

## ZERO CARBON RUGELEY

### WP17-D2: USER ENGAGEMENT - SIMULATED AV TRIAL & MaaS TRAVEL APP

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## Executive Summary

This report details the data collection methodologies and findings from two workshops held as part of the Zero Carbon Rugeley project, to explore user perceptions of autonomous vehicles (AVs), Mobility as a Service, and journey planner apps. One workshop, run twice, focusing on autonomous vehicles was held with Keele University staff and student participants and included a range of activities to explore perceptions around autonomous vehicles and included a ride in a simulated AV. A second workshop was designed for participants from Rugeley. This workshop explored perceptions of autonomous vehicles as well as Mobility as a Service and journey planner apps.

Key findings from the workshops include:

- Perceptions of autonomous vehicles are diverse, in part reflecting individuals' backgrounds and prior knowledge. For those less knowledgeable, autonomous vehicles were perceived to be futuristic, but personal experience of an autonomous vehicle during the workshop demonstrated that they are not as futuristic in terms of technology as had been initially perceived.
- Concerns about AVs were diverse ranging from concerns over the ability of AVs to respond to any circumstance and whether this response would be better than a human driver, ethical concerns over training the artificial intelligence in different scenarios, cyber security and hacking concerns, through to concerns about the wider implications to society such as the loss of skilled driving jobs.
- The workshop highlighted new benefits and uses of AVs that many had not previously considered, and shifted views away solely from thinking about AVs as individually driven car replacements, to their role in wider mobility services. For many strong benefits for AVs existed in social inclusion, and improved mobility for those without the ability to drive a car, and these potential benefits for some offset some previous concerns. The personal experience of the AV during the workshop for some helped participants to see the potential for AVs.
- The discussions of Mobility as a Service and Journey planner apps highlighted the potential for these services within the town of Rugeley to address some of the existing mobility issues within the town.

Overall, these workshops highlighted the benefit of engaging with users around new technologies to help increase understanding of users, but also to increase understanding of diverse perspectives of technical teams working on the development of these technologies.

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## 1. Introduction

This report summarises research conducted by Keele University in collaboration with Conigital and Connected Places Catapult into user perceptions of Autonomous Vehicles (AVs), Mobility as a Service (MaaS), and Journey Planner Apps as part of the InnovateUK funded Zero Carbon Rugeley project. The data informing this report was generated through two workshops that took place on Keele University Campus in March 2023. Workshop 1 focused on Autonomous Vehicles and involved Keele University staff members and students. Workshop 2 focused upon MaaS, Journey Planner Apps, and Autonomous Vehicles, and involved Rugeley community members.

## 2. Workshop Design

### 2.1 Automated Vehicle perceptions workshop

This workshop was designed to understand participants' perceptions of Autonomous Vehicles both before and after they experienced a ride in a Simulated Autonomous Vehicle. The workshop structure consisted of four distinct sections: 1) initial perceptions activities; 2) deep dive into AVs and AV ride; 3) ride debrief; and 4) final perceptions. The workshop had a duration of two and a half hours and was conducted twice in one day. A total of sixteen participants who were Keele staff and students took part across the two workshops. Participants were incentivised to attend with a £10 supermarket voucher to encourage a breadth of attendees.

#### 2.1.1 Initial perceptions activity

This activity began by asking participants how much they felt that they knew about Autonomous Vehicles by completing a 'knowledge line up'. Participants were asked by the facilitator to mark on a scale between one and ten their current knowledge levels, with ten being 'loads' and one being 'nothing' (figure 1).

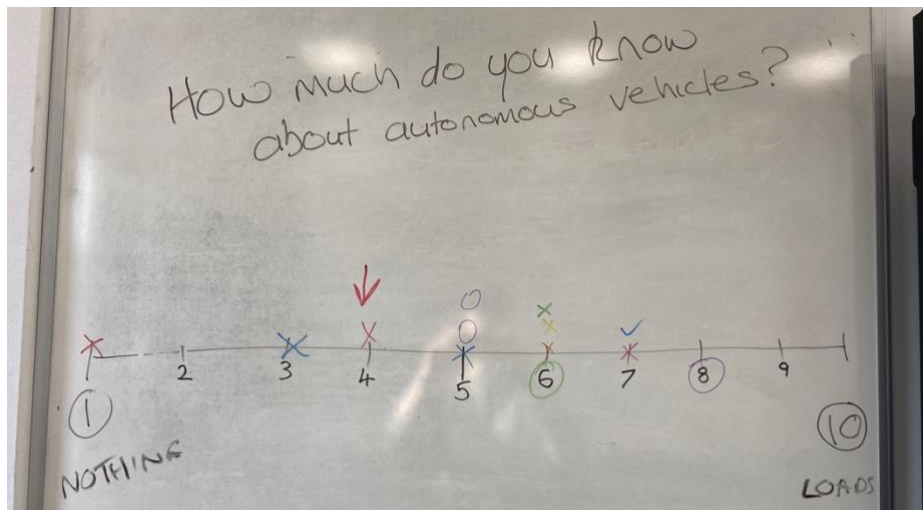


Figure 1: How much do you know about Autonomous Vehicles activity (2<sup>nd</sup> workshop)

Participants were then handed three post-it notes each and asked to write down the first three words that came to mind when they heard the term 'Autonomous Vehicles'. Once they had written down three words the participants were asked to stick their post-it notes in themes as a group based upon what everyone had written (figure 2). The facilitator then led a discussion about the themes that the participants had identified through grouping the post-it notes together in order to explore the reasons given for different words.

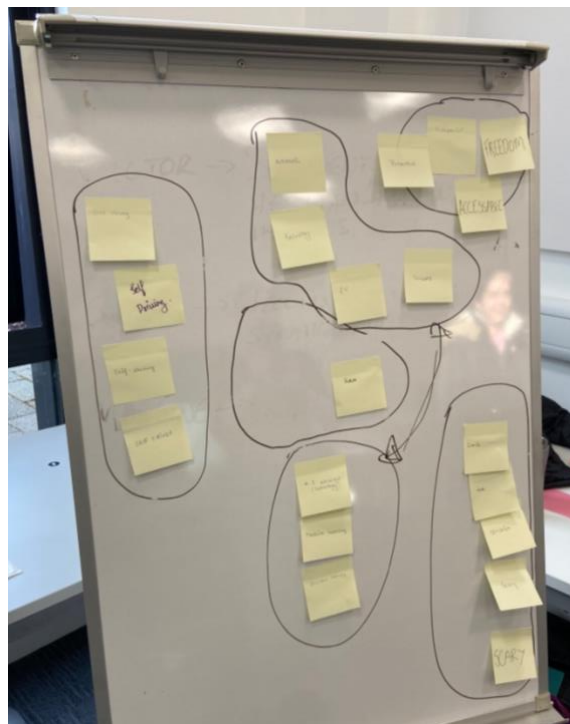


Figure 2: First three words post it note activity.

### *2.1.2 Deep dive into autonomous vehicles activity*

This activity began with a 30-minute talk about autonomous vehicles being delivered by Conigital staff members with the opportunities to ask questions. Following this, participants were split into pairs and began rotating around five different activities, spending ~15 minutes at each station, with a facilitator also present at each station. These activities included three flip charts (figure 3) each with one of the following questions written on it: i) What are your concerns about autonomous vehicles and where have these concerns come from? ii) What do you view as the benefits of autonomous vehicles? iii) What features would like autonomous vehicles to have? Station number four used a blank oversized monopoly board to encourage participants to think about how autonomous vehicles could play a role in their current travel routines (figure 3).



upon their experience in the vehicle. The audio from each debrief conversation was recorded and transcribed.

#### *2.1.4: Final perceptions*

To close the workshop participants were asked to write one key thing that they had learnt from the session on a post it note, and one key remaining question that they had on another post it note. Participants were then asked to return to the knowledge line up from the beginning of the workshop and mark where they now felt that they were on the scale one to ten, one being 'nothing', and ten being 'loads'.

## 2.2 Mobility as a Service, Journey Planner Apps, and Automated Vehicle Perceptions workshop

This workshop was designed to understand participants perceptions of Mobility as a Service (MaaS), Journey Planner Apps, and Automated Vehicles. The workshop consisted of four distinct activities: 1) Initial perceptions activity; 2) Journey planner app 'talk aloud' 3) MaaS in Rugeley, AV ride and debrief 4) Final perceptions. This workshop had a duration of two and a half hours and involved four participants who were residents of Rugeley, and were part of a group of 'Community Ambassadors' who had been heavily involved in other user engagement activities throughout the Zero Carbon Rugeley project..

### *2.2.1 Initial perceptions activity*

This activity began by handing the participants three post it notes each and asking them to write down the first three words that came to mind when they heard the term 'Autonomous Vehicles'. Once they had written down three words the participants were asked to stick their post it notes in themes as a group based upon what everyone had written. The facilitator then led a discussion about the themes that the participants had identified through grouping the post it notes together. Participants were then asked how much they felt that they knew about each of i) autonomous vehicles, ii) MaaS, and iii) journey planning apps by completing a 'knowledge line up'. Participants were asked by the facilitator to mark on a scale between one and ten their perception of their current level of knowledge, with ten being 'loads' and one being 'nothing' (figure 5).

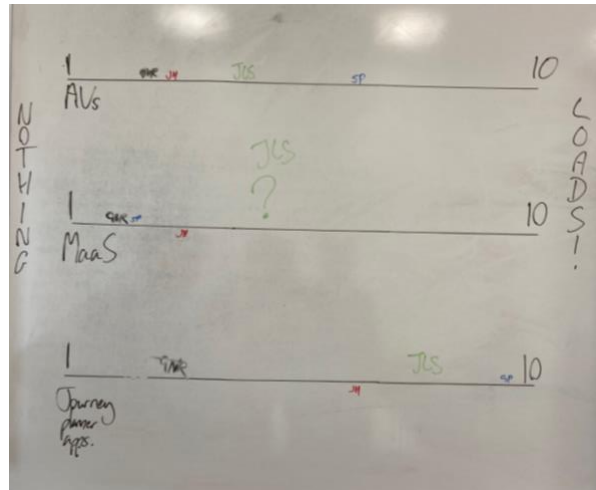


Figure 5: Knowledge line up for current levels of knowledge at the start of the workshop on i) autonomous vehicles, ii) Mobility as a Service, iii) Journey planner apps

### 2.2.2 Journey planner app 'talk aloud' activity

This activity began with a thirty-minute talk and fifteen-minute Q&A delivered by project partners Conigital and Connected Places Catapult staff about Mobility as a Service and Journey Planning Apps. Following this, participants were asked to take part in a 'talk aloud' activity individually using the Journey Planning App 'ConApp'. Participants were asked to talk their thoughts out loud whilst using the app to plan two journeys, one from Keele University to Rugeley, and another from Keele University to somewhere that they travel to regularly. Participants were also encouraged to explore other features of the app. Audio was recorded from each participant during this activity and subsequently transcribed.

### 2.2.3: MaaS in Rugeley, AV ride and debrief

For this activity, the four participants were split into two groups. Group 1 had an opportunity to have a ride in the Simulated Autonomous vehicle and speak to Conigital engineers. Whilst this was taking place Group 2 took part in a 'MaaS in Rugeley' activity. This involved participants being presented with a map of Rugeley and asked to annotate the map with post it notes reflecting on how MaaS, Autonomous Vehicles, and the ConApp could be used in Rugeley (figure 6). A Keele researcher supported the group with this activity by discussing the questions with them. Once Group 1 returned from their AV ride they took part in a debrief conversation with a Keele researcher from which the audio was recorded and subsequently transcribed. Group 2 then took part in the AV ride, and Group 1 took part in the 'MaaS in Rugeley' activity. Once Group 2 were back from the AV ride and completed the debrief, they also joined in on the 'MaaS in Rugeley activity'.





### 3. Findings

The results from the two workshops are split into two sections, the first presenting data from Workshop 1: AV Perceptions, and the second presenting data from Workshop 2: MaaS, Journey Planner Apps, and Automated Vehicle Perceptions.

#### 3.1 Workshop 1: AV perceptions findings

This workshop was conducted twice with two groups of Keele staff and students. Nine participants took part in the first session, seven participants took part in the second session, with a total of sixteen participants. The results for both groups are discussed separately, identified by 'Group A' and 'Group B', and presented by activity.

##### 3.1.1: Initial perceptions activity

Figure 8 presents the results of the initial perceptions from the 'knowledge line up' for Group A. Collectively Group A felt that they had a low level of knowledge regarding autonomous vehicles, with all participants placing themselves between 1 and 3.

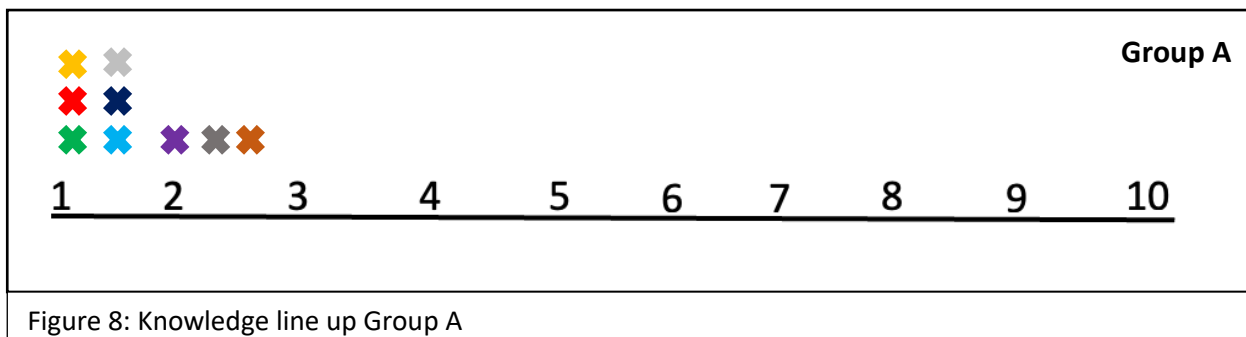


Figure 8: Knowledge line up Group A

Figure 9 presents the results of the initial perceptions from the 'knowledge line up' for Group B. The responses from this group were more dispersed in comparison with Group A, with one person placing themselves on one, one on three, one on four, two on five, and two on six. Collectively this group felt that they had a relatively high level of understanding of autonomous vehicles. In this group there were a number of students who were studying Data Science and had covered autonomous vehicles in their course, and another student who expressed a strong interest in all things to do with cars.

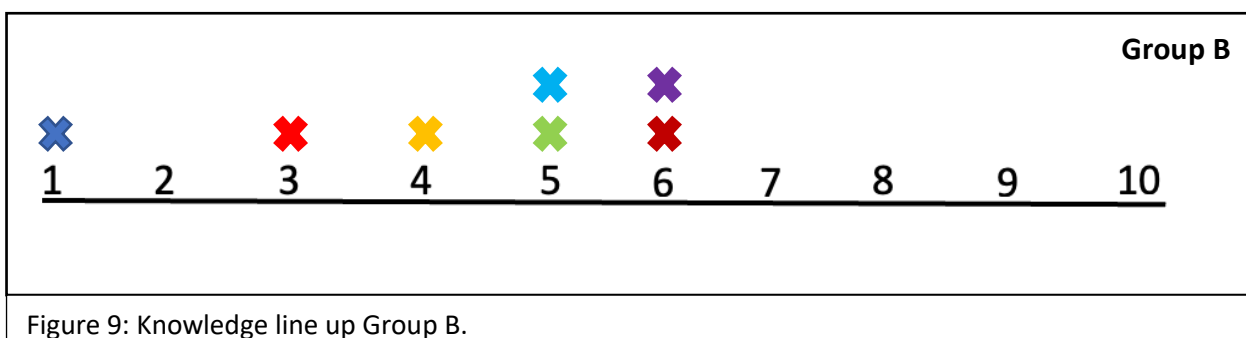


Figure 9: Knowledge line up Group B.

Table 1 presents the responses of the ‘first three words’ post-it note activity from Group A. The responses are categorised by the themes that the group identified. The most common response amongst participants was the view that Autonomous Vehicles were perceived as ‘futuristic’. The safety of Autonomous Vehicles was also identified by the group, with the words ‘dangerous’ and ‘scary’ chosen.

Table 1: Group A ‘first three words’ post it note activity in the groupings given during the group discussion						
Interesting	Autopilot	Efficiency	Dangerous	Wheel	Futuristic x2	System change
Cool	AI	Electric	Scary		Future	Jobs
	Robot	Smart	Safety x 3		Sci-fi x 2	
	Robotics				Technology x 3	
					Camera	
					Spatial awareness	

Table 2 presents the responses of the ‘first three words’ post it note activity from Group B. Whilst safety was also a concern for Group B, their responses centred more towards the AI and technology involved in Autonomous Vehicles and ‘self-driving’ as a synonym for autonomous vehicles, rather than viewing it as a ‘futuristic’ technology. In addition, Group B felt that Autonomous Vehicles represented independence, freedom, and accessibility.

Table 2: Group B ‘first three words’ post it note activity				
Self-driving x 4	Potential	Limits	AI	Future
	Independent	Risk	Machine learning x 2	
	Freedom	Unsafe	Automatic	
	Accessible	Scary x 2	Technology	
			Sensors	

### 3.1.2: Deep dive into autonomous vehicles activity

This section presents the data generated from the ‘Deep-dive stations’ that explored the following questions: What are your concerns about autonomous vehicles and where have these concerns come from? What do you view as the benefits of autonomous vehicles? What features would you like autonomous vehicles to have? How could autonomous vehicles play a role in your current travel routines? The data is presented by category of benefits, features, concerns, and travel routines, for both groups A and B.

### **Benefits of autonomous vehicles**

Table 3 presents the perceived benefits of autonomous vehicles by Group A. These have been categorised by the Keele research team into four themes: 1) benefits to people; 2) benefits to mobility; 3) technical benefits; 4) safety benefits. Participants felt that autonomous vehicles could support social inclusion and prevent isolation by providing improved access to mobility. Participants also identified several improvements to general road traffic, improving traffic flow and reducing journey times. Several safety benefits were also identified, particularly within removing human error as a factor of accidents.

<b>Benefits to people</b>	<b>Benefits to mobility</b>		<b>Technical benefits</b>	<b>Safety benefits</b>
Prevent isolation	Traffic reduction	Efficiency + cost	Customisation (choose driving style)	Reducing risky drivers (distracted, drunk etc.)
Social mobility	Traffic flow	Public transport	Works well with current infrastructure	Less chance of accidents
Better morning routines	Transporting groups	Better spread of transport (time)	Car to car communication	Driving in poor weather conditions
Stress reductions	Carpooling	Time efficiency	Retrofitting	Emergency vehicles
Easier to learn to drive	Plan alternative routes		Priority system (pay more for you to take priority in traffic)	Driving with health problems (having heart attack etc)
Disability assistance				

Table 4 presents the perceived benefits of Autonomous Vehicles by Group B. These have been categorised by the Keele research team into three of the same themes: 1) benefits to people; 2) benefits to mobility 3) safety benefits, and a fourth theme of environmental benefits, instead of the technical benefits discussed by Group A. Similarly to Group A, Group B identified Autonomous Vehicles as improving social inclusion particularly for elderly people and people living with disabilities. Group B also felt that autonomous vehicles could reduce private car ownership, and one participant felt that autonomous vehicles could be 'Eco-friendly' if they were electric. This group also identified that there were potential disbenefits associated with some benefits, for example a reduction in driving jobs.

<b>Benefits to people</b>		<b>Benefits to Mobility</b>	<b>Safety benefits</b>	<b>Environmental benefits</b>
Help with isolation	Save money learning to drive	Reduce need for private car	Better moral decisions, 9/10 depend on training	Eco-friendly if EV

Good for elderly people	Multi-purpose e.g., working in the car	Replace long haul journeys	Reduce accidents, know what to do, humans might not.	
Improves quality of life	Getting home when drunk or impaired	Driving quicker, humans process slower, reduce congestion.	Safety	
Good for people with physical disabilities	If new to an environment, helps finding way around without dependence on google maps	Don't have to depend on people for transport	No road rage	
Social benefits	Job dependency, replace unhealthy driving jobs, but reduce number of jobs.		No human error	

### ***Features of autonomous vehicles***

Table 5 presents the features that Group A would like to see on Autonomous Vehicles. These features ranged from those where there was a focus on what else could be done in a vehicle while other features related to safety concerns and practicality.

Wifi + Bluetooth, place for laptops.	Subscription service	AV Communication	Anti-travel sick	Commercial van
Netflix	Affordability	Approved driver system	App requests / summoning vehicles	Cargo space
Entertainment screen	Reliability	Safety	User friendly 'scenic route' vs efficient	Adaptable
Override (big red button)	Space			

Table 6 presents the features that Group B would like to see on Autonomous Vehicles, which covered similar sorts of features to those identified by Group A.

Childcare facilities	Solar panels	Regular service running later	Storage space
Dog function	Cameras inside	Better response time	More space
		Delivery infrastructure	Larger cars
			All terrain
	Entertainment features	Hybrid engine	

Maintain dual functionality (keep steering wheel)	Automated lights	Escape features	Wheelchair accessible
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**Concerns about autonomous vehicles**

Table 7 presents the concerns identified by Group A. These concerns were wide ranging from indirect concerns such as forgetting how to concerns about personal data, safety related concerns (robotics malfunctioning) and practical concerns about prices, costs, as well as the time of development.

Forgetting how to drive	Lack of knowledge (drivers)	Habits	Losing control	Losing human contact
Height restrictions	Habits (comfort zone)	Stealing software and car parts	Human control	Community benefits
The weather	Open environments	Family protection	Accountability (driver side)	Interference with sensors
Humans, animals (unpredictability)	Babies on board	Space in the cars (when there are more than one person)	Babies on board	Personal data
Prices	Costs	Robotics (malfunctioning)	Software	Hacks in software
Distribution (jobs/people/money)	Parameters	Passenger responsibility	Time of development	

Table 8 presents the concerns of Group B, which also include indirect concerns such as ‘making people lazy’ and the effects on jobs, to safety and cyber security concerns, to practical concerns such as insurance.

Make people lazy	Parking sensors	Insurance	Response time	Hacking
Society	Jobs	Safety	Ethics	Theft
Insurance				

**The role of autonomous vehicles in current travel routines**

Table 9 presents the thoughts of Group A regarding how autonomous vehicles could fit into their current travel routines, across work, education, and leisure. A fourth category was added ‘other’ to bring together general thoughts and comments made by participants. As the participants were all staff and students at Keele University a number of the suggestions related to how autonomous vehicles could be used in a higher education setting.

<b>Work</b>	<b>Education</b>	<b>Leisure</b>	<b>Other</b>
AV learn your favourite route	Centralised carpool system for staff and student.	AV option to suggest the 'scenic route'	Co-op not for profit opportunities
Care sector: Home visits for health care workers	Are car rides more personal?	AV to suggest new destinations	Unreliable public transport
Greater job access	Primary school AV bus DRT	Repetitive journeys i.e., airport shuttle	Time and reliability
Large spaces such as factories	Micro journeys around campus	Can you drink and ride AV?	Needs to be cost effective
Positive to remove the cost of personal commute (car)		Holidays: help people access new places	Spatially dispersed rural areas
Short distance rides for staff onto uni campus		Alton Towers and Trentham is a minimum of two buses currently	Increased social mobility
AV minibus for field trips		Mixing uni societies and connecting local universities	Kona doesn't look ready due to sensors and wires
Pedestrianise the campus for park and ride.		Fill in the gaps of public transport	Identification of riders?
		AV means you get to see more instead of driving	Can't picture AV's replacing personal cars, certain comforts to owners.
		Remove the burden of focus that driving requires	

Table 10 presents the thoughts of Group B regarding how Autonomous Vehicles could fit into their current travel routines. The responses are separated into four themes of 'work', 'education', 'leisure' and 'other', with 'other' categorising general thoughts and comments made by participants. In addition to thinking about personal travel across the different areas of work, education and leisure, participants also identified some additional uses of Avs for example in delivery of packages.

<b>Education</b>	<b>Work</b>	<b>Leisure</b>	<b>Other</b>	
Easy way for children to get to and from school.	Increased accessibility increases access to employment	AV help unconfident drivers in unfamiliar places	Start with automating public transport	Use AV for university campus open days

Journeys from SU to lectures	Fill gaps in bus service	Drive for longer and able to drink alcohol	Humans should always be able to take over control	Cars should be hybrid, problem with lithium batteries.
Under 18's in the car on their own, safer than taxi.	AV gives back time for prep work on commute	Safety of getting home after a night out	Generation gap, young people familiar with tech.	Car provides independence, bus better for longer journeys.
	AV delivery service, small packages	Hangover and don't want to drive, safe way home.	DRT makes transport more accessible.	AV helps with concentration and tiredness
	AV respond to different routes based on popularity	Vacations, not arguing over who has to drive	Helps with new environments	AV has the potential to respond to danger
	Small AV for short journeys around campus			

### 3.1.3: AV ride debrief

This section presents the results from the debrief conversations with each pair of participants following their simulated AV ride. The results are separated into Group A and Group B.

#### **Group A**

Drawing on the discussions in Group A the following themes were drawn out of the data and are explored in more detail below: 'scary', safety, less futuristic, wider mobility uses, generation gap, practicality, reflections on experience.

#### **Scary**

A small number of participants described the vehicle as 'scary'. This generally was not a reflection of their actual experience in the vehicle, but more stemming from wider concerns about autonomous vehicles. For example, participant 9 described the removal of a driver as 'unnatural':

*It just takes away the user input. It also makes me think about the safety of it all, because I do quite like the user inputs, actually. That is what keeps me safe, in my mind. There's a positive and a negative with everything, I think, [unclear] with this kind of thing. That's the battle I'm having, because we are trained with manual vehicles. And to give up that responsibility that we have when we're behind the wheel is really unnatural and weird [unclear] to me. (P9)*



In addition, participant 5 highlighted that upon seeing the vehicle, they felt that the layout and technology was too complicated:

*Just, again, looking at the layout and stuff, it just seems really complicated and it just seems like a lot. It's like... I don't know. It just seems scary to me. That's something that I just thought of. It's just how I felt a bit. (P5)*

## **Safety**

The perceived safety of the autonomous vehicle was a common point of discussion, with participants sharing a wide range of views. For example, safety concerns were raised regarding the competency of the AI technology, as well as how insurance and blame is worked out for AVs:

*I think there's still that safety from the point of view, one, I know robotic things and automated things can go wrong. It might suddenly decide to shoot into a wall or something. (P2)*

*So, yes. And then safety. I do think a lot of the time about, well, yes, what if something does go wrong? And how do you sue a company? What works in that respect? And what are the risks there? (P3)*

Furthermore, several participants commented on the amount of equipment in the car, particularly within the boot, with one participant expressing that they felt that this could present a fire risk:

*I was going to say risk of fires. With that much extra wires and stuff and technology, there's just a much higher risk. Because if it was to overheat or something, then all of that would affect everything else and then... (P6)*

One participant reflected on the slow speed of the car during their ride and commented that different uses of the vehicle may present different risks. For example, participant 2 was concerned with what risks may arise at faster motorway speeds:

*If it was going to be used for a more domestic situation, then it would need to be able to drive at motorway speeds. And obviously, that's got a whole different range of issues that you might need to think about (P2)*

Within concerns for the safety of the vehicle, participant 7 believed that driving an automated vehicle should require specific training due to the additional technology in the vehicle:

*There'd have to be some levels of competence in all the driving tests, you would think, or some sort of competence, which then get issued with a card that says, you can drive an AV vehicle, because there's a lot of technology to absorb. (P7)*

Although several participants raised concerns about the safety of the AV, participant 9 felt that the safety and role of AVs is impeded by the presence of none AV vehicles. They believed that AVs would benefit from only sharing the road with other AV's.

*We're concerned as well, weren't we, about this being one AV on the road, but the rest will be manual drivers on the road, and it'll only really work if all the cars on the road were AVs, because that's when the traffic management systems come into play. Congestion is gone. It won't happen yet until all the other vehicles are AVs. It's made me think about a lot of things, actually. (P9)*

### **Less futuristic**

A theme identified from three participants was the belief that the AV was 'less futuristic' than they had imagined. Several participants commented that they had viewed autonomous vehicles as a futuristic technology that reminded them of sci-fi films. However, upon experiencing the vehicle, they came to the realisation that the vehicle was closer to a typical vehicle than they had pictured. This was generally viewed as positive, with the familiarity of the vehicle enabling participants to picture how the vehicle could be useful to them:

*...it wasn't actually as futuristic as I thought. I suppose, really, you were having that image of sci-fi films. But actually, I can see from the conversation we've had that in a controlled environment, it actually could be a very useful tool (P2)*

*Started off thinking, cool, future sci-fi. And then it quickly changed to, oh, this doesn't feel too different. This means I could now sleep in the back, which means it's still cool, but in a slightly different way. (P3)*

Similarly, participant 9 commented on how the technology that they had seen in the car was no more futuristic than the technology they are familiar with in smart phones. This was viewed as positive due to the 'comfort' that this technology already exists:

*The technology that's in that car is the same technology that's in your mobile phone...To think it's simply down to these basic things that we have. The technology is already there, and it's quite readily available...And I do find comfort in these things that are readily available. (P9)*

### **Wider mobility uses**

During the debrief conversation, several participants reflected upon how the experience of the vehicle and the opportunity to speak to the engineers and the talk given by a member of Conigital staff had helped them to picture broader mobility uses for the AV. For example, participant 1 reflected on how they initially viewed AVs as driving one person to one destination, whereas after experience of the vehicle, they viewed the AV as having potential uses in public transportation:

*When you first thought about an autonomous vehicle, I thought about one person sitting and me driving to work. Having listened to the talk today, it seems like it's going to have a lot more benefit in multi-passenger uses, as in on airport buses, as in buses in cities (P1)*

Similarly, participant 8 reflected on how experiencing the AV helped them to picture how the vehicles could be useful on the Keele University campus. They felt that the vehicles could provide a carpool service for local staff members that, crucially, organises who is being picked up and decides the route that is needed. Participant 8 felt that this would remove the logistical challenges and organisational difficulties that they had faced within previous attempts at organising a carpool scheme:

*One of the things that we did discuss was having a kind of carpool. So, for example, if you run a scheme at Keele, and Keele owned those automated vehicles, could HR, who have everyone's addresses, calculate what's the best way to carpool? And say, right, this car is*

*going to... Vehicle number one is going to pick you up at this time, and then it's going to pick this person up, and then you're going to get to Keele. (P8)*

Participant 3 shared a similar view, commenting positively on the potential of AVs, and highlighting that they felt that AVs would be most useful in semi-controlled environments:

*I think I would be fairly pragmatic in saying that AVs, it's a pretty realistic future mobility option. And that, yes, I think it, yes, certainly can be useful, really. Like semi-controlled environments. And as they're used in semi-controlled environments, and learning's happened, occurred in those environments, then I see them... They'll be pretty suitable, I think, for, yes. (P3)*

Participant 8 highlighted that they were particularly interested in how existing vehicles could be retrofitted with AV technology so that the technology could be more accessible. They felt that this could be valuable in retrofitting public transport vehicles:

*They said they could retrofit, which means we could put it onto all kinds of transport. Especially public transport, which would mean people would be able to get around a lot easier. And it could really help people just get to where they need to be, maybe a lot safer, or a lot easier than they would have been, possibly. (P4)*

Finally, participant 9 reflected on how experiencing the AV enabled them to picture how the vehicle could be useful within their own travel habits. For example, they commented on how it could remove the 'dread' of having to drive on long motorway journeys:

*The drive is something we dread doing, and it puts us off going down there as often. But if there was a vehicle that did that for you, take you from door to door, that will just take away the stress of the drive, and you can just start enjoying your time straight away. It's made me think more about how convenient it actually is as well, benefits to having a vehicle like this, especially people who got family four and a half hours away. (P9)*

### **Generation gap**

Amongst participants, AV technology was viewed as a topic that may be more acceptable to younger generations. For example, one participant, who described themselves as young, felt that the technology may be a bit 'alien' to older generations:

*It did look a little bit alien inside, and I wonder for folks, so maybe seniors, who are more technophobes, whether that would be. But actually, I think maybe for myself, I'm fairly young and growing up in this era of technology, that actually, to be honest, it just looks quite normal. It actually didn't look... There was nothing really that dramatic about it (P3)*

Similarly, participant 10 commented that AVs were something 'for the next generation' as they felt that their generation were too familiar with manual cars and that AVs reminded them of the 'Terminator' films:

*That's why I think it's one of the things for the next generation as opposed to our generation, because they'll only ever know AVs. But as we've known manual cars, and we enjoy manual cars, and it's giving it that... Putting your life in the hands of a robot or an AI, that's what brings up the Terminator point and the I, Robot point all the time, and it's not always worked out well in sci-fi. (P10)*

### **Practicality**

Several participants commented upon the amount of space that the technology in the car requires. This was viewed as a negative aspect, with suggestions that this reduces the amount of storage space and also increases the weight of the car:

*Sacrificing boot space. Sacrificing a lighter weight of a car, because all that's going to make it heavier. (P6)*

Similarly, participant 9 felt that the car did not feel 'ready', commenting on the aesthetics and practicality of the technology and sensors that were visible on the car:

*I'd say it's not there just yet. It requires a little bit of polish. I know that was a research and development vehicle [unclear] but the boot space was completely occupied with computers, wires. The roof, it's an eyesore, with all of the sensors and everything on there. Yes, they'll streamline that down, and they'll make it look pretty. (P9)*

### **Reflections on experience**

Overall, the general consensus amongst participants in Group A was that the experience of taking a ride in a simulated AV and seeing the sensor technology was positive. Although there continued to be a range of safety concerns articulated, participants felt that they could picture a use for the AV both in their own lives and wider society, and the experience of seeing and being in an AV helped them to see this potential. The views of participant 7 capture the general view from Group A:

*So, it's made me optimistic about the way forward, because it can solve a number of problems that we didn't think... Or I didn't think had existed almost, before we started chatting. Very impressed, actually, with the potential. (P7)*

### **Group B**

The debrief discussions with Group B participants covered some of the same issues as Group A, but reflecting maybe the different starting point in knowledge of many in Group B, as shown by the different initial knowledge line up, several additional points are drawn out of these discussions. The key issues from the Group B debrief discussions are: safety, practicality, loss of jobs and skills, constraints, and overall reflections on the experience.

### **Safety**

Similarly, to Group A, Group B also had several discussions around the safety of the vehicle. However, Group B provided a much wider range of views regarding safety, and saw AVs as having a potentially positive effect on future road safety. For example, participant 11 felt that the technology within an AV would be safer than humans driving and that a transition to AVs could remove accidents:

*They're totally good things. If every car will be autonomous vehicle, then there will be no accidents. Accidents happen because of the humans. (P11)*

Participant 13 felt that a transition to AVs would also be safer than humans driving because it removes the ability of humans to drive under the influence of drugs or alcohol:

*It will probably be safer to have the machine cars that drive themselves because they're not going to do it when they're under the influence, or high on drugs, or angry, or upset. (P13)*

Participant 15 described how understanding more about the potential for AVs has made them view some of the safety concerns in a different light. Whilst they highlighted that they felt there were negatives associated with AVs, they overall felt that benefits were worth transitioning to AVs for and that they could 'improve society':

*I guess talking about the benefits more, there's clearly just endless benefits to this path. And knowing that there are so many more benefits than I realised makes the scary less significant. Because there are just so many benefits to so many kinds of people, I do think it would improve society quite a lot, even though there are negatives to it as well. But it just makes it less scary knowing how much it could improve life. (P15)*

However, some participants in Group B were concerned with the safety of the vehicle. For example, participants 17 and 13 both expressed concerns over the ability of the AV technology. They both felt that roads can be unpredictable and that they would not trust the technology to react to complex scenarios:

*For the public, it's just there's going to be no awareness. Just the machine and something could go wrong. Because with technology, you're not every time sure that it's going to work the way it is supposed to. It's also because the environment is always unpredictable. There could be something that you're not trained. The worry is always there. (P17)*

*Because there are very complex situations which you can't anticipate. Really bizarre things can happen, and a human could process that, whereas a machine isn't going... Won't have the data available to make a choice. (P13)*

Participant 16 shared concerns with the technology on the vehicle with particular reference to safety around cybersecurity and the potential for the car to be hacked. They felt that the technology could be vulnerable to hacking which could affect the vehicle's ability to perceive its environment:

*I think that will be the major concern for me. Because we asked them out there. Of course, they said they get the data, they train it to work on these data that it's trained to. What if something goes wrong with the security? (P16)*

These discussions around safety highlight the complex and varied nature of safety concerns, and how different individuals may perceive safety concerns in a different light, but also how increased knowledge can help individuals to balance concerns with wider potential benefits.

### **Practicality**

Similarly, to participants in Group A, participant 16 in Group B was concerned with the amount of space that the technology takes up in the vehicle:

*And a lot of wiring work. I think I had to ask, when it's available to the public, if the machines they have behind in the boot, if it's still going to be there. And they said it will be in maybe chips and all of that. I think that was a bit of concern for me because it wouldn't be ideal driving with a lot of that in your boot. (P16)*

This discussion highlights that the AV that the participants were experiencing was still somewhat from likely future versions of AVs.

### **Loss of jobs and skills**

One topic that came up in debrief discussions for some participants in Group B was the wider impact of AVs on society. For example, participant 14 was concerned with the removal of driving jobs for humans. They acknowledged that this could 'free up' time for people, although they didn't necessarily view this as a positive:

*For me it's also the societal risks, and about what kind of society do we want, and how do driverless cars fit into that. And we talked with...about the concerns about impact on jobs, on... If more and more skilled things are being handed over to machines, like skilled driving and so on, what is it actually freeing us up to do? Spend more time on our devices. And why would we want that? (P14)*

Similarly, participant 13 commented that AVs were 'eroding' job opportunities, particularly skilled lorry driving jobs:

*It's eroding the jobs that some people need, because perhaps that's what they manage or that's what they enjoy. Quite skilled jobs in some cases, like lorry drivers. (P13)*

Alternatively, participant 15 felt that it was a positive thing for 'unfulfilling, monotonous' roles such as driving to be taken over by AVs so that people can access more 'fulfilling' roles:

*I guess the argument that comes up quite a lot with AI is just it takes away from human purpose, I guess. And that's one of the biggest worries. But I am neutral on that whole thing. If it takes away from an unfulfilling, monotonous role in your life, the career, then I think it's a good thing. If we can provide more roles that are fulfilling for people, instead of driving, sitting on a tail, I think it's a good thing. (P15)*

### **Constraints on progress**

Participant 12 recalled a conversation with one of the engineers and commented on how they were surprised at the difficulty of mapping new routes for the car to take. Participant 12 felt that there were unnecessary barriers preventing AV technology progressing:

*Because we're using sensors. We're actually mapping the data and the roads. I asked them if we could drive the car in new routes and it's really difficult and complex and they're not sustainable at present. They're not given permissions to try new routes. They should have the maps before. They should have the data (P12)*

### **Reflections on experience**

The reflections on the simulated AV ride were varied in Group B. Some participants, who had greater initial knowledge of AVs, felt that without seeing it in AV (driverless) mode all they were viewing was the sensing technology, and this did not really give them a feeling for being in an AV. While others felt that the AV experience was more positive in that it enabled them to learn more about the technology, and gain reassurance that the correct precautions were being taken to make sure the technology is safe as it is developed:

*I'm less worried now, because I've not... I think it's given me a better understanding of the... That it is happening at a thoughtful pace in balancing the risks and the understanding and the technology keeping up and so on. So that side, that bit of scariness is reduced. (P14).*

### 3.1.4 Final perceptions of AVs activity

At the end of the session participants were asked to reflect on where they thought their knowledge levels were at the end of the session in relation to autonomous vehicles, and to give one key piece of learning and one outstanding question they still have. Figure 10 shows the results from the 'knowledge line up' at the start and the end of the session for Group A. All participants shifted from between one and three on the scale, to between four and six showing a perceived increase in knowledge.

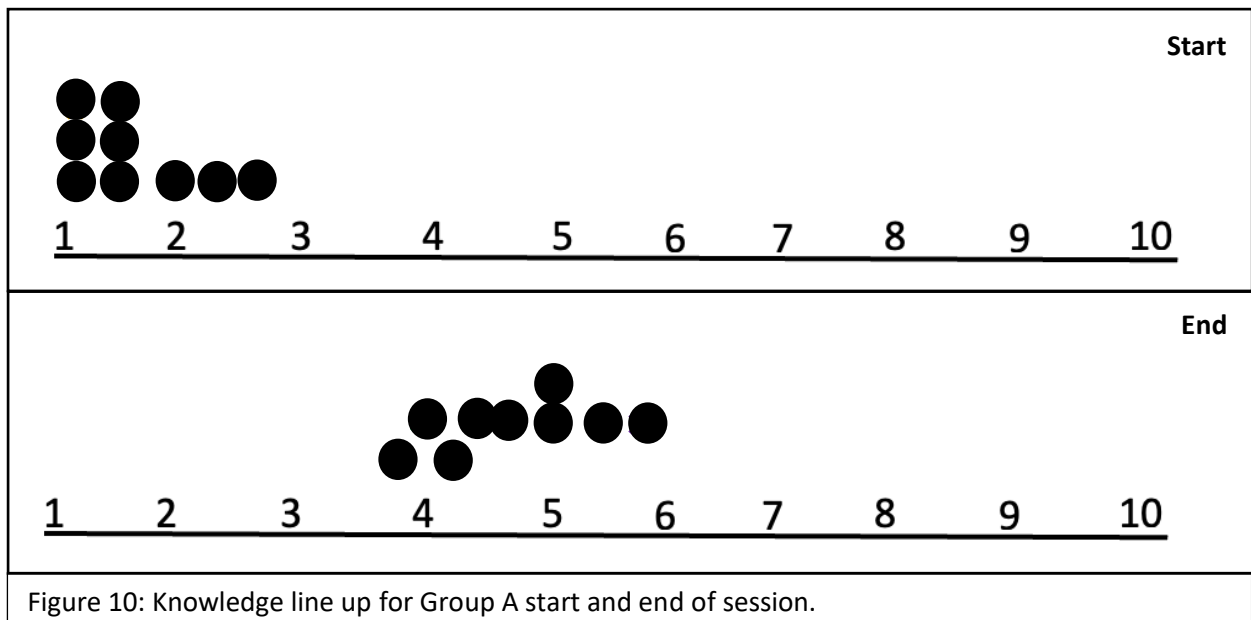


Figure 10: Knowledge line up for Group A start and end of session.

Figure 11 shows the results from the 'knowledge line up' at the start and the loss of jobs and skills end of the session for Group B.

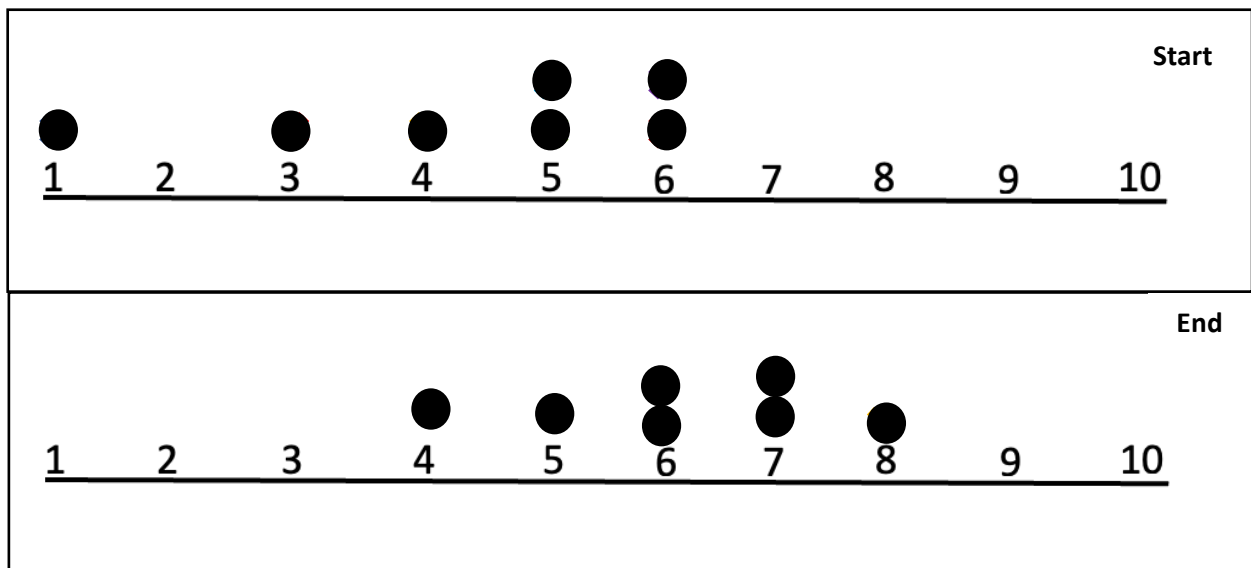


Figure 11: Knowledge line up Group B start and end of session.

Table 11 presents the responses of participants to being asked to provide one outstanding question and one key learning at the end of the session. Table 11 also shows the reason for attendance given at the discussions at the beginning of the session, for each participant in Group A.

Table 11: Group A - key question, key learning, and reason for attendance.		
Key Question	Key learning	Reason for attendance
How long until integrated?	Retrofitting	It sounded interesting and I was free
Why AV not EV?	Learnt more about intended use of AV	Interest in future of transport
Time scale?	Impressive technology	To know more about AV
Accountability?	Big industry and still evolving	It's the future!
How will I be able to afford it?	Alternative uses for AV	Curiosity
Still more info about safety	How it works	It is an industry that is rapidly growing and would be good to have knowledge on it / experience and a cool experience.
Is the car a prototype or the finished product?	Seen first-hand that the technology works using tech that can be found in a mobile phone	Sounded like a fun thing to learn about and do.
Social equity? Poor vs rich, community's vs corporation, Rural v Urban.	Realisticness – it is possible.	Interested to learn about these vehicles as they could be the future!!
Can AV's allow priority in traffic to emergency vehicles?	How AVs communicate with each other	



Table 12 presents the responses of participants to being asked to provide one outstanding question and one key learning at the end of the session. Table 12 also shows the reason for attendance given at the discussions at the beginning of the session, for each participant in Group B.

Table 12: Group B - A key question, key learning, and reason for attendance.		
Key Question	Key learning	Reason for attendance
How is this still better than competitors? What different are they doing? How one will want to choose you?	Based on data mapping.	Interested to experience AV in real time
How much will they roughly cost?	Huge benefit for people with disabilities.	To learn more about AV's
What happens when the data centre shuts down?	Technology advancement.	I love cars and want to know more and more about them.
How efficient are the AVs in regard to making a quick decision?	AVs are in level 4 now	Glimpse the future
By when will this technology be available and affordable for the average person?	It is possible. Give it a chance.	To learn about this relatively new technology
Who is responsible for the cars actions in the event of an accident?	How AV's 'see'	General interest and it looked fun. Want to be able to discuss this knowledgably. My brother in law's car is partly autonomous.
Existing cars or specifically designed cars for AV?		Benefits people with disabilities?
Research on EV batteries used in cars?	.	
Why not accept computer error in the same way we accept human error?		

### 3.2 Workshop 2: MaaS, Journey Planner Apps, and Automated Vehicle Perceptions

This workshop was conducted with four Rugeley residents and 'Community Ambassadors' for the Zero Carbon Rugeley project, who visited Keele University campus for the workshop. The workshop had a duration of two and a half hours.

#### 3.2.1: Initial perceptions activity

Table 13 shows the results of the 'first three words activity'. The results are presented in the three categories that the participants selected.

Table 13: Results of the 'first three words activity'.		
Jetsons	Connected	Scary
Future	Infrastructure	Scary
Sci-fi	Usefulness	Concerning
Robot		

Figure 12 presents the results of the knowledge line up, with three lines reflecting how much participants felt that they knew about i) autonomous vehicles (AVs) ii) Mobility as a Service (MaaS), and iii) journey planning apps. Participants felt that they had the lowest current levels of knowledge regarding MaaS with their scores ranging between two and five. In relation to knowledge of AVs, three participants placed themselves between two and three and one participant placed themselves on seven. The group felt that they were most familiar with journey planner apps with one participant placing themselves between three and four, and the remaining participants selecting seven, eight, and ten.

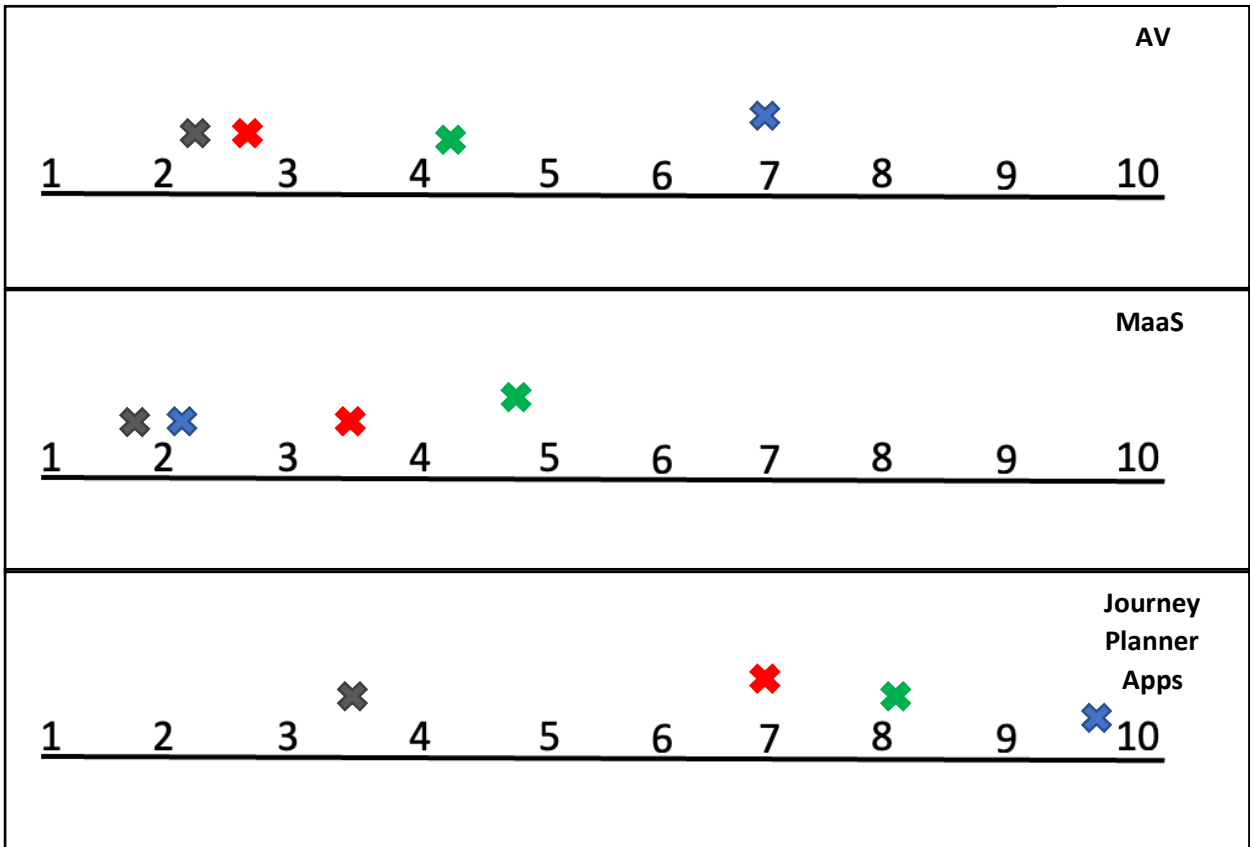


Figure 12: Knowledge line up responses from participants at the start of the session.

### 3.2.2: Talk aloud Journey planner apps

This section presents the data from the 'talk aloud' exercise as participants used the ConApp to plan two journeys. The ConApp has been designed as a journey planning app by Conigital. The discussion below draws out particular points identified through the 'talk aloud'. The key points explored below are: route filter options, the use of symbols, return trip option, points of interest, functionality and user interface.

#### Route filter options

When using the app to plan a journey, participants had a mixed reaction to the filter options for route planning which included the ability to filter journeys on different criteria including time, price, calories and duration. Whilst participant A felt that the range of route options was a positive feature, participant C reacted negatively to the wider choice:

*Interesting as far as the filters. By depart after, price, calories or duration. It's a good range of choice there. And that's around price (PA).*

*Sort by depart after, calories, price, duration. Don't want any of that (PC).*

Similarly, participant B was pleased by the wide variety of route options that the app provides:

*it gives me about 15 different options as well, which is pretty sick. The second one is cycling. It tells me the cost. It tells me that the cycling is going to take me two hours, 16 minutes. But we're going to expunge or get rid of no carbon and we're going to waste 1,840 calories. That's pretty cool. I must have ten different routes (PB).*

Participant A commented that they were happy that the route planner function defaults to show the fastest journey first:

*Proceed. Displaying fetching routes and then route options' map view, which is great. Again, this time, I'll select to oriented by duration and select a round trip. And I can confirm that it has put the shortest duration journey first and the longest last, which is what you want (PA).*

#### Symbols

Two participants struggled to understand what different symbols within the app meant. For example, participant A could not distinguish whether the route they had selected was suggesting a bus, car or taxi. Similarly, participant B did not understand what the symbol representing the pod journey option meant:

*I'll have a look at the routes. I've just scrolled up and I have got, looks like walk 47 seconds. Is that what it means? And then a picture of a man. I'm not sure whether it's a bus, car or taxi. Two minutes, 25. Two miles. Not quite sure what this mean (PA).*

*I don't know what that stands for. It looks like a little bag. What does that mean? I have to call.... Straight away, I don't know what the little bag means. Does that mean I've got to walk somewhere to somewhere else? Whatever that is, that's for two and a half minutes. How do I find out what that little bag with the Wi-Fi location is above it? That's what I don't understand (PB).*

### **Return trip option**

Participants A and B had mixed reactions to the return journey option within the journey planner function. Participant A missed the 'round trip' option and then became frustrated that the app would not provide a return option for them. Alternatively, participant B spotted the round-trip option immediately:

*But to then pull down the top, it's 2:39. I will go for 3:45 in the afternoon. Return date and time should be greater. Actually, it was asking me to select the date and time for the return journey. I hadn't read the top of the screen properly. And now the return tab is selected. By choosing it, that wasn't apparent because it looked like you'd be able to select return yourself and it may automatically calculate. But for me, that wasn't apparent (PA).*

*Just pretty straightforward. I can also change it to a round trip as well. How sick's that? (PB)*

### **Points of interest (POI)**

The POI feature was received positively by both participants A and B. Although participant B initially was unable to find the feature, once they had, they were impressed with the nearby restaurant feature. Similarly, participant A commented that they found the ability to see local services and how the app connected to other online services to be a positive feature of the ConApp:

*What I missed straightaway was the three little lines at the top. I was actually clicking on Evolution International, for instance, or the UAV Hub, and trying to bring those up, but actually it's three little lines at the top left-hand side of the score. It brings me up as Guest User, and it's clearly identifiable as Nearby POI. Scholars Restaurant & Terrace, Chancellor's Bistro. It literally tells me how close it is. It tells me what its score is. Big question is, is can I order a coffee at The Butty Box, Silverdale? Oh, don't do this to me. Call The Butty Box. I'm just going to stop this now and order a sandwich (PB).*

*Actually, an all pretty good experience, I think, because there's more involvement and interaction with other services' service providers. And this can only be a good thing (PA).*

### **Functionality**

There were a number of issues experienced in relation to the functionality of elements of the app. Participant C was frustrated by the route option function not displaying the journey time in twenty-four-hour format:

*Total journey time, three hours 38 minutes. Can I just say having PM, but not .06 23, did confuse me for a minute? I thought I was arriving early in the morning.*

Participant B was frustrated that when selecting to purchase bus or train tickets that the route they had selected in the ConApp was not carried over to the third-party app for purchasing tickets:

*Pick up the bus. 30 minutes and 55 seconds. And that takes me straight through to the option to buy a ticket and accept all cookies. Yes, please. It'd be nice if it remembered my locations though, wouldn't it? The Potteries First Bus service. It'd be nice if it actually remembered my journeys and was able to take this information straight across (B).*

Participant C struggled with the feature of the app that guides users through how to use it. They found the screen going black to be frustrating and restricting them from selecting options that they want:

*What I'm trying to do now is have a look [at] another option, but my screen's black. It just says I can save the selected journey. I can't go back and see if I can find another journey. I just now have a black screen with a little turquoise thing going, save selected journey, which I'm tapping and nothing is happening (PC)*

However, there were also positive comments on some aspects of functionality of the app. For example, Participant B appreciated the depth of the detail provided regarding public transport options. They commented positively that the app provides the bus number, stop location, time, and direction of travel:

*Takes me to the number 85 bus. I appreciate it actually telling me the number of the bus. That stops me getting on the wrong fricking bus. And we've all done that at least once. Number 85 takes 46 minutes. When I click on it, it takes me to a map which is nice and straightforward. It tells me exactly where the bus stop is. Also shows me the rough direction of travel that I'm headed to next (PB).*

## **User interface**

Both participants A and B spoke at length about the intuitive nature of the ConApp. They felt that it was straightforward to use and that the level of information provided about their route options was useful. In addition, they commented positively about the flexibility and choice over what route to select from the range of routes that the app provides:

*Let's go to Rugeley. And let's go to Rugeley power station now. We've got, first, choose the destination, excuse me, Trent valley station. Keele Innovation Centre, it's identified precisely where I am and presented the full address with postcodes. Useful. Displaying fetching routes (PA).*

*I love how straightforward this is straight away. It's simple to use. It's very straightforward. It's all integrated. It allows me to take control, really, of the journey, rather than being at the mercy of timetables and people who don't turn up. And what's nice is I can change this at any moment. If one journey is not working for any reason, if I suffer any issues, I can literally change onto another journey and work out exactly how much it's going to cost me (PB)*

The talk aloud exercise highlighted a number of different aspects of the user experience of using the ConApp to plan a journey with both positive and negative responses to specific aspects of the app.

### 3.2.3 MaaS in Rugeley Mapping exercise

Participants were presented with a map of Rugeley and asked to annotate the map with post it notes reflecting on how MaaS, Autonomous Vehicles, and the ConApp could be used in Rugeley. Drawing on the discussions and written responses, these inputs have been categorised under four headings: 1) benefits to people; 2) desired features; 3) benefits to mobility; 4) journeys in Rugeley. Table 14 presents the data generated during this 'MaaS in Rugeley' exercise.

Table 14: Summary of results from the MaaS in Rugeley exercise			
Benefits to people	Desired features	Benefits to mobility	Journeys in Rugeley
Wider well-being opportunity, encourage travel!	If you can hire the vehicle, it needs to have transport reliability and clear accessibility	Town is small, taking unneeded cars off the road can be easy	Trent valley to town station.
Safer alternative for those who are unconfident or have disability.	Advanced warning of availability of parking	More opportunities for AV buses for many people, reduces cars to familiar sites	To get to Cannock Chase
More holistic integrated approach, frees the traveller from common issues.	Shows what transport systems exist. Shows route options.	MaaS providers need to exist!	Village to town. Outliers e.g., Haywards, Yoxall to Rugeley.
More pleasurable journey, removing stress	Resonant wireless charging?	Reduce cars and parking issues	Church, supermarket, leisure centre
Better planning through more information		Trust makes a difference	Journeys to frequently travelled locations (shops and supermarkets)

These responses highlighted a wide range of benefits perceived for these mobility options within the town of Rugeley.

### 3.2.4: AV ride debrief

This section presents the results of the debrief conversations with the two groups of participants following the ride in the simulated AV and discussion with Conigital engineers. The key areas that are explored below cover: thoughts on the car, safety, and greater access to mobility,

### **Thoughts on the car**

Participants had a wide range of responses to experiencing a ride in the simulated autonomous vehicle. For example, participant C commented that the AV reminded them of 'Google Cars' that they had seen. Similarly, participant A remarked how the experience reminded them of the Television show 'The Jetsons' which was a utopian future-based cartoon:

*Felt like I was in the Google car (PC)*

*I put down Jetsons as one of my three questions... And one of the things that I remembered about the Jetsons was that integrated connectivity of transport of the hierarchy. That he'd take his little cuff. He would drop off and drop straight onto a travelator with no brake whatsoever. He'd just step back at the travelator and moves [unclear]. And this technology brings that into sharp focus, doesn't it? (PA)*

Participant D felt that an individual's reaction to the car will depend upon their previous experience with vehicles. For instance, they stated that the car was no different to EVs they had driven and acknowledge that other people may be coming from older cars:

*To me, it was no different than me getting a Tesla and driving home. It's just a car. I just felt like I was driving around in a slow car. But I think if you come from an ordinary car, then get into that one, would look quite futuristic. I think if you've come from something that has just got a computer screen anyway, then I'm sitting in the same car that I drive (PD)*

### **Safety**

Regarding safety, participant C reflected upon their experience riding in the AV. At one point during their journey another car pulled out meaning the driver had to break. This made them consider whether the car could have handled the situation in autonomous mode:

*It is smooth. It was very smooth. But except for when you'd have to do almost an emergency stop because somebody else pulled out... Those are the things that you fear for with autonomous cars. Are the cars going to be able to read the stupidity of other people? (PC).*

However, participant A felt that autonomous vehicles would be safer than if a human was in control of the car, perceiving humans as the 'biggest danger':

*The biggest danger on roads are people, let's be honest but, that's reassuring. If you take it off the people, then we're going to all be safer, aren't we, as a consequence? (PA)*

Regarding the general safety and hazard perception of the AV, participant B felt that the vehicle should have several pieces of technology that assess the vehicle's surroundings to make it as safe as possible. In addition, participant B felt that it was important for the AV to have several ways of assessing its environment in case one camera fails:

*It should, I would think, have as many forms of sensory perception as it can have (PB)*

Participant B expressed their concerns regarding the reduced level of noise made by electric vehicles. They highlighted that quieter vehicles could pose a risk to pedestrians who may not hear the vehicle coming:

*I'm still getting used to electric vehicles in the whole. It doesn't make a sound because I think they should, only because we are used to, I think it should have some form of exterior noise just for pedestrians because it's something that certainly, of our age, that's something we've grown up with. (PB)*

Finally, following their experience in the vehicle, participant C raised concerns with the visual and audio technology in the car. They highlighted how they found the various beeping noises that the car made to be stressful, and felt that the additional sensory inputs could trigger passengers' or drivers' anxiety:

*When I've got the noises going off in my car that I'm not used to, that can give me sensory overload. And that can actually set off my anxiety disorder. For example, in our van at the moment, every so often, if the sensor gets dirty, reverse parking sensor, it's going ballistic, and I've not even started doing anything. It's not just the standard low-level beep. It's going mental if I'm about to hit my wall. (PC)*

### **Greater access to mobility**

Several participants discussed how the experience in the vehicle and the opportunity to speak to engineers enabled them to picture how AVs could be beneficial to other people in the own lives. For example, participant C felt that the technology could make it easier for elderly people to travel, and remove the burden on family members who may need to drive relatives around:

*We said to the lady, were saying how useful it could be. If you've got an elderly family member who you don't really feel should be driving anymore, but they want their ability to be independent still and yet, because they live somewhere that's not really accessible very easily, they're reliant on you or your sister [to] go to her But the benefit is if you've got an elderly family member or a person that's [in] ill health, you've got the option that you could still have that ability to be transported without relying on other people. You've got that independence. (PC)*

Similarly participant A felt that an AV could be beneficial to elderly people and unconfident drivers as it would 'unlock' their ability to travel and access places:

*My mum's 70-plus. She drives a mini. She's only passed about five years ago. She's not the most confident driver. It would open up her world again and give her the ability to go down to the shop, pay the bills, go into town, do the shopping, that stuff, with complete confidence. As long as, of course, she was convinced that the technology was safe (PA)*

Finally, participant D highlighted how they felt that the AV could be used to transport people to and from hospital appointments to remove the reliance on one minibus picking up several people:

*I can see loads of advantages to getting this technology to work. When you think of all the people who take all the people to hospital, if you could get yourself there and if you could get yourself there at the time you need rather than waiting for the minibus to get you there three*



hours early and then wait for [the] minibus and you're the last drop-off. There's masses and masses of advantages to the technology that might develop (PD)

### 3.2 5 Final perceptions activity

Figure 13 shows the results from the knowledge line up relating to AVs, MaaS, and Journey planner apps. The results from the start of the workshop are shown in green, the results from the end of the workshop are shown in red.

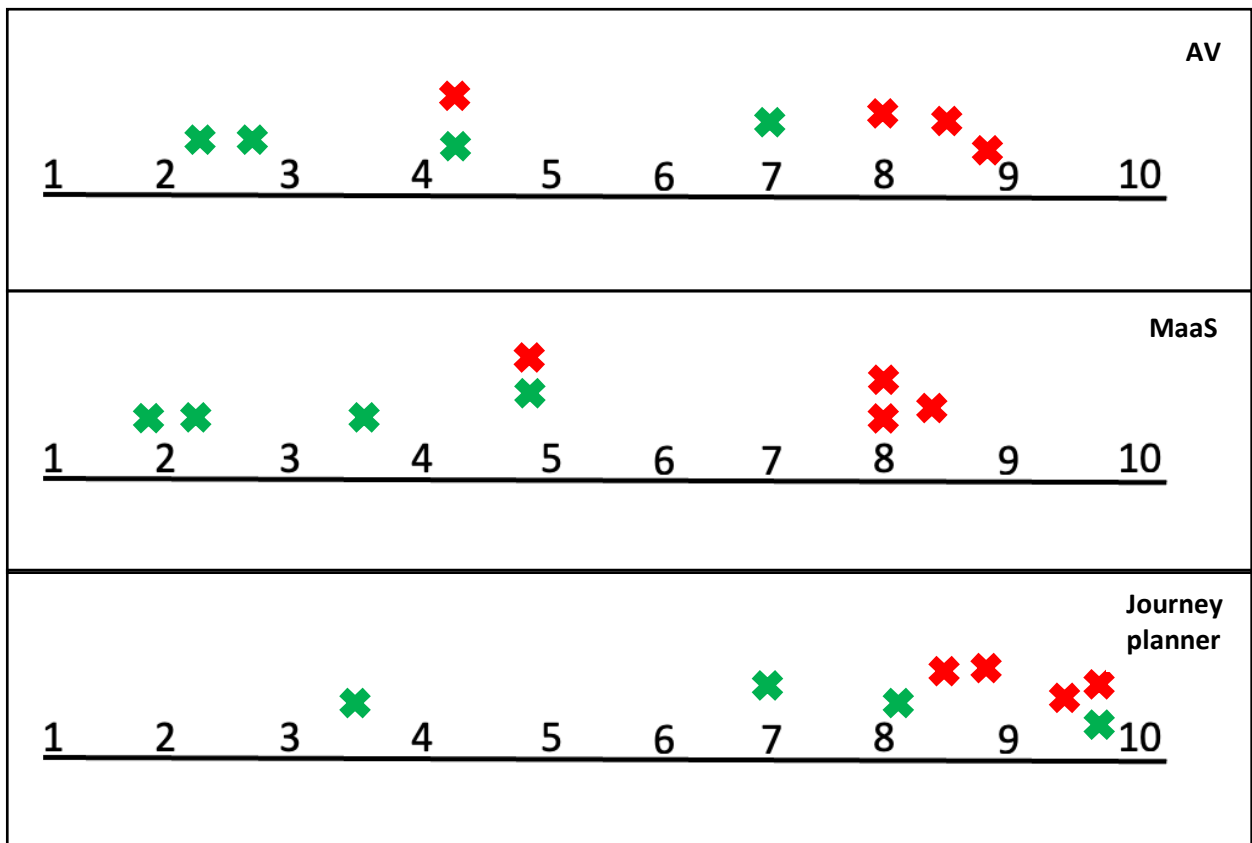


Figure 13: Knowledge line up for AVs, MaaS and Journey planner apps, with green representing the perceived knowledge levels at the beginning of the workshop and red at the end of the workshop

Table 15 presents one key learning and one remaining question from the participants.

Table 15: Key learning and remaining question	
Key learning	Remaining Question
Level of sensory input for AVs.	AV hazard perception reasoning
Integrated travel app	How do you win trust and take away difficulties?

## 4. Conclusion

This report has outlined the key findings from two workshops exploring perceptions of Autonomous Vehicles as well as, for the participants from Rugeley an exploration of user perceptions of Mobility as a Service and Journey Planning apps, both generally and in the context of mobility within Rugeley. The findings demonstrate a wide diversity of views about autonomous vehicles, with particularly deep conversations relating to the diverse benefits of AVs and concerns which span immediate safety concerns, ethical concerns, and concerns around potentially wider implications to society. Levels of knowledge around AVs was generally low, other than when related to specific interested or areas of study. The workshop helped highlight for participants the diversity of benefits and uses of autonomous vehicles, that many had not considered before, and brought the reality of the technology closer from for some, a very futuristic vision of AVs. The workshop uncovered some of the complex issues surrounding the future use of AVs, and different stand points about relative safety of 'humans vs machines'. The workshop highlighted the benefit of engaging with users to aid understanding of the potential of future technologies, as well as to highlight the range of user views to the technical teams involved in the development of these technologies.

The discussions with the Rugeley residents around Mobility as a Service and Journey Planner Apps, highlighted a keen interest to see these technologies further developed and made available to help address issues of mobility within Rugeley.