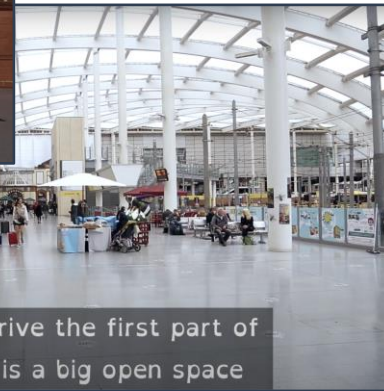
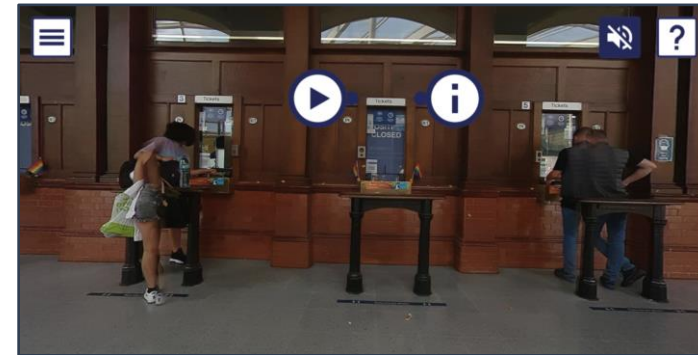


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Research Delivery for Community Rail Lancashire:
Review of resources for autistic travellers
December 6, 2022



CRL
Community Rail Lancashire

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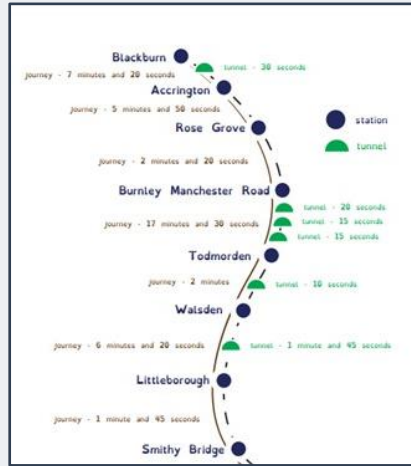
Community Rail Lancashire's four educational resources

Community Rail Lancashire (CRL) has developed four types of educational resources that are currently (or soon will be) used to support and enable neurodiverse travellers to better access and use rail services:



1

Station walkthrough videos



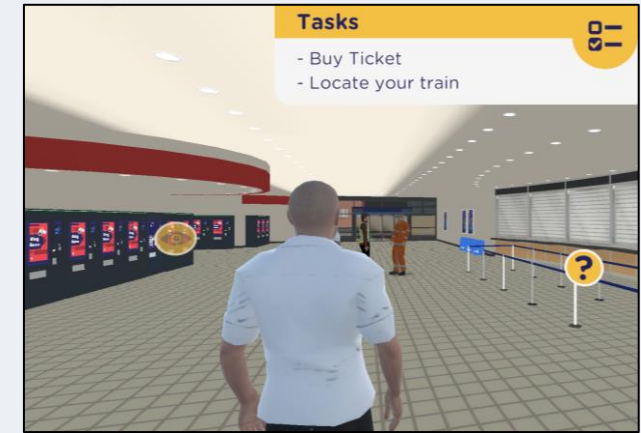
2

Print resources including maps



3

360-degree station experience



4

Accessible Travel Simulation game



The four types of educational resources were designed with autistic travellers in mind, but they had not yet been systematically tested to ask:

Is the content of the resources well suited to autistic travellers?

What do autistic users need to know about the rail system in order to make informed decisions, and plan delightful journeys?

		Ask for pens, crayons, ear defenders and sunglasses at stations with staff, but they might not always be available.
Contents		
Page	3	The line
Page	5	Map of the line
Page	6	General information and ticketing
Page	7	Timetables (accurate as of July 2019)
Page	9	What to expect
Page	10	What to bring with you
Page	11	What to do if the plan changes
Page	12	Blackburn
Page	14	Accrington

Is the format of the resources usable by autistic travellers?

How do autistic users with a broad range of access needs use the four resources, and what assistive technologies need to be supported for them?





Our research approach

To learn how each of CRL's resources may already meet the needs of autistic travellers, and to learn how each resource type could be improved, we created a research programme with two elements.

Online focus groups to better understand contexts and challenges

- 10 autistic participants (5 per group)
- Each group 2hrs over Zoom
- 2 sessions held over 1 day



Expert (heuristic) review of all 4 educational resource types

- Conducted by 2 experts from Open's research team
- Brought in knowledge gained from the focus groups, as well as evidence-based design principles from additional sources.



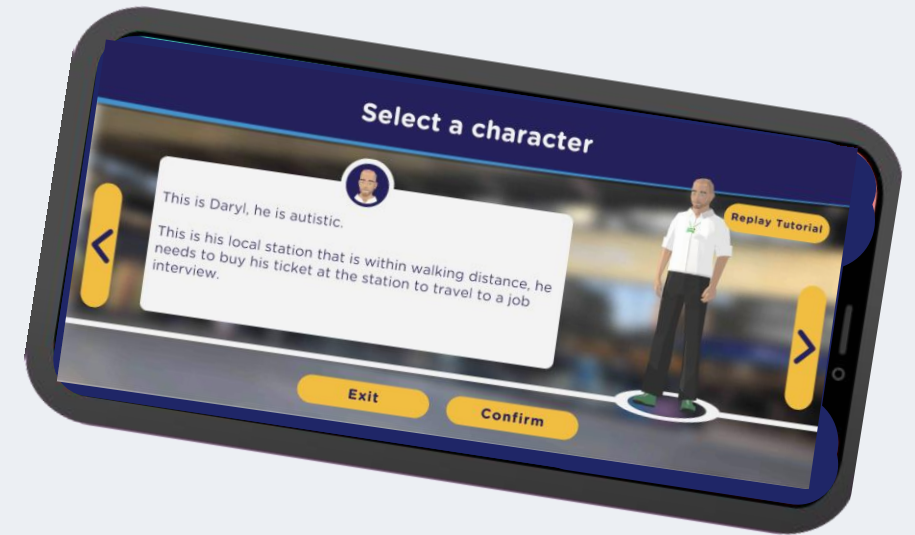
We recruited 11 autistic travellers for our focus groups

Participants were 5 men, 6 women.

Their ages ranged from 23 to 60.

Two out of the 11 participants had no additional access needs beyond autism. The remaining participants had additional needs related to:

- Dyslexia – 3 participants
- Dyspraxia – 2 participants
- ADHD – 4 participants
- OCD – 1 participant
- Memory and cognitive loss – 5 participants
- Mental health (anxiety, depression) – 5 participants
- Mobility impairment (wheelchair user) – 1 participant





Key findings



Key Findings 1 – Positive response and design validation across all 4 resources (1/2)

Focus group participants responded positively to the following design elements:

- **Detailed information about all aspects of the journey**, e.g., how the station looks, where to search for help, and how the stops and tunnels are laid out along the journey.
- **Advice and tips**, e.g., tips about finding and using ear defenders, about following colour-coded signs showing where to walk, and about how to book taxis from a local service.
- **Inclusion of station sounds in the videos and game**, though advance warning about ambient sound was highly important for many participants.
- **Ability to adapt and personalise the resources via configurable settings**, especially to control ambient sound and to select whether to hear music in the videos.



Key Findings 1 – Positive response and design validation across all 4 resources (2/2)

In addition, all ten participants endorsed the primary objective of the resources:

- To promote familiarity with rail travel and increase confidence in the face of potentially stressful journeys.

The 360-degree station viewer had the most positive response among participants:

- The familiar functionality of Google Street View, combined with many options for accessing information (text, video, and read-aloud), made this a preferred resource for building rail confidence.



Key Findings 2 – Opportunities to improve the resources

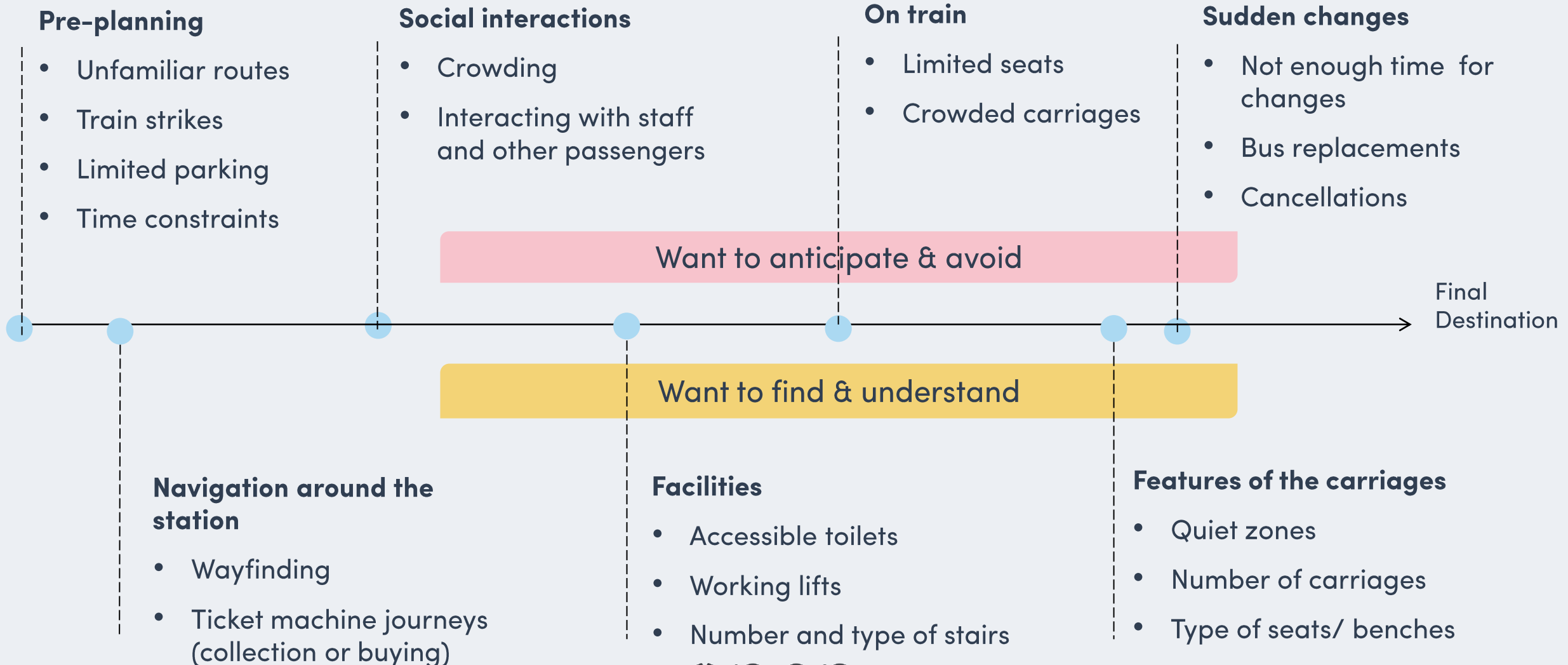
Participants gave actionable feedback about how to improve the following elements:

- **Realism:** More realistic and accurate (i.e., real-world equivalent) visuals, sounds, and interactions were desired for all 4 resources.
- **Content structure:** Participants consistently looked for structural elements like headers, text bullets and video bookmarks within the video and print resources. These accessibility elements would make it easier to find crucial information during travel planning.
- **Relevance to rail journey:** Information about elements beyond the rail journey (e.g, autism-friendly shops inside destination cities) were often considered unnecessary, and seen to be a distraction.
- **Accessibility:** Participants emphasised the need to ensure that all resources are fully accessible to users who sense, move, think and feel differently. Feedback centred on making information findable and understandable for neurodivergent travellers, including people with dyslexia and people who find highlighting in bright, 'dazzling' colours painful to view.



Detailed findings: the
experience of train travel

Focus group participants thought about friction points and looked for extra help at these points along the end-to-end journey





Many participants voiced concerns about interactions with other passengers and staff

- **Managing other people/passengers:**

- Navigating crowds in stations
- Other customers' impatience at ticket machines
- Busy-ness on the train (including not having a seat, negotiating who will sit)
- Disruptive passengers/anti social behaviour (including not moving out of a reserved seat)

- **Unhelpful staff**

- Negative experiences have left some travellers anxious about asking for help.

"...I hate asking for help - I'd rather struggle!"
(Female participant, 30-39)

"Staff can be really, really nice, but sometimes they can talk to you like you're stupid..." (Male participant, 30-39)

"I always seem to be on trains with people causing trouble, whether not paying tickets and arguing with guards or disruptive passengers. This means I have to keep moving carriages." (Male participant, 30-39)

"No conductor on some routes. It can stop me travelling - no one that can intervene in a bad situation on board.."
(Male participant, Under 30)



Additional concerns were varied and included broader aspects of travel

- **Safety:**

- Travelling at night (after 9pm) between certain stations could feel unsafe

- **Sensory experiences:**

- Light can be overwhelming, especially in newer trains
- Public address systems can be echoey and abrasive
- The combined sound of trains, announcements, and crowds can merge into an overwhelming roar
- Large, jostling crowds can be bring unwelcome tactile experiences - especially when an announcement mobilises many people at once

“As newer trains are coming lights are getting unbearably bright.” (Male participant, under 30)

“The Train Times website lets you know first which platform your train is arriving at. It means you have a minute or two extra before it appears on the arrivals board, so you can beat the crowds if you are fast.” (Female participant, 30-39)



Participants raised a number of ways in which they managed stress and anxiety

- **Travelling accompanied** on new or longer or more complex routes
- **Moving carriages** to avoid situations with other passengers
- Standing in certain **locations on the platform** (e.g., next to the stairs in case of a platform change)
- Repetitive **checking on train times** and updates
- Incorporating other **information sources** to help with planning:
 - National rail app
 - City Mapper
 - Google maps

“My safe space is trying to get in a bike space or I will hide in the bathroom. I would like to know about the train itself. Makes a difference if you have 10 carriages rather than 3 but I don’t think that information is easy to find.” (Female participant, 50 plus)

“What I tend to do is add an event in my calendar and an alert 2 days ahead. Then the night before I look at Google Maps to figure out which stations I am going to.” (Female participant, 30-39)

“Nearly missing the train that is every hour, [having] 30 seconds to get over to the other platform....[It] doesn’t happen as much but I do stand near the stairs in case of a last-minute platform change.” (Female participant, 30-39)



A major part of stress management for most participants is journey planning

Good planning is not only practical; it also helps to minimise anxiety-provoking situations like:

- Lots of changes (finding a direct route can help)
- Spur-of-the-moment decision making
- The need to use alternative options, e.g., bus or railway replacement services

“I would change my plans. If a rail replacement was there, I would not use it.”
(Female participant, 40-49)

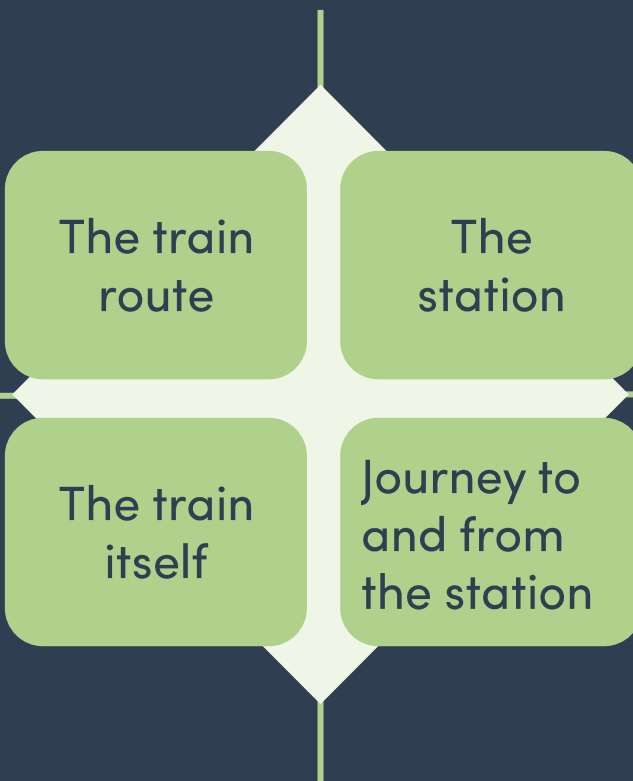
Planning includes finding sources of support, especially when anxiety can't be avoided.

“I would avoid a new route as much as possible as it is overwhelming ... if I am doing something different I would take my partner, also my children. There is something about being with my kids that overrides stress anxiety as it can't come out.” (Female participant, 40-49)



Effective journey-planning happens well in advance, and considers the following

- Number of changes on a journey
- Where the changes occur (e.g., will a lift be needed to change platforms?)
- Time given for change, and distance to travel within that time



- Station (un)familiarity
- Wayfinding and flow
- Stairs and lifts
- Assistance: meeting point/how far in advance to arrive
- Accessible toilets/ quiet spaces

- Seat style/composition
- Number of carriages
- Accessible toilet
- Table to work (wheelchair access)

- Whether driving is an alternative
- Time needed to build into journey time (plus contingency time)

“What is the most efficient route, how long it will take, how many changes – these are my priority order.” (Female participant, 40-49)



Most participants agreed: increased familiarity of journey elements is crucial for feeling confident whilst travelling

“I will do everything I can to use same timings, same carriages, make it automatic.” (Female participant, 40-49)

[Response to the 360-degree experience:]

“[It’s] like Google Streetview and I am familiar with how that works, feels logical to use... It greatly alleviates my stress knowing what something looks like and how to use it.” (Female participant, 40-49)

[Response to the station videos]

“[It] gives a bit of familiarity with the area.” (Male participant, 30-39)

Many participants felt that elements of CRL’s educational resources would help them to gain familiarity with the station and build confidence.



Participant feedback on CRL's 4 education resources

1

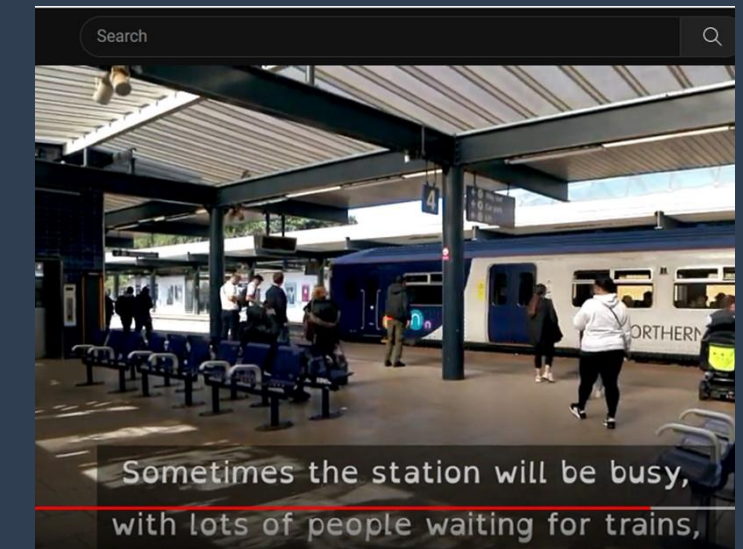
Station Walkthrough Videos – Positive Feedback

Participants were positive about the concept and content included in the videos

- Some credited the videos for creating a feeling of familiarity that helps manage uncertainty before arrival at a new station
- Others pointed out that they contain useful content (e.g., information about where the ticket office is)
- Some gave positive feedback on the voiceover

“Whilst stylistically it is not going to suit all of us, content-wise it is useful, it is really handy.”
(Female participant, 50 plus)

“Something about the voice is quite calming. Some are a bit obnoxious, this actually worked.” (Female participant, 30-39)



1

Station Walkthrough Videos – Opportunities for Improvement

- **Length:** participants wanted shorter videos, or bookmarks allowing them to navigate to shorter clips of interest
- **Content:** requests for content changes/additions included:
 - Showing more interactions with people in order to show how managing crowds and working with staff will feel.
 - Explaining how many staff are present, and where to locate them
 - Adding more details about navigation, such as where the ticket office is situated, and where to go for help
 - Additional advice on how to deal with unexpected situations in a busy environment
- **Realism and accuracy**
 - the station seemed too calm and quiet. Participants wanted more descriptions and demonstrations of how noisy the station gets and how sound echoes in the environment

“Could there be separate videos for the inside and outside of the station... I’ve forgotten the info as the video went along.” (Female participant, 30–39)

“I would rather interact on something to see the bit I need rather than everything.” (Female participant, 40–49)

“I have never seen it like this—what time of day did they film this? This is so different to my experience...”
(Female participant, 50 plus)

2

Print Resources Including Maps – Positive Feedback

Participants appreciated the detailed information available in the print resources when it was specifically about journey elements

- Two liked the Open Dyslexic font (although one felt it looked patronising or childlike and preferred another sans serif font)
- Some of the content was singled out as especially useful:
 - The detail relating to number of stops and tunnels and the time in between (although one participant felt that such precision, to the second, could cause stress rather than minimise it, if it was ever incorrect). Perhaps the map could state the times are average estimates
 - Advice on sunglasses and ear defenders



- **Readability:** a dyslexic participant on the spectrum noted that the text is not left justified and the gaps between each word caused a readability issue.
- **Text quantity and structure:** feedback included:
 - Many felt the booklet was too long, and requested concise structuring elements like headers and bullet points to help make text navigable
 - Important information (including website links/URLs) was 'buried'
 - Some people wanted less information and wanted to remove content that was not relevant to the train journey itself
- **Image content and format:** feedback included:
 - The photos of stations were too small for many to see clearly
 - One participant who is light sensitive felt that the green on screen was too bright due to the backlight on the computer screen.

"The justification and how it is spread out it throws me off..."
(Female, 30-39)

"It's a lot of information. If I am getting the train I am not bothered about finding out things about Manchester—I would find that out somewhere else." (Female, Under 30)

2

Print Resources including Maps – Opportunities for Improvement (2/2)



Participants also felt the design and imagery looked like it was targeted at younger audiences

“This is designed for a neurotypical person to read to their child.”
(Female, 40-49)

“My overall impression is it is helpful and they are trying to make things better for people. The typeface and way it is designed it makes me think it is exclusively for children and young people.”
(Female, 50 plus)

“[Child with mouth open] I see panic – it is not a happy introduction to something that is going to make me feel better.”
(Male, 50 plus)

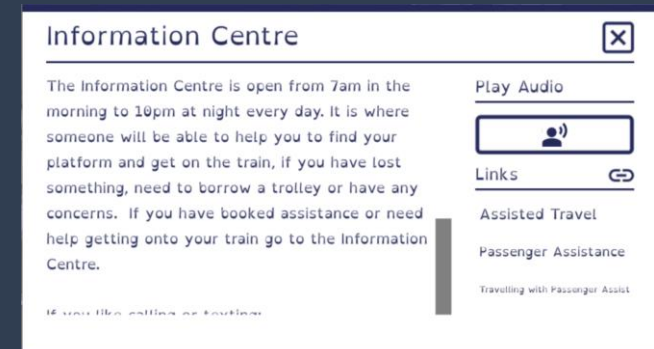
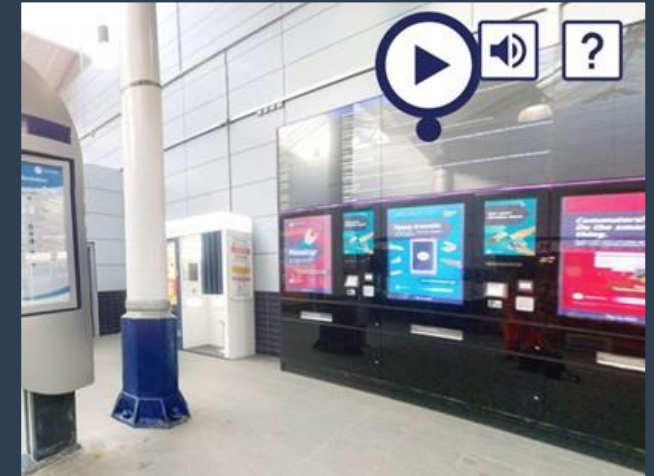
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3

360-Degree Station Viewer – Positive Feedback

The overall response to the 360-degree station viewer was very positive. The combination of a familiar interface with customisation options was especially well received. Participants also praised:

- **Familiarisation;** the opportunity to become familiar with the station, the sounds and the architecture – all of which were seen as very important
- **Customisation:** the optionality and adjustability of sound.
- **Multiple formats for information:** one participant noted that listening as opposed to reading was more effective for them.
- **Similarity with familiar software (Google Street View):** this simplified the learning process for many participants
- **Practical use:** some participants would use the viewer for exploring new stations or re-familiarising themselves with stations previously used



“I like that this is interactive and that I can choose the details when I want them and choose to read or listen. I like to be in control and move at my pace :) (Female participant, 40-49)

“I much prefer this to the video, With a few tweaks this would be something I use for stations.” (Female participant, 40-49)

“Compared to having doubts on written booklet I really liked this. If I do want to find out something I like a deep dive. I investigate buildings to find out what to expect.... Its digging really deep and I really like that.” (Female participant, 50 plus)

“I think being able to experience ambient sounds is so useful I’d rather be prepared in terms of noise expectation...” (Female participant, 50 plus)

“I like it minus the voice, reminds of google street view. I would find that really useful.” (Male participant, 30-39)

“[It’s] like street view and I am familiar with how that works, feels logical to use. I like I can choose stuff, like switching sounds on and off and switching pulsing things on and off and size of icons- all about options and choice. It greatly alleviates my stress knowing what something looks like and how to use it.” (Female participant, 40-49)

- **Distracting visuals and sound:** The ‘pulsating’ arrow on the floor was highly distracting to many participants, and for a few participants the reading voice sounded patronizing.
- **Realism and accuracy:** stations do not look and sound busy in many cases, and participants wanted a ‘true perspective’
- **Capturing/demonstrating detailed processes:** multiple participants wanted the chance to see a ticket-buying process performed.
- **Even more customization options, including:**
 - The ability to change the size of the icons
 - Speed of text/voiceover display
 - Font selection (for one participant Open Dyslexic was difficult to read)

“The voice may remind some of a kids’ TV show.” (Male participant, 30-39)

“I worry ticket machines will time out or I will press the wrong details and buy the wrong ticket - and also getting card out in public I think someone could come along and grab my card.” (Female participant, 30-39)

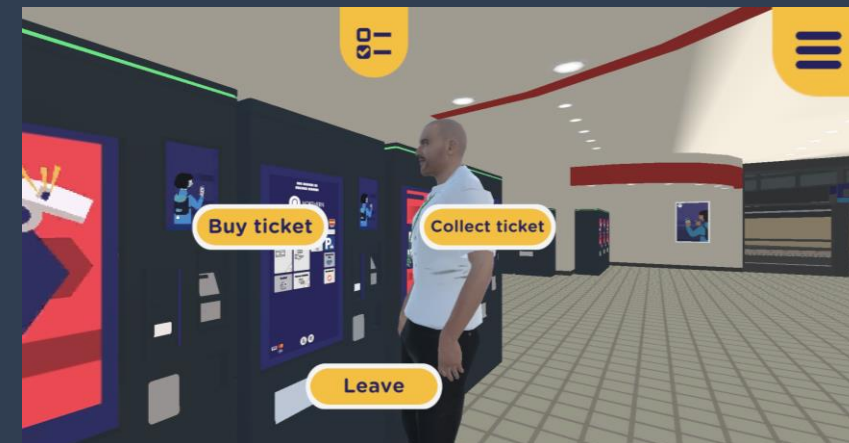
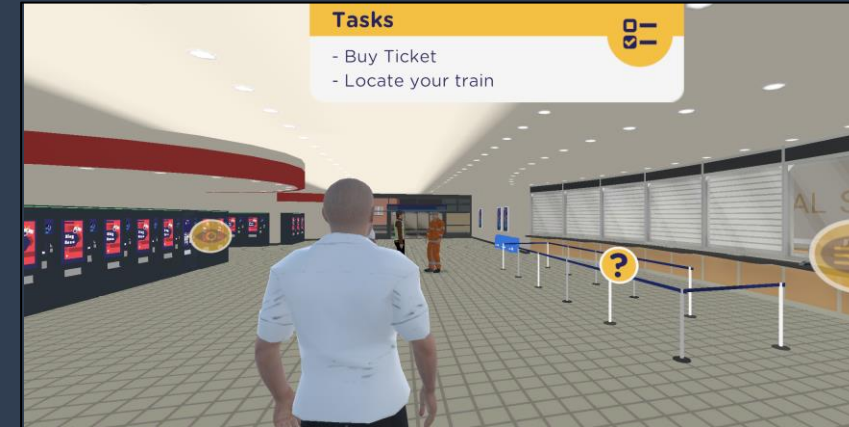
“I am just given impressions of things not actual step by step this is what you can do to alleviate anxiety. I am not going to be the only one using that ticket machine and some are very unfriendly and unkind.” (Male participant, 50 plus)

4

Accessible Travel Simulation game – Positive Feedback

Whilst participants felt some refinements were needed, the concept of the Accessible Travel Simulator was well received.

- Positive comments centred on the concept of building confidence in a virtual environment.
- Though not all participants (average age 35) felt that a phone game was relevant for them, several suggested specific younger people in their life who would benefit from the app.
- The many customization options were appreciated
 - one participant spoke very positively about the dark mode default in the app.
 - Two participants spoke positively about the option to change fonts, and about Open Dyslexic specifically



4

Accessible Travel Simulation game – Positive Feedback

“I don't think I would use this now, but when I was a teenager this have been revolutionary for me, so I knew how to take train. If I had something like this when going to college for the first time.. brilliant.” (Male participant, 30-39)

“I would like an airport version of this game as I don't know how to navigate one.” (Female participant, 30-39)

“By the way, the VR game is a very cool idea. I love the immersion and being able to learn interactively.” (Male participant, under 30)

“My boys would play this type of thing.” (Female participant, 40-49)

“I think overall it's progress with this game - it's the individual details that need refining.” (Male participant, 30-39)

- **Realism and accuracy:** across every element of the game. The station and train looked empty
- **Distracting elements:**
 - Some errors in the current game were noted (e.g., the task list sometime replicates the same task across multiple lines). Participants stressed how important it is to have no friction when 'live.'
 - One was confused about what differentiates the eye and map symbols that reveal interactable elements.
- **Accessibility improvements**
 - One participant wanted to change the font size, but learned that size changes make text run off screen.
 - One participant asked if the app could integrate with the accessibility preferences already set in a user's phone

"[Errors] can cause stress through distraction which can cause anxiety which is the problem." (Male participant, 50 plus)

"Could the app link in to the accessibility preferences I have already set in my phone?" (Female participant, 40-49)

- **Realistic and relevant interactions:**

- Proximity: the staff member stands uncomfortably close to the avatar on the platform when answering questions. Talking to staff members might not be easy for some autistic people, so the interactions need to be realistic to build confidence

“Talking to a staff member that easily isn't a good representation of autism.”
(Female, Under 30)

- **Leverage interactions to teach more skills:**

- Staff members can reinforce skills about how to find and read sources of information in the station

- **When actions and locations are relevant, they can be displayed in even more detail:**

- When an avatar interacts with the ticket machine, perhaps display the sequence of tasks on a viewable screen.
- One participant was most interested in tools for planning visits to an actual station. She would like a detailed, faithful representation of a real-world station.

“I know how to get to the ticket machine but not what to do at the ticket machine – what buttons to press. I know it is a simulation but you could go through the sequence of buttons.” (Male, 30-39)



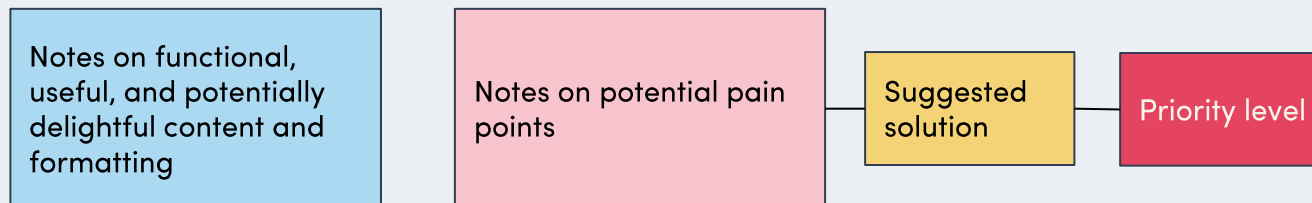
Heuristic Review: An Introduction



We completed an expert (heuristic) review of the four CRL educational resource types

Our review assessed the accessibility and usability of the 4 resources for autistic travellers who may have additional sensory, physical, cognitive and mental health requirements.

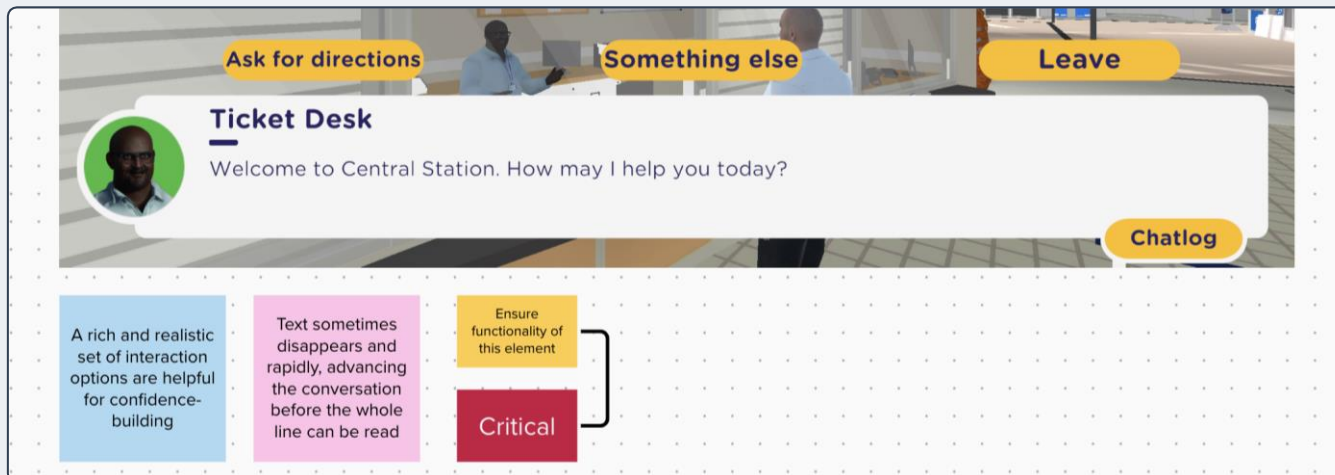
- We annotated each resource with information about accessibility wins and potential pain points for CRL's target users.
- For all pain points, we provided:
 - At least one suggested solution
 - A priority level, to help CRL and its partners decide about next steps





The Heuristic Review is available in two formats

- **An online whiteboard (created using the software, MURAL)**
 - <https://tinyurl.com/2cmwx6r4>
 - This board can be copied, and its elements reused, for future reviews
- **A downloaded PDF of the whiteboard, showing its status on 6 December**
 - The download has been submitted alongside this report deck.





Thank you to the following sponsors of this research:



A close-up photograph of a person's hands holding a clear glass jar filled with sliced pickles. The person is wearing a light-colored, vertically striped shirt. The background is a solid dark blue. The image is used to illustrate the concept of open inclusion.

Open Inclusion helps businesses unlock value.

By considering the needs of people with disabilities through insight, product, service and physical environment design.

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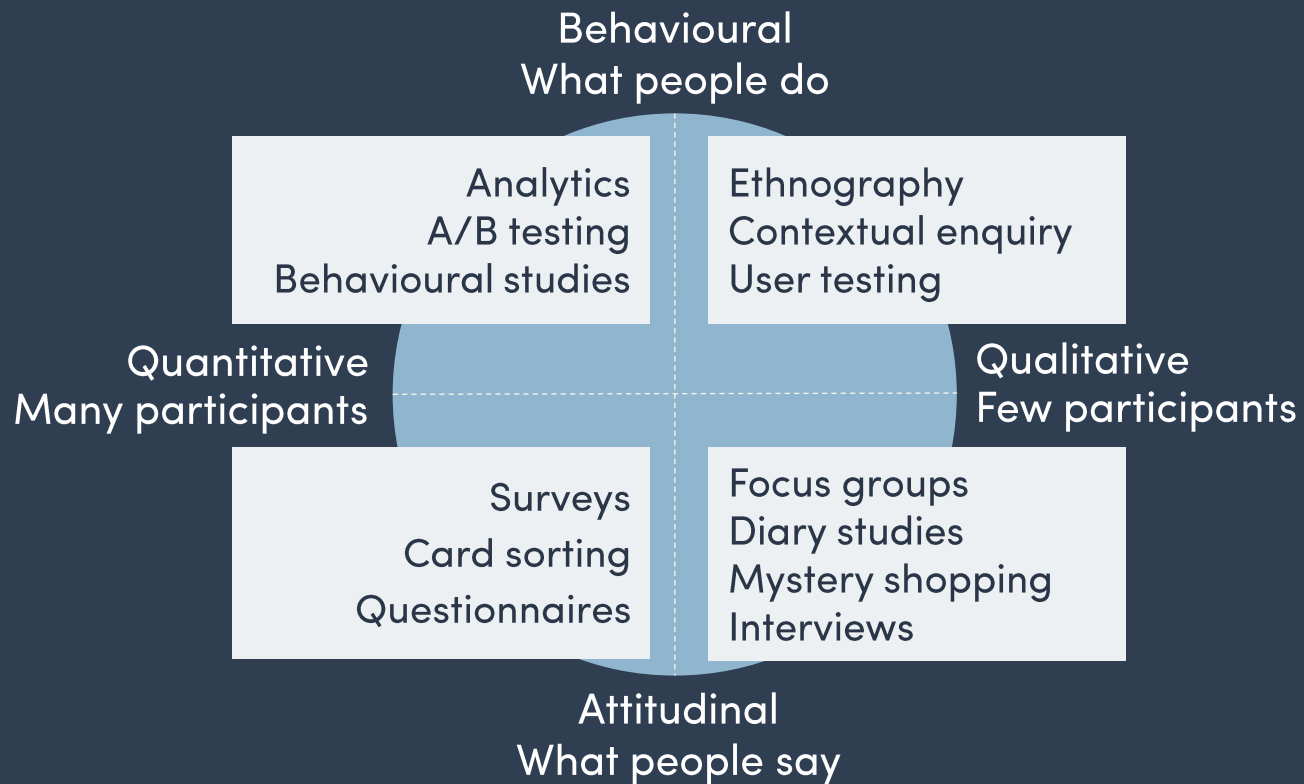
Open Inclusion has a wide range of research methods
So we can tailor the most efficient approach for each client, project or design stage

Customer or citizen/user engagement

- Behavioural to attitudinal
- Qualitative to quantitative
- In environment or remote
- Pan-disability, other access needs
- Customers, citizens, staff, stakeholders
- Pan-disability / needs
- Multi-channel, mode or format

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Thank you for your time!

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