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Public engagement, digital technology and transport: engaging through open, early and experience-centred perspectives at scale

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ABSTRACT

Public transport plays a significant role in people's everyday lives for commuting, business, and leisure purposes. Increasingly, the way the public is able to access information about passenger services has been transformed through digitalisation. Despite these digital transformations there remain very few opportunities for people to become directly involved in shaping the design of public transport at an early stage to reflect their personal preferences and experiences. In this paper, we outline and analyse an innovative digital engagement strategy for new trains on the Tyne and Wear Metro network in North East England. This engagement involved people in the design, specification, and detailed features of a new fleet of trains. This was successful in generating over 33,000 public engagements that, in turn, shaped the design and procurement of the trains prior to construction. We discuss how participatory digital technologies can be used to configure engagement, facilitating critical and constructive commentaries. We describe how centring people's experiences, imagination and curiosity can lead to more meaningful engagement through digitalisation, where the public are not merely the users of transport services but may also be its architects.

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1. Introduction

Freedom of movement is an essential human right, recognised in the UN Charter (United Nations, 1948, art. 13). A critical enabler underpinning that right in large urban areas is a public transport system that facilitates mobility, assists in delivering mass movement efficiently, contributes towards sustainability, and reduces urban congestion (Buchanan, 2019). However, both access to and experience of the use of public transport systems vary significantly, with some societal groups such as disabled people facing transport exclusion (Hine & Mitchell, 2001; Preston & Rajé, 2007). One way in which such exclusion might be countered is to approach the design of transport systems in an inclusive way

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that seeks to ensure they meet people's needs. This research focuses on engaging people in an effort to design metro rail systems that can better meet their needs.

The design of and how we experience public spaces is a push and pull between architectural, planning, and engineering factors on the physical side, and political, democratic, and financial factors on the experiential side (Cullingworth et al., 2015). Underlying, and in most cases shaping, these two sets of factors are a range of questions concerning economic and social values and benefits (Vigar, 2017). Beyond simply being a means of getting between places, the infrastructures of public transport – stations, track, routes, rolling stock, and the like – are public spaces themselves, in which people have complex, embodied experiences of time, place and mobility (Bissell, 2007, 2009, 2010; Watts, 2008). As such, it could be argued that new infrastructure and transportation developments should be the subject to the same level of involvement and scrutiny as other public spaces.

There is widespread recognition that involving people in the future of places is important (Baker et al., 2007; Bugs et al., 2010; Graham & Healey, 2007; Healey, 1996; Robinson & Johnson, 2023; Rodger et al., 2019; Rydin & Pennington, 2000). In the twenty-first century, there are now wholesale programmes of work that facilitate public engagement upstream in both the physical design process and in the public services. These programmes comprise innovations such as digital engagement (Wilson & Tewdwr-Jones, 2022b), co-production (Brandsen & Honingh, 2016), and creative practice (Cinderby et al., 2021), all of which are intended to better meet people's needs by initiating early dialogues between service providers and those most affected by place change in unique ways.

Yet engaging communities more innovatively in discussions and integrating their experience and knowledge into transport planning remains challenging. Vigar (2017) outlines the significant role of technical knowledge and political forces in transport planning, noting that little attention is paid to public input, or to embodied and local knowledges. Indeed, despite a growing recognition of the value public involvement in other forms of planning, little appears to have changed in the past two decades: '[the] language of transport planning is more usually that of engineering, technology, economics, and, nowadays, occasionally the environment. The language of social welfare is rarely heard' (Whitelegg, 1997, p. 128).

Engaging people in conversations around the places they live and the services they use can lead to better outcomes, as well as giving them a voice in decisions that affect them (Rydin & Pennington, 2000). Citizens, as service users, may not be experts by qualification, profession, or employment, but people do possess unique knowledge by virtue of their particular lived experiences and can make insightful suggestions about ways in which places or services might be improved. Such preferences and suggestions may be diverse, or even contradictory, but the value of collaborative discussion is in the inherently political conversations in which such views are discussed, debated, and expressed (Healey, 1996).

Indeed, feminist authors have argued that because individuals cannot transcend their own particularity, an objective account of social relations and policies must be more than the 'sum of their differentiated viewpoints' but rather constructed via 'critical, reflective, and persuasive interaction amongst ... diverse experiences and opinions' (Young, 2004, p. 25). This is particularly the case for marginalised groups, whose voices are frequently underrepresented (Vigar, 2017; Whitelegg, 1997; Young, 2004). For those most affected by 'transport disadvantage', such as disabled people, there remain few opportunities to

express views, preferences and experiences, especially early in the design process, and a lack of agreement on approaches that might best facilitate this (Hine & Mitchell, 2001).

Within this context, we introduce the first objective of this research:

- i. To understand whether a more open, early, and detail-focussed deliberative approach could be adopted in transport design.

Alongside this, there is a need to understand how such approaches can support the sharing and discussion of people's diverse experiences and preferences in relation to transport, rather than seeking to come to a homogenised 'average' of different views.

This leads to our second objective:

- ii. To understand whether we can uncover and facilitate discussion around diverse experiences and perspectives.

Finally, we identified an opportunity to apply innovative public engagement methods within transport planning, which hitherto has not adopted such developments from parallel fields. This presents an opportunity to explore whether, at the intersection of the first two objectives, novel forms of engagement could be undertaken with large populations at a regional scale.

This leads to our third objective:

- iii. To understand whether these discussions could take place in at a regional level.

In this context, in 2016 we initiated a research project around public engagement in the design of new trains for the Tyne and Wear Metro network in North East England, a region home to more than 2.6 m people. Opened in 1980 and reusing parts of an existing suburban railway system, the Metro serves the Tyneside and Wearside conurbations surrounding the cities of Newcastle upon Tyne and Sunderland, serves 60 rail stations and carries around 37 million passengers a year (Nexus, 2020).

The contribution of this paper is threefold. First, we document the design and deployment of a novel approach to engaging people around a strategic transport planning issue with the aim of sustaining open, early, and detail-oriented perspectives across a region. Second, we offer a critical reflection on using such an approach in this context. Finally, we conclude with insights to inform future engagements around similar issues, particularly those involving transport developments, engaging at a regional scale, and engaging with diverse lived experiences.

The paper is structured as follows: first, it engages with debates on the role of engagement and expertise in transport planning, before discussing how people's experiences might serve as a resource for planning and some of the challenges with digital engagement. We then introduce our approach and overriding principles, considering how emphasising dialogue around experiences can help to amplify voices seldom heard in traditional public transport consultation exercises. The findings describe the extent to which we met our objectives, and we conclude by discussing the wider conceptual, methodological and policy implications of this research.

2. Engaging with lived experience AT scale

The way that people live in places, with feelings and aspirations (lived, embodied, with meaning), is very different to the way places are governed (technical, abstract, measurable) (Graham & Healey, 2007). As Chapman (2011) notes, while changes in places are obvious, ‘the processes underlying this are not easily accessible or appreciable’ (p. 516).

There are long-term and enduring issues with engaging people who will be impacted by planning decisions. This has led to sustained efforts to make decision-making more inclusive through new methods that seek to better understand how people’s needs and desires can be more effectively understood and accommodated (Healey, 1996). Of particular relevance to this research, digital technologies have been introduced in an attempt to reduce the barriers to participation (Bugs et al., 2010; Robinson & Johnson, 2023), which in England, has meant the relatively slow adoption of digital approaches to planning over the past two decades, alongside the faster emergency responses witnessed during the COVID-19 pandemic (Wilson & Tewdwr-Jones, 2022a). Despite their diversity, these technologies share certain broad aims: to make people aware of opportunities for engagement; to make engagement easier by reducing the time it takes to participate and removing the need to travel to engagement activities; to help build consensus on decisions; and to make the processes of planning more transparent (Bugs et al., 2010; Marshall et al., 2024).

Evidence suggests that these digital technologies are successful in reducing the barriers that people face to engaging with formal processes. But making participation ‘easier’ and ‘faster’ can impact on the nature and outcomes of the activity itself. Planners, for example, have a sophisticated understanding of how engagement methods shape the responses people give through them (i.e. how engagement shapes engagement). As Wates (2000) calls for when designing in-person approaches: ‘Design a process to suit the circumstances. This may well involve combining a range of methods or devising new ones’ (p. 17). However, there is seldom reflection on the design or curation of digital approaches, with a limited understanding of the way the digital tools themselves shape engagement.

Focussing on faster engagement can encourage short-term reporting of specific problems, rather than long-term engagement with underlying issues (Wilson & Tewdwr-Jones, 2022b). Digital tools that purport ‘to reach more people, more conveniently, thereby proposing to strengthen consultation and engagement efforts’ (p. 74), often miss the impact and value of these new forms of engagement: ‘[p]articipation platform tools can potentially make it *easier* [...] but these tools do not necessarily generate *better-quality* participation or *deeper levels* of engagement’ [emphasis added] (Robinson & Johnson, 2023, p. 81).

These tools tend to emphasise getting as many people involved as possible, but do not address other well-documented issues people face when engaging with urban processes, such as gaining a detailed understanding of complicated proposals (Bugs et al., 2010), understanding the experiential consequences of them (Baker et al., 2007), or the challenges with expression and communication when sharing closely-held and complicated feelings, experiences and aspirations (Sandercock, 2003). Approaches that place significant weight on expedience are ‘in contrast to more deliberative methods of gathering contributions [...], such as involvement, collaboration, or empowerment’ (Robinson &

Johnson, 2023, p. 75). This has led to calls for approaches that prioritise slower, more considered conversations that discuss the complexities and trade-offs of decisions (Chapman, 2011; Robinson & Johnson, 2023).

Critical to this engagement is recognising that embodied, lived and local knowledge 'requires talking, and crucially listening, with particular groups' (Vigar, 2017, p. 41). Specifically, in the context of transport planning, this requires early involvement in the process, the targeting of the 'many groups who often remain voiceless in transport debates' (Vigar, 2017, p. 41) and engaging people on their terms and in their language (experientially) rather than those of decision makers. To this end, Sarkissian et al. (2010) calls for open spaces of dialogue driven through expressiveness and creativity, populated by those not typically invited to these discussions. Healey (1996) calls for strategies that involve 'new styles of planning discourse [...] that participants will learn new things about themselves, their relations, their interests, values, and understandings' (p. 222). Indeed, sharing and discussing these values becomes a resource for collective deliberation, in which the inclusion of marginalised groups such as disabled people can illuminate 'otherwise unnoticed bias and partiality' (Young, 2004, p. 27). The incorporation of these 'situated knowledges' into discussions can enable better decisions to be taken (Haraway, 1988).

While it is possible to address these considerations via in-person and relatively small-scale workshops or meetings, it is more challenging to scale up such discussions. Decision-makers are instead tempted to rely on closed approaches such as surveys that enable rapid quantitative analysis. Yet the benefit and the challenge of conducting and analysing open, large-scale, experience-centred engagement comes in the synthesis (rather than 'averaging out') of different and sometimes contradictory perspectives (Cardano, 2020).

It is perhaps due to these difficulties that research on experiences of rail transport is often conducted at relatively small scales utilising approaches such as ethnography, semi-structured interviews, focus groups (Bissell, 2009, 2010; van Hagen & Sauren, 2014; Watts, 2008; Watts & Urry, 2008) and/or questionnaires (Oliveira et al., 2017). While large-scale datasets are playing a larger role in decision making, particularly in transport planning (Vigar, 2017), these have distinct limitations. Kitchin (2014) identifies concerns with the increased reliance on such forms of data when they are incorrectly seen as complete, objective, and devoid of politics, and notes how they can emphasise technocratic forms of governance which respond to data, rather than people. While these datasets can tell you what someone did, 'there is less of a focus on the "why" or "how"' (Thakuriah et al., 2017, p. 34).

A notable absence is large scale, user-centred approaches to understanding experiences: with the exception of social media sentiment analysis (Mogaji & Ergan, 2019), prior research has not been undertaken at a large scale. While Oliveira et al. (2017) adopted a user-centred approach to consider *technological innovation* to improve passenger experiences, our concern is in the wider experience of trains as a public spaces, and how experiential insights can be scaled up. Engaging with people's experiences, and having discussions that by necessity must be detail-orientated, is challenging at a regional scale. These discussions are familiar to urban planners: for example, determining the pedestrian experience between points involves considering the overall experience but delivering it through a series of smaller interventions (Chapman, 2011). In the following

section, we describe how we addressed the above considerations through a multi-year project around the development of new trains for a regional transport system.

3. Pioneering a digital first: metro futures

The parameters and ambition of this project were set by the geographical extent of an in-situ regional transport system, and the need to engage with as many of the 2.7 m residents as possible. Early in the project we developed a series of three principles, shaped by the debates described above, that would guide our approach to Metro Futures. This section describes these principles.

First, large scale consultations risk missing the specificities of particular people's lived experiences if they only engage with the most popular concerns. Rather, we sought to *encourage a multitude of different voices*, by amplifying concerns of those who are typically marginalised. Such an approach can lead to more informed decision-making: Young (2004) argues that better decisions are reached with broader resources for collective deliberation and discussion, and notes how marginalised groups such as disabled people can reveal 'otherwise unnoticed bias and partiality' (p. 27) and thus contribute to collective well of social knowledge by articulating this to others. Better decisions can be reached by bringing together and engaging with such 'situated knowledge' (Haraway, 1991). In our research, we therefore made particular efforts to engage with marginalised groups such as disabled travellers, paying close attention to the issues they raised rather than deferring to 'popular' opinion.

Secondly, we wanted to create an environment that *encouraged exploration and creativity* in how people discussed their experiences, and interacted with design proposals, in order to encourage 'imagination, novel ideas, and solutions' (Wilson & Tewdwr-Jones, 2022b, p. 109). Rather than simply prioritising the ability for people to make comments quickly and easily, we emphasised opportunities for them to explore and express their views through deeper, experience-focussed engagement. Across all the activities we undertook, we not only collected people's experiences, thoughts and ideas, but also tried to elicit ideas for how concerns they raised might be addressed.

Thirdly, we wanted people to be able to *draw on their experience as a resource*. Framing Metro users, and potential users, as experts encouraged them to situate their experiences with each other, and together think about the changes they would advocate and the experiential consequences of any proposals. Key to this was devising approaches with 'each person engaging from their own perspectives and ... [b]y holding onto their own perspective each person is able to creatively respond to the other from their own perspective' (Wright & McCarthy, 2008, p. 639).

4. Case study: Tyne and Wear Metro

Nexus is the public body that owns and manages the Tyne and Wear Metro ('Metro') in North East England. As the first light railway built after the passing of the Disability Discrimination Act 1978, the Metro introduced several accessibility features including step-free access throughout the network. The original train fleet is still in use beyond its anticipated 40-year lifespan, leading to well-publicised challenges with maintenance and reliability despite a £350 m modernisation programme funded by the UK government

since 2010. Nexus therefore sought further government funding to secure a long-term replacement train fleet. In 2016, we partnered with Nexus to devise and lead a public engagement programme to incorporate passenger needs into the business case for the new trains. This enabled us to explore our research aims around engagement with lived experiences around transport planning on a regional scale. Our work formed part of a wider programme of public consultation led by Nexus titled ‘Metro Futures’ (MF). In 2020, following the successful funding application and the awarding of a contract for the new trains, we again worked with Nexus to engage the public in more specific design considerations for the new trains.

In the following sections, we first describe our approach to Metro Futures, outlining the activities we undertook in 2016 and 2020 (4.1), and illustrating how the three guiding principles described above (*encouraging a multitude of different voices, facilitating exploration and creativity, and drawing on experience as a resource*) underpinned these activities. In Section 4.2 we then describe how we subsequently re-analysed the data from the project as a whole in order to critically reflect on Metro Futures, drawing out the wider findings and implications of the research programme that we describe in this paper.

4.1. Our approach to metro futures

Our research group was engaged by Nexus in both 2016 and 2020 to devise and lead activities as part of Metro Futures. The chronology of these activities is shown in [Figure 1](#), while more detailed accounts of the activities in 2016 and 2020 can be found in Bowen et al. (2020; 2023).

Our work consisted of a series of four design workshops with a group of around 20 ‘co-researchers’, seven ‘pop-up labs’ in busy public locations with approximately 300 passers-by, an ‘imagine Metro’s future’ activity with six local schools, and a project website for sharing public contributions and eliciting further comments. We used three digital applications for stimulating and sharing public contributions (described below) to have more in-depth discussions of issues and ideas with co-researchers at a small scale, before sharing and developing these contributions at scale via the pop-up labs and project website. In total, around 3,000 people took part in these activities. These findings contributed to an ultimately successful business case to the UK Government’s Department for Transport for funding to replace the train fleet.

In January 2020, the tender was awarded to Swiss manufacturer Stadler to replace the current fleet of Metro trains (see [Figure 2](#), left). Nexus approached us again to lead the engagement around Stadler’s proposed design (see [Figure 2](#), centre). We had initially planned a similar approach to Metro Futures 2016 (MF2016), combining in-person and online activities. However, the COVID-19 lockdown in early 2020 forced us to re-

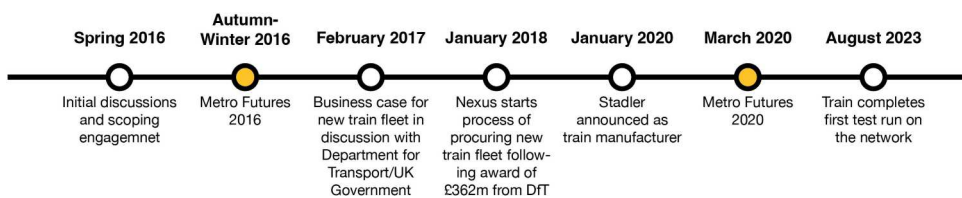


Figure 1. Programme Timeline (Source: authors).



Figure 2. Current (left, CC BY-SA 2.0 Glenn Scott); 3D visualisation of new Metro trains (centre, ©Stadler); and Physical Mock-Up (right, CC BY Authors).

develop our engagement as a series of novel online experiences. This was followed by a shorter period of limited in-person activities, led by Nexus, testing the accessibility and ergonomics of the train interiors via a physical mock-up (seen in [Figure 2](#), right).

Metro Futures 2020 (MF2020) thus consisted of online activities centred around an interactive, immersive project website. This hosted a virtual 3D visualisation of the new Metro trains built by Stadler ('3D mock-up', [Figure 2](#)), social media polls, live video webinars, and online workshops. Findings were disseminated in a report that contextualised and illustrated people's comments; and a 'sunsetted' version of the website. Public feedback from the MF2020 activities was used by Nexus and Stadler to refine the final train fleet design. The first of the new trains arrived for testing in February 2023 and full deployment is expected in 2024.

The following sections describe how we operationalised each of the three principles in the activities we undertook during the two periods of work: in 2016, by engaging people through their experiences of the current Metro; and in 2020 by engaging people around their potential experiences of the proposed design.

4.1.1. Encouraging a multitude of different voices

We used a range of activities that allowed people to scale their involvement depending on their level of interest, amount of time, and opinions of the new train. Our desire was to have engagement options available for anyone interested, but crucially, more involved approaches available for those with more time or inclination to participate in more depth. As part of this, we made concerted efforts to recruit widely, and offer opportunities to those not typically engaged.

In MF2016, we recruited *co-researchers* to help us gain an understanding of the diverse perspectives we were gathering. It was challenging to ensure representativeness in our recruitment, as we had significantly more interest from men. Co-researchers included several disabled participants, including three with visual impairments, and one with a hearing impairment. No one in the group used a wheelchair, although one participant had sometimes accompanied her daughter who used a wheelchair. We *engaged young people through local schools*, and a more general audiences through seven 'pop-up labs' in public locations such as metro stations around the region.

In 2020, we emphasised an even broader range of digital tools. The *Metro Futures Website* formed the central part of our public engagement. *Social Media* was used to attract new people to participate. Three *webinars* were broadcast on YouTube Live and Facebook to broaden engagement, and allow people to raise their own topics. *Online workshops*

facilitated in-depth, detailed discussions with a range of groups, including disabled people with a variety of impairments and access needs. We held twelve two-hour workshops, with open invitations, for topic-based detailed discussion of the trade-offs of design options. Four of these targeted groups with specific requirements, including wheelchair users, youth councils, and D/deaf people. To maximise participation, one workshop was held in British Sign Language (BSL), led by a BSL facilitator and a BSL interpreter, while a second workshop involved the use of a speech-to-text interpreter. Interest in MF2020 was substantial with over 23,000 engagements¹: 8,298 through the website, 14,100 through social media, 53 through the workshops, and 341 through the webinars.

4.1.2. Facilitating exploration and creativity

We wanted to allow the exploration of different design possibilities and for creative expression rather than foregrounding opportunities for quick-but-shallow engagement.

In 2016, during the ‘pop-up labs’, we used a *hardware device that encouraged creativity and communication through drawing and talking* (JigsAudio, see Wilson & Tewdwr-Jones, 2019). We led a series of activities over a day (‘Imagine Metro’s future’) with six schools (55 school children and their teachers) to generate novel and imaginative design possibilities.

In 2020, we were keen to centre people’s experiences but were faced with a novel challenge: how to centre experiences and promote exploration of a Metro train that had not been seen in person. Our website (Figure 3) was designed to create a dynamic, contextual, and immersive environment to promote exploration through experiences. We tried to nurture this through three distinct features.

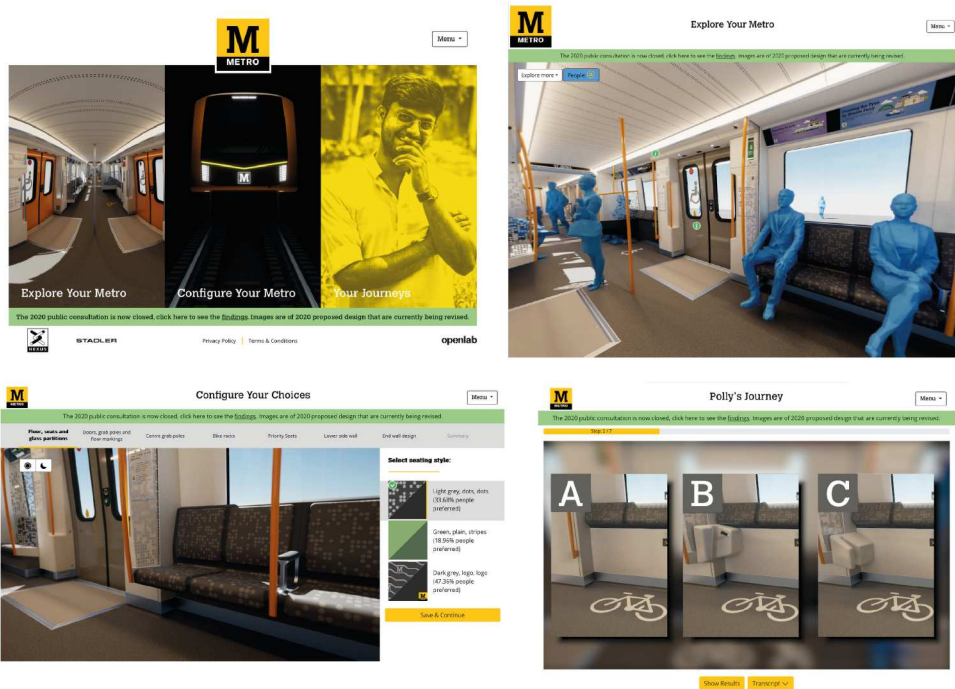


Figure 3. Top Left: Metro Futures Homepage; Top Right: Explore your Metro; Bottom Left: Configure your Metro; Bottom Right: Your Journeys (Source: Stadler, published with permission).

'Explore your Metro' allowed participants to experience 360-degree mock-ups of the entire train at seven different locations. Participants could add other passengers, wheelchair users, luggage, pushchairs and bicycles, and provide feedback via Likert scales and free-text comments. 'Configure your Metro' provided context to the design choices, and the relationships between them. Participants stepped through a sequence of choices about the interior configuration, with earlier choices reflected in later views, and view their design at day and at night. 'Your Journeys' put participants in the shoes of other Metro passengers through six interactive videos. We created six personas (see Blythe & Wright, 2006), informed by prior discussion with particular user groups, based around specific experiences of using the Metro. The videos encouraged users to choose design options, and comment on the suitability of their choices from the perspective of the persona.

The *webinars* used fly-throughs that allowed users the freedom to navigate and explore the details of the design, including elements that were not specifically highlighted on the MF2020 website.

4.1.3. *Drawing on experience as a resource*

In 2016 we used a *collaborative video recording technology* (Bootlegger, see Schofield et al., 2015), to allow the structured collection and sharing of people's experiences through deliberately open and ambiguous prompts (for example, 'What do you value about the Metro?'). These experiences were discussed on the MF2016 website and at workshops, with prominent issues shared at *pop-up labs* to inspire wider comment. We used a *tablet-based tool* (ThoughtCloud, see Dow et al., 2016) for encouraging people to respond to a series of pre-determined questions by providing ratings, audio or video messages. The MF2016 website brought together in-person comments, videos, and comments made on the website. The website attracted over 3,550 people, who left comments and agree/disagree votes.

In 2020, we were keen to take a similar approach that centred people's experiences. To do this, we had early discussions with community organisations representing groups including cyclists, disabled travellers, wheelchair users, and young people. We ensured, as far as practical, that issues raised by these groups were represented across all engagement activities (with the exception of targeted workshops, as explained previously). Rather than only showing an empty, well-lit carriage in the 3D mock-up, we sought to enable them to consider a range of environments and experiences by giving them the option of displaying other people and luggage (to simulate a crowded environment) and visualising the train at night, as shown in [Figure 4](#).

4.2. *Our research approach*

Reviewing the Metro Futures programme as a whole involved revisiting the research outputs that were produced, critically reflecting on the diverse forms of data – including artefacts, contemporaneous notes, documents, reports, and personal recollections – that were generated over the course of the project. We first identified themes amongst the individual elements of the engagement programme – for example, comments made through the website, or workshop transcripts – through thematic analysis following Braun and Clarke (2006), noting similarities and differences between different strands



Figure 4. Proposed design without (top-left) and with passengers (top-right), during the day (bottom-left) and at night (bottom right) (Source: Stadler, published with permission).

of engagement. We also conducted statistical analysis of website analytics, such as the amount of time people spent on different parts of the website and their navigation behaviours. Revisiting the data holistically in this manner enabled us to identify themes from across the programme, allowing us to focus on the *character of the engagements facilitated by Metro Futures* and assess how our approach was able to encourage different forms of engagement.

5. Findings

In this section we reflect on the whole Metro Futures programme of work across 2016 and 2020. We return to our principles, judge the extent to which we succeeded in accomplishing our goals, and identify shortcomings and challenges in our overall approach.

5.1. Creating places for exploration, creativity and experience-centred engagement

Focussing on experience, prompted through creative, expressive and novel tools, had the effect of enabling participants to add detail and design responses and potential solutions to the issues they raised. During interactions such as pop-up labs, people regularly recounted their experiences and provided feedback about how the issues they faced could be addressed. The use of personas stimulated participants to discuss not only their own experiences of the Metro, but also to consider other people's experiences and how these could be improved. We found that engaging people around practical considerations, such as how their desired choices might be implemented, helped them to link issues to their intended resolutions. This had the effect of grounding ideas in what was

practical and feasible at each stage of the consultation: for example, rather than people only describing the problems they experienced, we were able to discuss with them how these might be addressed.

Enabling people to communicate their complex experiences in novel ways helped to generate a series of pragmatic design proposals, while raising new issues and sometimes unforeseen concerns. Indeed, we found that significant insights came from those that spent time undertaking creative activities or exploring the proposed design, as although people could provide preferences (such as the style of the seats) rapidly, it took more time and consideration to embed different design choices within lived experiences (such as which style makes priority seats more visible). People engaging with the wheelchair area through the physical mock-up discovered that handrails were poorly sited, and that location of the passenger information screen directly above them was not visible. In the workshops, we were able to discuss alternative positions, and their trade-offs. Participants reported having to regularly ask people standing in the wheelchair areas to vacate the space, and highlighted how while this is a rare experience for many passengers, it was an everyday experience for them. They suggested that, to discourage this, perch seats in the wheelchair space should be removed.

Detailed engagement with the mock-up, whether through the website or workshop, allowed people to imagine the experiential consequences of the proposed design. This helped to produce an environment that allowed for detail-oriented, constructive critique of the proposed design, and how any issues identified might be addressed. While concerns such as those above were relatively rare, it was possible to understand the significance of these in people's lives through such detailed-oriented engagement. Our analysis of the data therefore had to be sensitive and nuanced: rather than prioritising only ideas that received broad support (which were easily apparent), we sought to retain a focus on the concerns and ideas that were typically underrepresented. By engaging with detailed, experience-centred perspectives we could better understand the veracity of concerns raised by marginalised groups, rather than these being buried under popularity most widely favoured design options.

Despite these efforts to engage people in detail on the experiential consequences of the design, most engagements were through shallower approaches such as social media where people only selected a preference. Nonetheless, we were still able to engage widely with over 4,000 of these 'deeper' engagements in total. This suggests that with appropriate scaffolding and tools, a significant proportion of participants did choose to participate more deeply, and that 'deeper' engagement can indeed be scaled up. For example, a significant proportion of engagement with the 'journeys' and 'explore' options of the MF2020 website encouraged interactions longer than 2 minutes (72.9% and 66.8% respectively).

Developing these experience-centred approaches, however, was not always straightforward. While conducting interviews that informed 'Your Journeys', we spoke to a schoolchild who described their experiences of being bullied on the Metro. Others discussed feeling unsafe because of antisocial behaviour. We sought to include some of these vignettes in our stories, encouraging people to explore how design decisions might influence the positive and negative experiences that are part of everyday life. However, Nexus felt uncomfortable associating Metro with negative experiences, posing a challenge for our experience-centred approach which was grounded in

people's actual experiences rather than an idealised vision. This situation was resolved by explaining that we hoped the inclusion of these experiences would be reflective of broader experiences, and open up a discussion of how Metro might address such negative perceptions.

5.2. Synthesising experiential perspectives

There was a tension throughout this research: early in the programme, we encouraged people to be creative in generating ideas, but found that participants struggled to be creative without an existing design proposal with which to engage. Later, as the design proposal became more tangible, people more readily responded with creative design ideas. However, at this point these could not be accommodated. We found that as the boundaries for what was possible with the engagement changed, we spent increasing time explaining the engagement process itself, clarifying what was and was not 'on the table' to change. To complicate matters further, as new issues were considered, additional changes, suggested by Nexus and implemented by Stadler, were reflected in the proposed design. Nonetheless, we included all feedback in our report to Nexus, whether or not they were within scope, and, in some cases, 'what was on the table' expanded to consider new issues or changes.

During the later phase of engagement, it became apparent that a significant number of people were unhappy with Metro's new seating layout (from 128 to 104 seats per train) because of concerns they would be, in the words of one respondent, 'cattle trucks'. Tensions around the seating layout amongst passengers and local politicians continued when an inconclusive survey revealed no clear preference from the public for a particular seating layout (Dickinson, 2017). Significant public pressure was applied to Nexus, especially via social media, demanding that they reconsider the seating layout. Although system-wide the new trains would provide more seats overall, due to an increase in service frequency, this nuance was difficult for Nexus to convey – particularly with the often fast-paced and reactive, politicised discussion that took place on social media.

The seating layout issue illustrated some of the wider tensions in engaging with experiential accounts. Through the programme we had collected experiences around specific contexts from a range of different perspectives: for example, someone wanting to sit while travelling the length of the system when it was quiet, versus someone travelling a few stops during rush hour within the city centre. A related issue, discussed earlier, was the removal of perch seats in the wheelchair areas. Experiential data enabled the consideration of different perspectives, and the implications of particular design choices for different groups of people. Yet it provided no 'answers' to difficult decisions: ultimately, a binary choice had to be made on the seating layout, and while different perspectives have merit, no one decision could satisfy all users.

Nexus was keen to demonstrate how they had listened to and addressed people's concerns, and in light of the demand for more seats on the trains, the retention of perch seats in the wheelchair spaces would have helped them to do this. However, the experiential approach we adopted led us to consider whether certain perspectives were more significant than others: by enabling people not only to communicate their preferences but also discuss the significance behind them, we were able to better understand whether feedback was intrinsic to their ability to access the Metro. As such we were able to highlight

minority perspectives that would particularly affect certain groups, that might otherwise have been drowned out by dominant views. Ultimately, the seating in the wheelchair area was removed, but this issue – and several others – highlighted how sometimes a design decision had to be taken that could not satisfy all groups.

The wider ambition of experience-centred engagement should therefore not be to identify a single ‘best’ choice, but rather to help decision-makers make better-informed decisions based on bringing together many different perspectives, in which the consequences of each choice for different groups are well-understood. This highlights a particular challenge when attempting to integrate people’s experiences, preferences, and feelings into large-scale consultations: the importance of doing so without losing the individual and nuanced contexts that are essential to informing decisions.

Overall, the exploratory approach of Metro Futures demonstrated the opportunities presented by in-depth digital engagement as well as the challenges of reconciling this openness with the pragmatic need for the design to be finalised as the engagement progressed. As the proposed design materialised and design choices made at earlier stages were implemented, the scope of the engagement inevitably became narrower. In turn, this led to external pressure on Nexus to reconsider earlier design choices and reopen discussions that were now outside the scope of the engagement activities, such as the seating layout. Such tensions partly a consequence of the open nature of the Metro Futures activities and may not have emerged, at least through formal channels, in a more traditional and closed engagement process. Nonetheless, the fact that the project facilitated the expression of these concerns, which otherwise might have been simply ignored as ‘out of scope’, suggests that Metro Futures was successful in its objectives of engaging at a regional scale with diverse lived experiences in the design of new transport infrastructure.

6. Conclusion

In this research, we sought to identify approaches that encouraged people to think creatively about the future design of the Metro trains, informed by their experiences, imagination, and situated knowledge (Haraway, 1988; Vigar, 2017; Young, 2004). Our objectives were to understand whether an open, detail-focused, deliberative approach could be adopted in transport planning (a subject rarely opened-up for public scrutiny and engagement); could uncover and facilitate discussion around diverse experiences and perspectives in this context; and could be scaled-up across a region. However, in pursuing these objectives, we have also opened-up wider questions surrounding three sets of inter-related issues: the role of deliberative, slow, and experiential approaches at scale; methodological questions surrounding university-led engagement projects; and pragmatic reflections on the extent to which the policy environment supports genuine engagement.

The research demonstrated the value of both engaging *widely* with large numbers of people, but also in *depth*, with fewer people. The number of people engaged, or the number of comments made, is commonly used as a proxy for the success of a democratic activity (Baker et al., 2010; Rydin & Pennington, 2000) – for example, voter turnout (Arnesen et al., 2019). In contrast to measuring success by quantity, we argue for a move towards a more nuanced measure of what counts for effective engagement:

one with a focus on creating opportunities for quality and robustness in engagement, and not necessarily just focused on generating the largest possible number of people engaging as quickly as possible (Johnson et al., 2020; Robinson & Johnson, 2023). 'Slow' engagement provided participants the opportunity to ground their feedback in their lived experience and expertise, while more expedient or 'fast' forms of engagement do not allow for the full expression of such contextual knowledge. The challenge then becomes how to evaluate highly variable forms and depths of commentary: should opinions conveyed through a Twitter poll be given the same weight as those expressed across a two-hour workshop?

Understanding people's experiences in greater depth allowed us to not only understand the issues people were raising but also to solicit their suggestions for how these might be overcome. Key to this is taking the time to explore proposals, deliberating potentials, and engaging with their consequences (Healey, 1996). This enables an understanding of the underlying experiences which inform people's engagement, rather than focusing solely on their feedback on specific design proposals, which in turn offers the opportunity to understand the potential experiential consequences of design changes. Discussions about transport, and transport systems, are invariably complicated and experiential. Metro Futures demonstrates both the appropriateness of using deliberative approaches to understanding these complex experiences, and the opportunity that exists to do so at scale via a combination of in person and digital methods of engagement. Such a strategy could be applied across the whole spectrum of transport modes, but should retain an emphasis on developing bespoke approaches that respond to specific local and regional contexts. Complex decisions cannot be reduced to tick boxes or referenda alone with pre-determined responses; attempts to treat engagement in this way is reductionist and misses a lot of the vital knowledge that makes engagement pragmatically helpful for both initiator and respondent (Baker et al., 2010; Rydin & Pennington, 2000).

We need to develop opportunities that both emphasise the experiential knowledge people have (Graham & Healey, 2007; Healey, 1997), and create approaches that readily afford these being shared (Healey, 1996). This is particularly important for those groups who are already marginalised, whose situated knowledge can contribute to the quality of discussions (Young, 2004). Just as we should not design public transport systems according to what is simply most popular, digital engagement processes should not be designed to engage everyone as quickly as possible. Digital tools do enable faster and more efficient ways to interact with citizens, but the critical issue here is that they should not be deployed solely to reduce costs or as tokenistic processes; rather they can be one element within a much broader, well-resourced, tailored, and effective programme of engagement. In designing digital tools for faster engagement, for as many people as possible, we risk losing a lot of what makes engagement engaging.

Metro Futures, as an engagement and research project, led by a university that initiated, fulfilled, and analysed the results, was unique and potentially risky for both Nexus and the University: What if, following wide-spread engagement, the funding application for the new Metro trains had been refused by the government? What if the results of the engagement, for all its creativity, novelty, and breadth, were simply ignored downstream in the process? What if our desire for innovative engagement (fulfilling our research objectives) through a new proof of concept approach was not effective, or failed as a new research method? What if the train manufacturers could not produce trains that responded to the public's desires or

brief? Is it ever possible to be 'objective' and neutral witnesses, while facilitating real-life engagement on a politicised, large-scale, time-sensitive project? These questions were at the forefront of consternation about the research process as it unfolded, but we would argue are pertinent to all civic-focussed social science research projects.

The project required ongoing cooperation and negotiation between both parties, and was only made possible through significant buy-in from Nexus. Engagement that opens up questions and subjects proposals to detailed scrutiny can be uncomfortable. Having a 'warts and all' experience-centred engagement that, for example, highlights negative experiences can conflict with the wider values of an organisation that aims to promote the positive use and benefits of their service. The meeting of a stepwise and 'rational' approach to engagement, in which broad issues are discussed, narrowed, and finalised, with the open-ended tools and approach adopted in Metro Futures, posed challenges for decision makers: the very same tools that were used to engage positively and creatively were at times used to push back on earlier decisions. The project implementation was unpredictable and challenging at times, but nonetheless valuable for all parties. The programme led to a change in thinking at Nexus, including the recognition that detailed, experience-centred engagement can complement rather than conflict with their wider purpose (such as by increasing passenger numbers through meeting people's needs). More tangibly, the programme resulted in research and engagement results with impactful outcomes. These included:

- The results of the Metro Futures engagement initiative, including citizen preferences, were incorporated formally into the Nexus financial business case submitted to the UK Government in January 2017.
- A series of further joint public engagement events organised between the research team and Nexus in February 2017 at the House of Lords and at the Tyneside Cinema in Newcastle in June 2018 to celebrate the historic place of the Metro in the life of the region, and to feedback the results to the Metro Futures work to the public.
- The participation of the research team in the public and media announcement of the choice of Stadler, as the train fleet builders, following the procurement process, in January 2020.
- Attendance of the research team at the public and media launch of the first train in the new fleet, christened the Class 555s, in Newcastle in March 2023.
- Nexus won the 2021s Global Light Rail Awards Technical Innovation of the Year (Rolling Stock) prize, as well as three gold and one silver award from the Chartered Institute of Public Relations for their use of social media and digital engagement, in recognition of how the Metro Futures programme has set a benchmark for how people can be involved in shaping transport systems.
- Four new works of arts commissioned, funded by Arts Council England: the first permanent major art exhibition on public transport anywhere in the world.
- Nexus is currently exploring how similar approaches might be used to develop other types of services that could augment the use of the new trains when they are rolled out.

Our final reflection relates to broader research and engagement partnership requirements. Metro Futures benefitted, and was shaped through, a sustained institutional and research partnership (in this case, over four years) that met both the needs of the transport operator as a business (to both be seen to be, and to be, more responsive,

transparent, and accountable), and the university (to conduct excellent and impactful research). In this context, partnership expectations had to be discussed and agreed to, including being committed over a long time period and ensuring the results of the engagement carried legitimacy and weight. Meeting the growing desire of funding bodies to co-produce research with external partners and communities (Kempton & Marlow, 2021; Vallance et al., 2020) requires substantial up-front work to develop trust and to work through agreed strategies and tactics to address real-world issues through speculative projects. Ultimately, research that fulfils the diverse needs of communities, partner organisations, and universities takes a significant time to design, broker, and deliver. It requires the development of long-term relationships of trust between stakeholders and communities that can withstand the complex and intense nature of such collaborations, particularly when some aspects of these projects may play out in public and politicised debates. With increased uptake of digital engagement opportunities, there is a need for increased consideration of the opportunities they present for genuine discussion of people's long-term experiences, feelings and aspirations.

Note

1. An engagement equates to one interaction via one of the approaches we took; the number of engagements is therefore not equal to the number of people we reached.

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Data availability statement

The data that support the findings of this study are openly available in the Newcastle University Research Repository at <http://doi.org/10.25405/data.ncl.15772029>.

Research ethics and consent

Ethical approval for this research was granted by Newcastle University's Faculty of Science, Agriculture and Engineering Ethics Committee.

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