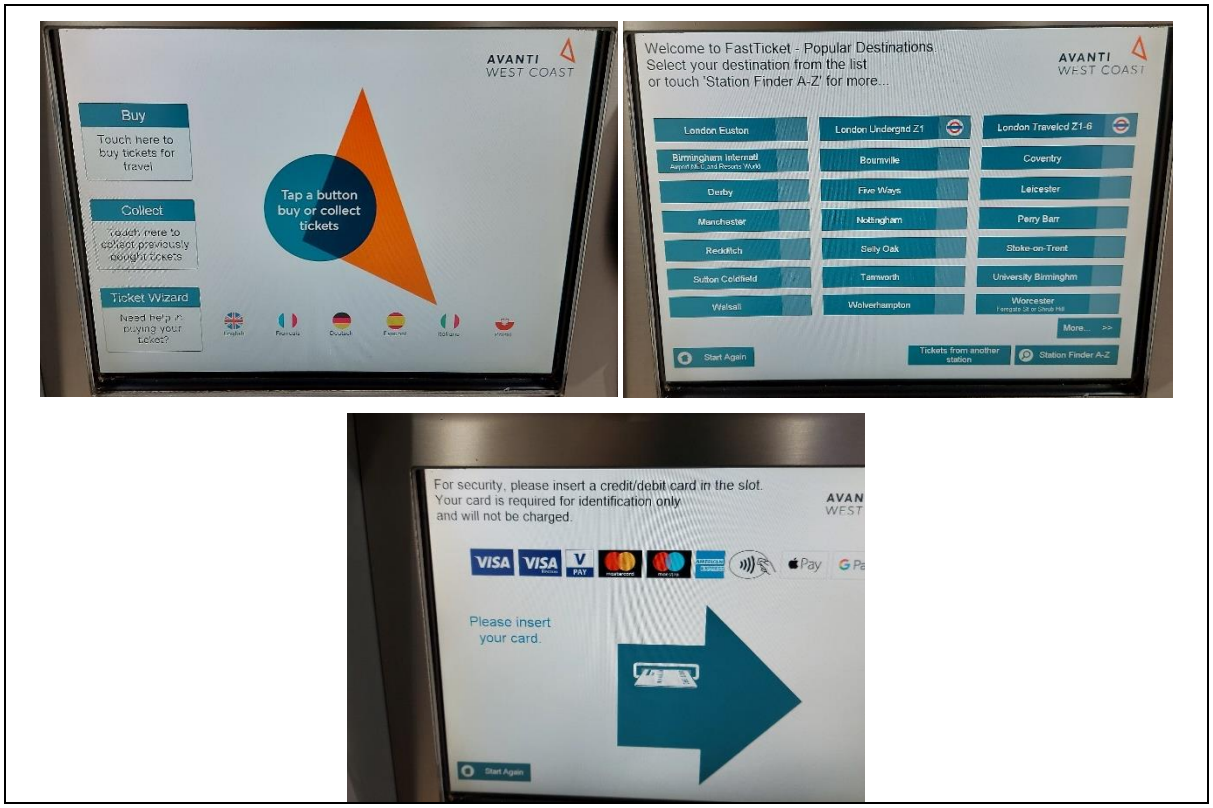
The group was impressed by the language choices along the bottom of the screen, but thought there could be more. The group observed the home screen used unfamiliar language: for example, 'Ticket Wizard' was a term the participants were not aware of and were unsure of its meaning. The participants indicated they might use the ticketing machines at the Station, but would find them difficult and would need assistance completing a purchase. Figure 2 shows the screens from a ticketing machine at Birmingham New Street.

[12] DfT, Design Standards for an Accessible Railway Station, 2015, Page 17

[13] DfT, Design Standards for an Accessible Railway Station, 2015, Page 133

Learners who were uncomfortable purchasing tickets themselves said they would ask someone else to do it for them. One key concern for a participant was internet safety and fraud when buying tickets online.

Figure 2 Ticketing machine



Arriving at the Station

There was general agreement that Birmingham New Street Station was very large which caused issues with wayfinding. All of the focus group agreed they found the Station intimidating and did not know where to go and what to do when they first arrived. One participant mentioned Nottingham Station was much easier.

At Nottingham Station, the ticket office is in the middle of the concourse and can be clearly seen from each entrance. Currently at New Street Station, the ticket office is in the centre of the building but is not visible from any of the entrances. It is located behind escalators leading to Grand Central shopping centre. The space between the escalators is regularly used as an information point, showing changes to timetables, Network Rail updates, to advertise events or marketing space for businesses. Consequently, this space is often very busy which obscures the visibility of the ticket office and ticketing machines. This leads to confusion and less instinctive movements to the ticket office / help available.

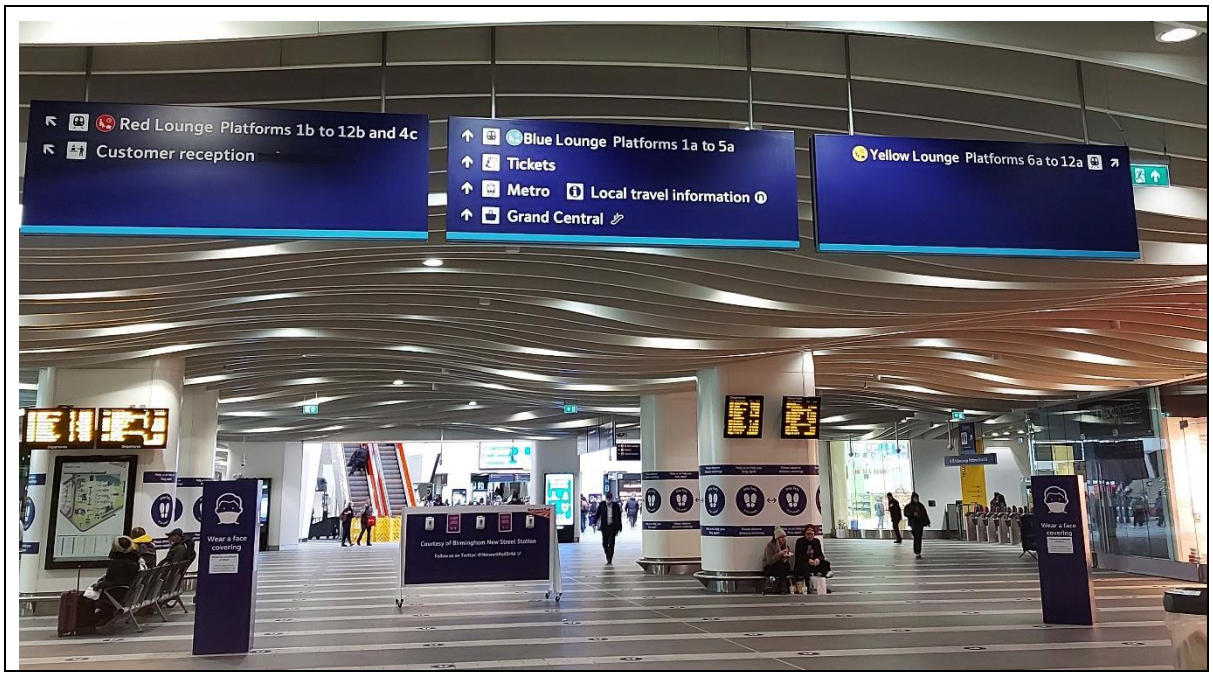
During the audit of New Street Station, I asked the concourse help point about the most common questions asked. The most frequently asked questions are:

- Where are the toilets?
- Where do I buy tickets?
- General questions about certain services.

As a part of the focus group, the participants were shown a picture of the station from an entrance, which included overhead signage. When asked what they would do first, their answer was to find

the correct platform. With prompting, they acknowledged they would need to find the help desk or information centre. However, it was not intuitive where the information centre was, and the group struggled to identify the direction on the sign. The reason was the middle sign was too complicated (Figure 3). Focus group participants were focused on the symbols on the left-hand side of the boards and missed that of the 'Local travel information' which was more central. The group guessed the information centre was straight ahead because 'Local travel information' was on the middle board where all the arrows were pointing in the same direction. The group did not associate or acknowledge that 'Customer reception' with travel information.

Figure 3 Station entrance picture



The teacher of the class mentioned she used to teach the learners how to use public transport. She would take the learners to New Street Station and encourage them to plan a journey and ask questions to the staff. She said that it was dependent on the learners' characters as to their success. Many learners felt intimidated by the staff or embarrassed to admit to staff they were struggling to use the Station.

The results of the NRPS and focus group suggest the layout of New Street Station does not afford intuitive wayfinding, leading potentially to a negative customer experience. **Standards Box 3** summarises relevant standards for designing accessible railway stations.

Standards Box 3

- As far as possible, stations should be laid out in a logical way, so that finding a particular facility is partly intuitive.[14]
- Clear announcements of departures, giving information about time, platform and destination, should be given
- Aural announcements should give priority to covering any variations from the normal timetable.[15]

[14] DfT, Design Standards for an Accessible Railway Station, 2015, Page 94

[15] DfT, Design Standards for an Accessible Railway Station, 2015, Page 116

Symbols

During the focus group an exercise was conducted to understand if the group knew the meaning of symbols used at New Street Station. The learners understood most of the symbols. Table 1 shows those symbols which learners were unsure of the meaning, compared to their intended meaning.

Table 1 Symbols which caused confusion

Symbol	Meaning	Focus Group Meaning
	Toilets	Exit
	Cashpoint	Ticket machine
	Changing place	Help desk
	Ticket machine	Unsure as had already identified a ticket machine in another symbol
	Left luggage	Unsure
	Drop off point	Taxi rank
	Platform numbers	Unsure
	Ticket desk	Unsure as had already identified tickets in another symbol
	Tram	Train

The symbols used for facilities and services are not consistent across the rail network. Table 2 compares the symbols used at New Street Station and Nottingham Station[16]. The lack of consistency may cause issues with people who are reliant on the symbols find their way around different stations.

Birmingham New Street has many more facilities and amenities than Nottingham Station which can make the signage more complicated.

Table 2 Symbol Differences between New Street and Nottingham

Meaning	New Street	Nottingham
Toilets		
ATM / Cashpoint		

[16] Based on information found on National Rail Enquiries – accessed December 2020

Bus		
Drop off		
Entrance	N/A	
Ticket Machine		
Tram		

Standards Box 4

- Information displayed on signs should use straightforward descriptions… and be accompanied by recognised, adequately sized pictograms.
- Symbols should supplement words as they are more readily understood by people with cognitive impairments and people whose first language is not English. However, symbols should not be used without text unless it is known that they will be understood by passengers.[17]

Summary

From the focus group, station audit and the design standards, gaps have been identified in three main areas:

Gap	Example
Ticket machine prompts	Not understanding to push a button to initiate buying or collecting a ticket. This would be similar across Network Rail.
Understanding of symbols	Inconsistency of symbols used and misunderstanding of certain symbols, especially when some are very similar. This would be similar across Network Rail.
Illogical station layout	Station users not being able to find the ticket / help desk at New Street. Common wayfinding questions being asked at the help desk. This issue may exist at other stations across Network Rail.

Potential Solutions

This section proposes high level measures to mitigate the three main issues identified above.

The use of technology

The New Street Station manager suggested the use of technology could assist travellers with low literacy with the ticket machines. For example, augmenting the text on the home screen of the ticketing machine with visual prompts, including a map option to choose the origin and destination might improve ease of use.

[17] DfT, Design Standards for an Accessible Railway Station, 2015, Page 90

The manager acknowledged there the abundance of digital media around the station which could be easily adapted to assist people with low literacy levels, or those who struggle with the written aspect of language. Other technologies with the potential to assist could include:

- The development of a phone app to work in conjunction with the Station
- The use of QR codes to give extra information
- Adapting the existing help points around the station by including more visual aids or aural help

The use of nudges

Nudges are psychologically informed tools which encourage behavioural change. It originates in Thaler and Sunstein's 2008 book 'Nudge'[18] and has been used in various areas of law, economics, philosophy and social theory. Much of the literature focuses on the ethics behind nudge theory, due to the concept of 'redirecting an agent's choices by altering the choice conditions'[19].

There are three properties of nudge intervention;

1) They redirect individual choices by only slightly altering the choice condition
2) They use rationality failures instrumentally
3) They alleviate the unfavourable effects of these failures

There are many decision points when using public transport: in the case of rail, the frequency of these decision points often increases at the station during wayfinding and even potentially safety information. Nudges may aid users with low literacy levels and provide reassurance by changing the conditions in which they are making the decision.

Figure 4 illustrates an example of a nudge, where the footprints on the escalator complement the existing signage (picture on the left), reassuring users they are standing or walking in the correct place.

Figure 4 Escalator Etiquette

New Street Station Escalators

Example of Nudge Theory on Escalators [20]

[18] Thaler, R. H. and C. Sunstein (2008), Nudge, Yale: Yale University Press.

[19] P. Mongin, M. Cozic, 2016. *'Rethinking nudge: not one but three concepts'* Cambridge University Press

[20] Pin on Neat Places & Spaces (pinterest.com) accessed December 2020

Nudge theory could also assist with wayfinding around the station. One example could be using colours correlating with the coloured lounge/zones to help travellers find the correct platforms, which the focus group identified as difficult. This idea is shared by Dr Paul Symonds in his blog 'Colour Coding Signage for Easier Navigation'[21]. Figure 5 shows coloured lines used at London Victoria Train Station. This technique has even inspired wayfinding in a language school in the Ukraine, also shown in Figure 5.

Figure 5 Using Colour Coding for Navigation

London Victoria[22]	Language school[23]
	

Symbolism

The confusion between inconsistent symbols (across train stations or public transport infrastructure) and ambiguous symbols (not clearly showing the meaning of their intent) was identified strongly in the focus group. A potential mitigation is to use symbols which are more familiar to the public. *'Emoji's by design make a direct link between written communication and the 'real' world, by using (very conventionalized) pictures or icons.'*[24] As such there may be the potential for modernising the symbol systems throughout our transport systems to include emoji which can be recognised by a wide range of users, including those with low levels of literacy or language barriers.

Station Layout

The lack of intuition created by New Street Station layout can be mitigated through a redesign of the station. It is clear that users who are struggling are unsure where to go to ask for help. There is no line of sight between the entrances and the help desk which creates confusion when entering the building. There are a few solutions to help assist station users with finding the help when they need it:

- New Street Station has three entrances, there could be a potential to have three smaller help areas at each of the entrances in sight of people as they enter the station
- Potential nudges, as mentioned above to assist wayfinding
- Ensuring the area in front of the existing ticket office is clear of obstructions (the space between the escalators)

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[21] Colour coding signage to guide and help people navigate - Wayfaring. (travelwayfinding.com)

[22] (210) Pinterest accessed December 2020

[23] Colorful lines, inspired by the London Underground, will lead you to classrooms at this language school (contemporist.com) accessed December 2020

[24] Is Emoji A Type Of Language? | Lexico

Conclusions

This research has identified some gaps in how public transport information is presented to those with difficulties reading the written language. The gaps were identified through a combination of:

- Desktop research, looking at relevant literature with regards to equalities and design standards;
- An interview held with Patrick Powers, manager of New Street Station as well as a site audit of the station itself; and
- A focus group held with learners of English as a foreign language, who struggle with written language.

Gaps were identified in the design standards and Equalities Act 2010. It was found that some parts of the Equalities Act being open to interpretation, with ambiguous language such as 'reasonable adjustments' used, therefore not necessarily being disseminated down to building design. The design standards were purely guidance and best practice and so no consequence was held for those not upholding all elements. Patrick Powers, Manager of New Street Station acknowledges that he believes there is a 'huge gap' when looking at literacy within the transport network, not necessarily just rail. He was unsure if it was being considered at any level and was unaware of any support available to help overcome the issues experienced by those who have low literacy levels.

The issues identified were predominantly Network Rail wide with inconsistency found in symbols and signage and ambiguity in the symbols used at stations. People who have low literacy levels are likely to rely on the visual aid of symbols to help reassure and guide them in decision making. It was also identified that touchscreen technology in the stations would also benefit from further visual prompts.

New Street Station as a case study also showed that the design guidance does not necessarily all get adhered to, with the findings from the focus group identifying that the station does not have an intuitive layout (DfT Design Standards saying that the stations should be laid out in a logical way, so that finding a particular facility is partly intuitive).

Further reading about best practice or possible solutions identified the following to close the gaps:

- The use of technology
- The use of nudges
- Station layout
- Adapting symbolism

It has to be noted however, that although these suggestions may assist people with low literacy levels, consideration has to be taken to understand if implementing the suggestions would have a negative impact on another hidden disability group, such as those who have sensory sensitivities (ADHD, Autism etc).