designability

Funded by Motability Foundation

Designing **inclusive** cars with **accessibility** and **flexibility** as standard

Introduction to the project

At Designability we use person-centred design to create products with and for disabled people to improve and enrich their lives. As a disability charity, we think it's important to involve disabled people throughout every stage of the design process, to make sure what we create is not only fit for purpose but also meets people's needs.

We want all vehicles to be accessible to everyone and we are striving to improve the accessibility gap in the UK which currently stands at 38%[1]. This means that disabled people (as defined under the Equality Act 2010) take 38% fewer trips than non-disabled people. This is a figure which has not changed for over a decade.

Our aim is to explore and understand how vehicle design could be improved to make cars more accessible and inclusive for all by consulting with disabled drivers and passengers. They have shared their experiences as well as their ideas for how car travel could be better.

This research is part of a wider project led by the Motability Foundation and Motability Operations into inclusive vehicle design. Both organisations identified in 2021 that not enough consideration was given to accessible design, and it would be necessary to address this as vehicle manufacturers switch their focus to electric vehicles. This built on the Motability Foundation's accessible electric vehicle charging project, which was supported by Designability, and Motability Operations' sector insights and knowledge.

The Motability Foundation grant funded this project to explore and understand how vehicle design can be improved, to make cars more accessible and inclusive for all users.

In 2022 the Motability Foundation commissioned the Energy Saving Trust to conduct research into electric vehicle design, which further highlighted the barriers that disabled people face.

[1] Source: https://www.motabilityfoundation.org.uk/media/iwaidhxk/motability_transport-accessibility-gap-report_march-2022_final.pdf

The current context

Car travel remains the most popular form of transport among disabled adults and around a third of these journeys are made as a passenger. Disabled drivers represent five per cent of the driving population, which is around two million people. Motability Foundation's Transport Accessibility Gap also found that disabled people report twice to three times more difficulties when travelling than non-disabled people.

Currently, one in four people in the UK is living with a disability and it is predicted that by 2035 the number of disabled drivers or passengers will increase to 2.7 million. This rapidly growing figure is reliant on car travel to support their independence, freedom and well-being, making it imperative to understand and explore the barriers faced by disabled drivers and passengers.[2]

These insights reflect that the current provision of transport, both public and private, does not adequately cater for the needs of disabled people. This in turn contributes to wide-ranging socio-economic disadvantages, such as disabled people being almost twice as likely to be unemployed and nearly half of everyone in poverty in the UK either being disabled or living with a disabled person.

Our design and innovation team consulted with over a thousand disabled people who shared their experiences as well as their ideas for how car travel could be better to make cars more inclusive and accessible for everyone.

[2] Source: https://www.motabilityfoundation.org.uk/media/gz1berkp/12519_est-report-updates_v1.pdf

Vision

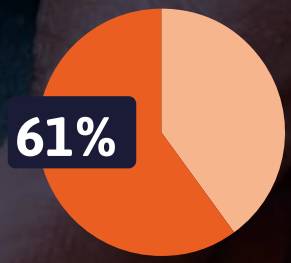
Disabled people are able to make the car journeys they choose independently, comfortably, safely and with confidence.

Mission

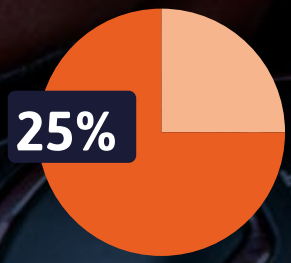
To inspire the car industry to design inclusive cars with accessibility and flexibility as standard.

The project **so far...**

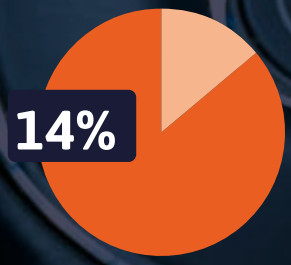
During this project, we've heard from over 1,400 disabled drivers and passengers with a wide range of different impairments and experiences of using cars. These include:



61% of our participants have physical impairments – a physical impairment limits a person's capacity to move, coordinate actions or perform physical activities. This can look like reduced mobility, dexterity and strength.



25% have cognitive impairments – a cognitive impairment describes a person's memory and/or thinking that are mild but still noticeable. They might affect how someone processes information, their spatial awareness or concentration.



14% have sensory impairments – a sensory impairment is where one or more of the senses that a person relies on every day are no longer functioning as expected. They can affect people's, vision, hearing or sense of touch.

People living with impairments often describe the impact this has on their mental health.

A study from the Office of National Statistics reported that disabled people whose impairments affect them more severely have poorer well-being ratings than disabled people whose impairments affect them less severely.[3]

The disabled drivers and passengers who participated in this project shared the challenges they faced every time they made a journey. These included getting in and out of their car, preparing to travel, driving, and storing luggage and mobility equipment such as wheelchairs and walking aids.

Despite the benefits of technology now available in many modern vehicles, including electric cars, that allow smarter and more automated driving such as adaptive cruise control, lane assist, reversing cameras, and automatic lighting, disabled people still face challenges in finding and using vehicles that meet their needs.

Through our close engagement with over 50 people through online interviews, group workshops and observing people using their cars, we have been able to explore in detail what those challenges look like, the impact they can have on someone's journey, and also be inspired by the ingenious ways people use and adapt their car to better meets their needs.

For some, the impact of these challenges are significant. This means people can't use their car with the confidence, comfort and independence that they would like. These challenges can also affect someone's sense of safety.

We want to change that.

[3] Source: https://www.ons.gov.uk/peoplepopulationandcommunity/healthandsocialcare/disability/bulletins/disabilitywellbeingandlonelinessuk/2019

Access; getting in and out

People felt the most vulnerable when getting in and out of their vehicles, particularly wheelchair users, and people with reduced mobility or visual impairment. It presents the highest risk of falling and people told us about the effects of strenuous transfers from their wheelchair into the car and the impact this has on their body.

42% of those people who found getting in or out difficult or very difficult, mentioned it was because of their limited mobility e.g. reduced mobility, balance, strength, flexibility and general pain, coupled with the movements required like swivelling in the seat, lifting or lowering from the seat, bending and transferring from a wheelchair made getting in or out of the car difficult for many.

Simple features like grab handles are really useful to support people getting in and out of the car safely and comfortably, one participant told us *"A lot of cars have stopped adding the handle over the door. If there's no handle, I have to push up with my hands [from my wheelchair] and it takes more energy - I have more control with a handle - It's like a grab rail for a car!"*

42%

of those surveyed who found getting in or out difficult or very difficult, mentioned it was because of their limited mobility

"I hold the door frame and then I literally drop myself to the seat. I didn't fall off yet this way, but it feels like I could. It is the most vulnerable moment for me"

We've observed the many ways in which people adapt or hack their vehicle to better meet their needs, for example adding straps to door frames to help them get in and out. This kind of creativity is inspiring and makes us wonder how vehicles could be designed to include features like this as standard.

Seating and interior space

Interior space in vehicles can sometimes be quite tight, even in larger vehicles due to bulky centre consoles or interior features – this reduces the amount of space available for people to move and use their car.

For some people the design of seating doesn't meet their needs, it can be too narrow and firm leather or side bolsters can make their journeys uncomfortable leading to discomfort and pain.

74% of those people who found travelling difficult or very difficult, mentioned it was because of experiencing pain and discomfort during their journey.

Electronic seating is extremely beneficial for those with reduced strength and dexterity. Particularly if mounted within easy reach and with memory functions (access mode and drive mode).

"The seat in my car automatically goes back to give me more space to get in or out. When I close the door, the seat moves into my driving position."

Vehicle interiors must therefore be improved to meet the seating and storage requirements for drivers and passengers. With such a high percentage of users experiencing pain and discomfort during their journey, we understand how improving the interior spaces would make a significant impact.

74%

who found travelling difficult or very difficult, mentioned it was because of experiencing pain and discomfort during their journey

"The centre console is large and takes up lots of space... it limits the space for my legs and bottom so it's uncomfortable."

Travelling and the driving environment

We've heard from people who can't use non-driving control because they are hard to reach or to locate, and often the user interface or the touch screen is complex and confusing.

The two key reasons people cited for finding travelling in their car difficult were the controls in the driving environment and a sense of cognitive overwhelm

Respondents said fatigue, stress, anxiety, and noise made driving difficult. They also mentioned hand controls could be tiring to use and spoke of challenges of information overwhelm and maintaining concentration.

With so many different controls and settings to adjust the driving environment, difficult access or interaction with them highlights a significant challenge for disabled drivers and passengers.

Many spoke about the sat nav being difficult to use, there being too much information to take in, controls being too small, fiddly, or hard to reach, and touch screen, in general, being difficult to use.

Touch screen interfaces need precise input and provide no feedback this causes issues for some people with limited dexterity or control of hands and fingers.

Driving controls

and cognitive overwhelm are two key reasons that people find travelling in their car difficult

"I can't turn the heating down when driving because I don't have use of my left arm. I have to stop the vehicle and stretch to reach the heating control with my right arm"

Poor visibility of some controls in the driving environment can include being located low down or behind the steering wheel. The inconsistent designs of the driving environment across different vehicles mean people need to learn where everything is located each time they use a new car, which makes it difficult to use another car spontaneously and feel safe.

People reported feeling unsafe, particularly when using controls while driving if they needed to move to see and reach buttons. As well as anxiety around being able to get out of the vehicle quickly if needed (feeling trapped). Feelings of confusion and frustration trying to find or use controls and coping with discomfort and pain whilst driving increased the feeling of being unsafe for many.

Semi-automated or automated controls such as cruise control, lighting, wipers and reversing cameras were seen as hugely beneficial new technologies that increase accessibility. What other functions could be automated or semi-automated to improve this even further.

18% of those people reporting travelling as easy mentioned 'technology and automation' as the main reason e.g. automatic transmission, cruise control, automatic lights and windscreen wipers, lane assist, blind spot alerts and parking cameras all making driving less onerous.

Improving visibility/usability of controls and buttons focusing on simplicity, size, contrast and tactile elements.

18%

of those people reporting travelling as easy mentioned 'technology and automation' as the main reason

"It's not very safe to be looking at a screen [rather than feeling for dials] when you're driving - I have limited movement so I have to move my whole body round to see the screen"

Storage of equipment and luggage

Getting equipment in and out as well as storing and securing personal belongings and luggage

Often people need assistance getting equipment or luggage in and out of their vehicle because they cannot do it independently. They don't have the strength, mobility or dexterity to easily lift items into the car. This is also more difficult for wheelchair users who cannot reach into the car from a seated position.

The 2nd most difficult experience disabled people have when using cars is 'getting equipment in and out with 31% of survey respondents reporting this as difficult or very difficult.

There is an assumption that the boot is the main storage area, but some people can't access the boot and so they use the back seat, foot well or passenger seat.

There are not suitable solutions to support items stored on seats as they can fall off seats and onto the floor and become impossible to retrieve.

31%

of survey respondents reported difficulty getting luggage or equipment into the car

"It would be nice to have a dedicated space for my crutches, somewhere that is secure, out of the way but that I can reach easily."

"My walking stick has to go in the rear seat footwell which is not ideal [because it is hard to reach and it sometimes gets stuck]."

Specific storage solutions for mobility aids such as walking sticks and crutches are not provided as standard.

40% of those people who reported getting luggage and equipment (mobility aids) in and out of their car as difficult mentioned ‘car boots’ as the main reason. People found it difficult to get things into the car due to challenges such as not having enough space in the boot (or car in general), lifting items over the sill of the boot, the boot or car seats being too high to easily lift items onto, and facing difficulty in closing the boot, particularly if it is not automatic and too high or heavy to manage easily.

Level access into the boot can make loading items easier than if there is a boot lip or sill that people have to lift items over. This is more common in larger cars (SUVs, estates), but less common in smaller cars with lower boots.

of those people who reported getting luggage and equipment (mobility aids) in and out of their car as difficult mentioned ‘car boots’ as the main reason

We want to re-imagine vehicle interiors, to maximise space and allow more flexibility in how the space can be configured and used to meet individual needs.

“The boot is high to get things in - I actively avoid doing this and get another person to do this. Having a low boot helps, it is an easier height to lift stuff in and you don’t need much strength.”

What does this mean for disabled car users?

Top level insights

- People often need assistance to use their cars and can have difficulty seeing, reaching and using features creating a lack of **independence**
- People regularly travel with **discomfort** and pain
- People feel unsafe or vulnerable which affects their **confidence** and can change their behaviour, leading them to drive or travel less

When we think about the impact of a product feature, design solution or challenge it can affect people in two ways.

1. Physically, causing discomfort, or pain
2. Psychologically creating frustration, confusion or affecting their emotions (low mood, anger, sadness)

This impacts someone's ability to use the vehicle effectively, safely, or even at all.

People respond by changing their behaviour (adjustments, compromise, planning, not doing something etc). They change their behaviour because there is no alternative.

We want to change that.

Improving disabled people's access to transport widens access to healthcare, employment, education, and social activities as the Motability Foundation reports[4] demonstrate. Critically, it highlights how disabled people must have a voice in the decision-making process, informing transport policy makers in the early stages of transport infrastructure, product, and service development, making accessible vehicle design critical for the future of private transport.

[4] Source: https://www.motabilityfoundation.org.uk/media/gz1berkp/12519_est-report-updates_v1.pdf

It's quite a process just to get into the car. I'm already exhausted by then [and my shoulders won't last forever doing this]."

What happens next?

We will continue to work with disabled people and engage with the car industry to imagine new solutions to create more accessible and inclusive cars whilst showcasing existing best practice design for better access.

By developing and testing new ideas with disabled people and industry we can create feasible solutions that meet disabled people's needs**.**

We will provide open source guidance and design examples that inspire industry to approach design from a new angle.

By looking with a fresh perspective at how vehicles are designed with disabled people's needs front and centre, there is huge potential to deliver better cars for everyone.

We will continue to work with the Motability Foundation to engage with disabled people and the car industry to imagine new solutions for accessible and inclusive vehicles whilst showcasing existing best practice design for better access.

Accessibility is sometimes considered a 'nice to have' but the commercial benefits are often overlooked. One such example is Voice Assist, such as Siri or Alexa. Originally designed in the 1990s, it was created for visually impaired people to produce written documents and save/open them merely by speaking. Today, its easy-to-use hands-free technology is used by a reported 52% of internet households making it a very inclusive design, far greater than its initial intended audience.

Working together

How might we work together to increase **comfort**, build **confidence**, provide **safety** and enable greater **independence**? How could we support people to find and have access to vehicles that best meet their needs?

- Adapt vehicle design so more people can use cars independently
- Consider vehicle design from an 'accessibility first' perspective
- Prioritise practical features over nice to have extras
- Reimagine spaces and storage solutions within the car to better meet the needs of people with accessibility challenges

Acknowledgements

Thank you to all those who have supported the project to date:

Participants

The disabled people we meet are the experts of their lives and how they use their cars. Their continued involvement in this project is essential to create and deliver solutions that have the potential to change their lives.

Industry

We will also engage with the industry to understand the landscape in which they operate and where accessibility improvements could be made in the design and manufacturing process. Ensuring solutions not only meet the needs of disabled people but also the practical requirements of industry to stimulate real-world change and lasting impact.

Thank you to everyone who has shared their time and experiences with us.

Additional thanks go to:

RiDC for supporting design, administration and high-level analysis of the discovery survey

Driving Mobility for sharing expert knowledge of disabled people's experiences of using cars

Motability Operations for sending a survey to 9,000 Motability Scheme customers and providing an overview of the adaptations market

CALLUM for providing industry knowledge/perspective at a top level to gain insights into how the car industry works

Get involved

If you have insights to share or want to be involved in this project going forward, please scan the QR code or email **innovation@designability.org.uk**

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