

Interaction Design II - Design Brief



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in Creative Multimedia

Declaration

This report is my original work and has not been submitted previously for a degree at this or any other institute or university. To the best of my knowledge it does not contain any material published or written by another person, except as acknowledged in the text.

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1.0 - Introduction

The user experience (UX) is a growing field which has more attention now than it did many years ago. Today, user experience is one of the most important aspects when creating any new kind of technology. As technology is moving rapidly forward, developers have to work alongside designers to ensure that their products are not only functional, but are easily used by their target audience. Before, if a developer created a new application they could sell it and users would have the decision to either use the product or be without it as few companies were developing applications. Through the years the user slowly began to creep into the development of products as that is who they were being designed for, the user. The design process changed over time from being a one way stream of production to line of communication which went both ways.

The design process is now an important process within development as it helps tailor products to the appropriate target audience. Using the design process, the team has gone through each individual stage to identify a problem, create a design challenge around it and collect data on topic. Information to help with the design challenge can be pulled from many areas such as recruiting the target audience for interviews or observation of the target audience and recording the data. Once data has been collected and analyzed, personas are constructed to represent the primary, secondary, and anti persona. With personas constructed, then brainstorming begins while keeping in mind the primary persona and their needs. As ideas are thought of and built upon, it is then time to move the best and most realistic idea to the prototyping phase where a version of this idea is created for further user feedback.

2.0 - Choosing a Design Challenge

The team was required to ideate different design challenges that could be solved to an existing problem. In order to formulate a design challenge the team held a brainstorming session around the briefs topics:

1. Change. Can we use technology to change people's behaviours
2. Learn. Can we use technology to help people learn.
3. Inform. Can we use technology to inform people.
4. Connect. Can we use technology to connect people.
5. Communicate. Can we use technology to help people communicate.

With these topics the team brainstormed a number of different design challenges to fitted into the various topics. The team allocated roughly 20 minutes to individually brainstorm different design challenges, once the time ended, the team members came back to work together and analysed each design challenge and based on interest and early speculations on the ability to create various solutions the team chose 3 different design challenges.

When the team proposed the design challenges to the class they received feedback on their ideas. It was felt that from the feedback received the team should return to the drawing board and come up with more ideas but focus on the wording and ensuring that it is a broad enough design challenge.

The team came up with more ideas and critiqued them more harshly as to ensure the quality of the design challenge. The team analysed the challenge by comparing it to the provided class notes on design challenges. The team had formulated a final design challenge by seeking guidance from the modules lecturer for Interaction Design II, which he then provided the team with advice on tweaking the design challenge to help make it targeted a particular problem but also allow for multiple solutions.

The team finalised the design challenge and decided to move forward with it. The design challenge was defined as:

“How to educate experienced drivers to improve on road safety”

With the final design challenge the team then moved onto defining their known and unknown knowledge, what they do and don't understand in relation to the design challenge, constraints and barriers to solving the design challenge and the research the team carried out to help get a better understanding. Information sources included RSA as our expert, the Road Traffic Act 2010. (Appendix 12.0.1)

2.1 - What Was Learned

The team learned about the importance of analysing the design challenge and ensuring that it was worded in such a manner that it is particular to a topic, not too narrow but broad enough to later be able to ideate multiple solutions. The team understands the need for multiple solutions in order to best address the design challenge and put forward the best solution.

The team learned about the necessity of having a design challenge is critical, as it can dictate the flow and the solutions that will be created. The team sees the design challenge now not only as a way to lead the design process but also to anchor the designing process and should be treated seriously. It is something to be taken into consideration during each step of the process to ensure the team is fulfilling the design challenge as they set it out.

2.2 - What Would Be Changed

At the conclusion of the project, the team discussed if they were to redo the project once again, they would like to reword the design challenge differently. When the team reviewed the design challenge after the brainstorming stage, they found that a lot of the possible solutions were good ideas but not always directly related to the design challenge or even related to the primary and secondary personas thus having to be ruled out those grounds. This was a positive it

demonstrate that the team was focusing on the design challenge but the team could have considered restricting the design challenge even further in order to focus it even further.

The team believes they satisfied the design challenge and are quite happy with how the project has progressed over time.

2.3 - What Was a Surprise

What surprised the team the most was the difficulty in formulating a design challenge. The team was surprised at how difficult at first it was to create a design challenge. The team found that they spent most of their time just phrasing and wording the design challenges. It was important meet the criteria of creating a design challenge but the team took it all in their stride and were able to overcome this and create a well-structured design challenge.

2.4 - Challenges Faced

As mentioned in what surprised the team during this stage, the team felt that the process of creating a well structured and open design challenge to be difficult. This was a process the team had to adjust to as the team felt they kept making the design challenges either too narrow or too broad or not focused enough on a topic. It was during the brainstorming for design challenges the team came up with multiple design challenges but fell short on the actual wording and structure of them. For example, a past design challenge was “How to keep long-term drivers informed on the rules of the road and driving techniques” this design challenge was ruled out as it defined the direction of the solution too much and also the wording of “long-term drivers” was not complimentary nor informative to the target audience.

With some guidance from the Interaction Design II module lecturer the team was able to anchor the design challenge to meet the criteria of creating a design challenge. But it was the process of creating the design challenge initially that the team found challenging.

3.0 - Recruit

During recruitment, the team considered many factors they could use to find their potential interviewees. Framing the interviewee criteria with the design challenge they had chosen, they knew their subjects would need to be experienced drivers. An interviewee was declared as an experienced driver if they had their license for more than two years and if they did not have plates on their car anymore. With this criteria the team could then obtain a range of drivers with varying experiences. Selected drivers would have their license for the minimum amount of years while other drivers would have had their license for many years. The team thought this was vital for their design challenge as it had potential to demonstrate if experienced drivers were more of a danger on the road, or not. With a younger driver the information could be compared in contrast to older drivers and their knowledge of the road and certain techniques. From there, they decided to create an equal ratio of male to female interviewees while ensuring age varied. It was important to the team that there be an equal ratio and varied ages as it would allow for a greater look into the various types of drivers on the road and many viewpoints. During this time, a survey was created using Google Forms(Appendix 12.7) to allow for even more data collection from the anonymous public.

3.1 - What Was Learned

With recruitment, the team learned the importance of having a diversified group of candidates as it allows for many viewpoints and opinions. Before selecting interviewees, each one should be broken down to see if there are potential risks of having them as a subject. These subjects may be harder to schedule interviews for, contact later, or may not answer questions with enough information.

3.2 - What Would Be Changed

The team would begin recruiting earlier on as to ensure a greater chance of recruiting candidates. The selection of interviewees would also be increased upon as due to time restraints, the team had to limit their potential candidates to people who attended or worked at the Limerick Institute of Technology campus in Clonmel.

3.3 - What Was a Surprise

Surprisingly, a number of students who attend Limerick Institute of Technology in Clonmel do not have their license or did not meet the experienced drivers criteria. The number of people who were too busy for our interview was also surprising as many people had assignments to complete, even though interviews were conducted in early October.

3.4 - Challenges Faced

During the recruitment process, the team was challenged with obtaining outside subjects from the college as time restraints were in place, both for the candidate and the interviewers. The team was primarily available between midday hours and in the evenings, but had no means of transport to get to potential interviewees.

4.0 - Observe

Once the team recruited their first set of interviewees, they proceeded to make public and driver specific observations before conducting interviews as to get a better sense and understanding of driving in Ireland. The team decided to observe two specific candidates, one living in a rural area, and the other in an urban area. With two separate drivers, it was thought that many notes on the different aspects of each driver would be captured as each driver would be in opposite settings. Subjects were not aware that they were being monitored while driving as to ensure they would drive as they do on a day to day basis.

Our urban subject was based in Cork City and typically drove in the city on weekends during peak times for traffic. The driver was a recent N license driver after not driving for 7 years as they financially could not be driving during those years. During drives, it was noticed that the driver's confidence was greatly improved upon once they had obtained their full license as they felt that they were not held at the level of a learner anymore. They had also been practicing their driving techniques in preparation for their test, which might have added to their confidence. While driving in the cities, they would always obey rules and regulations of the road, minding their speed and other street signs. They would speed only to overtake, as they thought that the speed limits were reasonable as they prevented people going too fast and not being able to brake in time. The driver would occasionally point out bad drivers (not indicating, going through lights, illegally parking) saying that they are only doing so because they are a full licensed driver, so they don't have to face many consequences. The subject was also very cautious of his own driving capabilities and would criticize them while driving. An example of this would be during a drive, they went through a green light and turned, but another driver sped up and was cut off by the subject. The other driver honked and made the subject aware that they might have performed under their own standards. Minutes after this incident, they continued to talk about what had occurred and if it was their fault or the other driver's fault. The subject did contemplate breaking rules of the road such as parking in loading bays as Cork City lacks parking. They were used to driving in close quarters as Cork has many small roads, so they were not nervous when cars were driving past them closeby.

Our rural based subject typically drives weekdays and travels to and from Clonmel on the main road. This driver has been driving for roughly 25 - 30 years with a full licence. It was noted that the driver typically follows the rules and regulations of the road and is a confident driver with fountains of knowledge in handling various driving situations and conditions. The driver would sometimes demonstrate causal driving techniques such as forgetting to indicate or not concerning themselves with indicating based on the situation they're facing, an example of this was when the driver is driving and there are no other cars around, outside these scenarios the driver would follow the driving protocols. The driver would also seem to take calculated risks for example, when exiting a location which prevents drivers turning right, this driver usually would abide by this outlined rule but if given an opportunity during the nighttime hours, the subject could possibly take a calculated risk and turn right once they were sure both ways were clear. It is believed that this calculated risk formulated from the subjects years of experience and confidence with driving. Under normal circumstances the driver would demonstrate their vast knowledge and experience as they carried out their driving and performing many driving techniques. The subject also didn't seem to have a fear or dislike of particular driving skills and techniques.

The team also carried out three more observational studies in the form of card sorting which would be carried out by interviewees. The card sorting is detailed under 5.0 - Interviewing.

From the Google Form which was distributed online through Facebook and Twitter, the team obtained 30 responses. From the survey lots of data was pulled on the topic of driving. With the information gathered the construction of the interview guide was changed. The survey results informed the team of aspects which were not originally thought of and lead to the improvement of the interview questions which would be used at a later stage. Please see Appendix 12.8 to view the responses from the survey. The survey also provided an insight into the general thought space of drivers and their opinions on topics such as mobile phone usage, legislation and ability with techniques and more. These responses provided the team with a basic level of research in order to understand the target drivers.

4.1 - What Was Learned

Throughout observation, the team discovered many elements which might have gone unseen. Observing drivers allowed for another perspective on driving and what other aspects of driving. As two drivers were observed, this allowed for a greater range of data to be gathered. The observation also confirmed that many drivers are dangerous, in one way or another, while driving. As a pedestrian dangers on the road are only seen as fast drivers, but driving itself shows the true number of dangers on the road.

4.2 - What Would Be Changed

The team would have observed an interview subject while driving, but with a constraint on time it was not possible. A concern was raised that during the drive with the interview subject, the subject would potentially be more cautious of their driving and might not drive as they usually do or possibly ‘act’ up their driving ability thus spoiling the observation.

4.3 - What Was a Surprise

The amount of data collected was surprise enough as the numerous dangers on the road were accounted for and viewed not just from a pedestrian’s point of view. The feedback from the survey showed the sheer number of bad and/or dangerous drivers was also a surprise as it was suspected that there were only a few when in fact during the observations there were many driving mistakes being pointed out about other drivers.

4.4 - Challenges Faced

Scheduling observational drives was difficult for the team as they had other tasks at hand and found it difficult to find time to do so. Subjects were also busy as they were current students in the middle of their semester, while some could not be monitored as they drove on weekends, or primarily walked unless driving a longer distance.

5.0 - Interviewing

During this stage, the team initially started by brainstorming various interview questions. The team used an iterative process in creating the questions. Questions were roughly plotted out and then restructured until the team felt they had appropriate questions that could be used for the interviews and that best addressed the design challenge.

The team Selected interviewees for the interview were based on a set of criteria, this criteria included:

- Having a full driver's license for more than 2 years
- Currently do not have N plates

The team took into consideration the age range and gender of drivers as the team wanted to maintain a balance and have an even spectrum of candidates to interview. The team identified young drivers who have been driving in the last 5 years and drivers who have been driving for more than 15 years, the team also ensured that the group of candidates are a balance of males and females. In total the team had selected 3 female candidates and 3 male candidates. Out of these candidates the team also decided that one of these candidates would be our anti - candidate in order to analyse the different needs of the drivers that the team is trying to target. The team decided to do to completely understand the varying needs of different leveled drivers.

With the candidates chosen, the team went to organise the times that suited with each candidate to interview them and the location in which the interview will take place. In order to prepare for the interview the team drew up an empathy that would be used during the interviewing of each candidate. The team decided that one member would interview while the other would write the empathy map. The empathy map outlines the do, say, think and feel elements of what the interview. Please see Appendix 12.0.2 to view our empathy map template.

The team then went onto developing three card sorting activities, these activities were: identifying general driving clusters, dangers on the road and driving techniques. The dangers on

the road and driving techniques were card sorts where the candidate would sort them according to their opinion for example driving techniques were rated based on the candidates feeling of their own ability and comfortable level while the dangers on the road were heavily based on the candidates opinions on what is the biggest to least danger on the road. These card sorting activities were chosen as it was felt there was a lot to learn through completing a simple observation. These card sorting activities would also help the team to see if there were any commonalities between interviewees or even the different perspectives of each interviewee candidate. With the empathy map and card sorts, the team was ready to conduct the first interview.

The team learned from completing the first interview that there were a number of interview topics and question they did not address and the team decided to remove some of the cards from the general clustering as the team felt the cluster became too car component based rather than focused on driving. The team also learned about the wording of two cards - driving conditions and road conditions and learned that the first candidate found it very confusing and felt they were too similar, the team talked to the candidate about their interpretation of it and agreed that they were too similar so the team decided to rename road conditions to road works to help reduce the possible confusion.

As the team progressed through the interviews they learned from completing each interview that there were changes and updates that could be made to improve the interview guide. After each interview, the team had a post-interview process. This process roughly took 3-5 hours long per candidate. The process included listening to the recordings of the interviews, remapping the interviews empathy map into sticky notes in conjunction with the notes from the original empathy map, differentiating the aspects of the empathy map into categories of important, middle ground, least important and personal, identifying themes in each interview, creating a theme cluster relations map based on the relationships shared between themes, creating insight statements and developing 'How Might We' questions that could be used to solve the design challenge. To view each of these steps please see appendices 12.1 , 12.2, 12.3, 12.4, 12.5 and 12.6

The team found that carrying out the interviews helped to gather vast amounts of knowledge on how drivers drive and the factors that have an influence and impact on them. The interviews

provided the team with knowledge on the road, dangers while driving, driving techniques, legislation, road conditions and many more where themes could be identified and theme cluster relations defined.

5.1 - What Was Learned

The team learned a lot about the amount of information that can be gathered from interviewing. The team understands the value of interviewing and how interviewing can be used to gather quality research and information that is relevant to actual subjects of which the team are trying to design for. The team feels that the interviewing stage was very successful as a lot of information was gathered and the team learned a lot of different things that drivers faced and things that are concerns to drivers such as mobile phones being the biggest distraction for some drivers or how some candidates don't keep up with the latest driving legislation. The team feels this research will help them to appropriately target the design challenge.

The team also learned about the importance and usefulness of post-it notes as it allowed the team to easily and quickly move various aspects into different stages of the analysis of the interviewing stage. The sticky notes made the process more hands-on and the team found it helps with communicating and getting certain aspects across in a more visual manner. Post-it Notes were an integral part of analysing each interview.

5.2 - What Would Be Changed

The team feels that if they were redoing the project there are a few things the team would do differently.

- The team felt that it would be interesting to get a wider spectrum of interviews as the team found by interviewing 6 people they were able to get lots of information but the team feels that more candidate with varying experiences could allow for other topics that were not mentioned to be brought up and this would later on provide the team with a wider base for forming other solutions to the design challenge

- The team felt that it would have been beneficial if some common skill based questions were asked as it would have allowed for easier comparison on the different drivers ability and could influence the direction of the solution to the design challenge.
- After completing this stage, the team now feels that it would have been interesting to find out more about driving habits and whether drivers have habits while driving. Habits became a discussion point during a later interview and stood out to the team. It later became something that was asked about during additional interviews.
- The team would like to try carrying out talking to a focus group before conducting as the team feels it could be used to help better focus the questions when interviewing candidates.
- During the interview stage, the team learned more about distractions while driving and later became a major research point but the team would like to conduct a card sort on distractions to gauge what candidates feel are the biggest and smallest distractions while driving, this could have been another area in broadening the possible solutions to the design challenge.
- The team feels that next time they would also try to be more assertive while interviewing and ensure that interviewees stay on topic as there were times where the interviewee would go off on a tangent and sometime the team had trouble reining them in.

5.3 - What Was a Surprise

The team found there were a number of surprising aspects throughout the interviewing stage. For example the team was surprised at the amount of time in general that it took to analyze each interview, as mentioned before the team typically spent 3 - 5 hours on each interview analysis. The team understood the benefit of spending this time analysing the interviews in order to gain more insights.

It was this interview analysis that also lead to gathering large amounts of data which the team was surprised to learn how much data can actually be gathered from an interview alone.

The team was also surprised by the usefulness and practicality of using post-it notes as it made the process very tangible and visual. It also simplified the process as post-it notes could easily be moved to different heading or even progress into the next stage of analysis for example, the team was able to take post-it notes from the post-interview empathy map and use them once again in the clustering of themes.

Another aspect that the team found surprising was the repetition of themes. During the analysis of each interview, in particular the creation themes from the categorization of the post-it notes empathy map many of the interviews identified the same themes. The team felt this was surprising as it showed the common elements across all interviews but the team also gained other themes alongside these.

Finally, the team was surprised by the amount of interviewees who were asked about a typical driving experience but struggled to understand the technical jargon. Some interviewees struggled with understanding what an uncontrolled junction is. As the team are not experienced drivers, they both have basic knowledge and experience with driving and understood these terms but it was surprising that candidates didn't understand the technical terms. This went on to be something the team had to review as during interviews the team would have to explain to the interview what the term meant.

5.4 - Challenges Faced

During this stage, the team didn't have many challenges but the main difficulty that the team faced was getting a variety of different interviewees. The team felt that although they were able to maintain a balance with the selected candidates, these candidates mainly consisted of peers within the college but the team would have liked to have asked people outside of the team's environment and get a completely different perspective from other candidates who wouldn't know the process of this project. The team had the difficulty of interviewing these people outside of the college environment due to time constraints and scheduling issues.

6.0 - Personas

When constructing personas, the team looked at identifying behavioural variables. The team ensured to include all types of behavioural variables - Activities, Attitudes, Aptitudes, Motivations and Skills. Appendix 12.9.1. These variables helped the team to identify the types of questions and scales that can be tested using them against the interviewees. The behavioural variables gave the team insight into the core elements found through research, observations and interviewing.

Using these behavioural variables, the team used them as subject headings for mapping the variables with the interviewees. The team had decided to carry out a survey in the early stages of the project and it was discussed about potentially using the survey results in the mapping of interviewee but it was felt that there was a lot of data and but including the 30 survey responses where a lot of the questions in the survey do not correspond with the questions asked in the survey, so it was decided to exclude the survey results from the mapping section of persona creation.

During the mapping of interviewees to behavioural variables, the team used responses from the interviews and notes from the observation card sorting activities to dictate where an interview is placed on each map. (Appendix 12.10 - Subject Mapping). Once all interviewees were mapped to each behavioural variable map, the team was able to quickly identify clusters. The team chose focus on clustering two groups per mapping behavioural variable. It was decided to approach the creation of personas by taking one side of cluster and making them into persona 1 and taking the other half of the clusters and making them persona 2.

With each persona defined, summary of points about the persona were written out and a persona profile was built summarizing and stating the different aspect of the persona as defined by the cluster group. This summarizing of their driving and personal history helped to outline the main points of the persona. This was then developed into a story where the reader saw a day in the life of the persona. The persona created were Jane Clark and Bob Loblaw. (Appendix 12.11.3 and Appendix 12.11.4). Briefly, Jane Clark is an experienced driver. She is 38 years old

and has been driving for the last 15 years, she spends most of her time taking her 3 kids to and from different places. She wouldn't be very knowledgeable about the rules of the road as she would have been in the past. She is a strict type of driver and wouldn't dare use her phone while driving. Although Jane has been driving for a number of years she still struggles with her driving technique. She feels strongly about speeding and it is something she believes is personally and socially unacceptable. She has a tendency to avoid speeding at all costs. She also wouldn't find herself keeping up with the latest legislation and would only hear about it if it is being discussed on the radio.

Bob Loblaw has had his full licence for the last 4 years ago and typically drives to go to work during the weekdays and to friends on the weekend. Bob is quite knowledgeable of the rules of the road. He is not typically a strict driver. Bob is easily distracted by external factors while driving, as well as by his mobile phone. He uses his mobile phone occasionally while he is driving as he does not see it as a danger on the road. Bob will typically take calls and text while driving. Speeding is a daily occurrence with Bob's driving, typically going 5 - 10 km/h over the speed limit as he feels it is socially and personally acceptable to speed. Bob does not usually keep up with legislation as he feels it is unimportant. Bob is a confident driver, but feels that it is important to improve upon the current skills he already has.

Next, the team identified the primary and secondary persona. The team came to the decision that Bob Loblaw would be the primary user as he poses lots of different challenges that could be interesting and still compliment the design challenge. Outlined below are the specifications of each persona:

Bob Loblaw - Primary:

- Could possibly update him on legislation
- Improve upon his current driving techniques
- Wouldn't mind monitoring but would like the option to opt-out
- Something which could ensure he is kept up to date with rules of the road
- Keep track of his past and current driving for comparison
- Something which would reduce the amount of distractions from his phone
- Something that is not completely reliant on a strong mobile connection

Jane Clark - Secondary:

- Could possibly update her on legislation
- Help her get over her fears with certain driving techniques
- Something to help her with her driving routines and that fits into her busy schedule
- Something that helps to further reduce the distraction of her phone
- Wouldn't mind monitoring but she needs an incentive
- Something that possibly retests her ability or helps her ability, she is confident in her ability but it is the skills and techniques that she fears
- Something to assist in her driving for leisure and desire
- Something that could provide her with information or checklist on safety equipment
- Something that may help improve her knowledge on the rules of the road

6.1 - What Was Learned

The team felt that they learned a lot of different things during the persona stage. For example the team learned about the importance of having personas and utilizing them to get a better understanding of a user no matter what their criteria are. The team also sees the benefit of having a primary and secondary persona as the team's main focus is to satisfy the primary user but not hinder the secondary persona.

6.2 - What Would Be Changed

If given the opportunity to redo this project, the team would have liked to interview more people so that the team had more than 2 personas and could create and help the team to better target their core candidates while getting another perspective with having another persona.

6.3 - What Was a Surprise

The team was surprised by how easier the process of designing for gets when you have a particular subject in mind that your are designing for. It helped to ensure that the design ideas later on will be within the scope of the persona. It was also believed that by outlining the

knowledge and the story of the persona, as it gave the process a more personal and connecting aspect.

The team was also surprised with the clustering of persona groups using the mapping of interviewees as a lot of cluster were similar, or close together but there were instances where responses were completely opposite.

6.4 - Challenges Faced

As mentioned previously, the mapping of the interviewees to behavioural variable scales were challenging as sometimes there were cluster close together and the team would be tempted to combine it for both or one persona but the team decided that any gap that is either half way across the mapping line or a greater gap between interviewees would be the division for the cluster but this process ended up slowing down the team's progression in order to discuss the differentiations. But the team was capable in the end of defining two main personas.

The team also had difficulty with using the survey in conjunction with the interviews during the mapping stage. The team felt that with the interviews they had a lot of content but by combining it with the survey results the team feels that by adding the survey would have been very beneficial but combining it with the mapping would have lead to information overload. The team came to a decision to leave out the survey results from the mapping. Finally, another reason why the team did not include the survey during mapping was due to very little similarities between the survey questions and the interview question thus making the survey response harder to interpret when mapping.

Another challenge that the team faced was trying to prevent design issue such as the elastic user and self-referential design. The team was able to overcome this by always referring back to the persona and making sure that they did align with the mapping of interviewee subjects and not let the teams opinions of what would be an interesting aspect they would like to explore at a later stage.

7.0 - Brainstorm

The next stage that the team moved onto was brainstorming of ideas. For the team to ideate, they needed to select three ‘How Might We’ questions. All ‘How Might We’ questions were compiled into a document where each member had to select three, from this each member then selected one and the final ‘How Might We’ question was a collective decision. The main focus on choosing which ‘How Might We’ questions were based on the primary persona and complementing the secondary persona. The ‘How Might We’ questions were then checked to ensure the questions aligned with the primary personas needs.

The top 3 ‘How Might We’ question included:

- How might we inform drivers of proper driving techniques to combat certain situations?
- How might we reduce the amount of accidents caused by distracted drivers?
- How might we ensure drivers that mobile phone usage is dangerous no matter what?

Using the top three ‘How Might We’ questions were then used to brainstorming all possible ideas that could be utilised to create a solution. To view the process of selecting questions, please see Appendix 12.12.1.

There was 10 minutes given for each ‘How Might We’ question to ideate different solutions and elements that could be used in the creation of the final solution. It was treated as all ideas being valid and an importance was placed on coming up with as many possible ideas for each ‘How Might We’ question. Examples of ideas included tasering the driver if they get distracted by picking up their phone, using gamification to entice drivers not to use their mobile while driving, monitoring and reviewing the drivers technique.

The next step included each team member having to choose a total of 6 ideas that they believed were the strongest at solving the design challenge and satisfying the personas needs. The complete total of 12 ideas meant each member then needed to choose their top 3 ideas. From the total of 6 ideas combined from both team members, it was debated over which idea the team should use so it was decided to rate the 6 ideas based on excitement of the idea,

innovativeness and practicality of implementation. These bases were graded from 1 - 5 and the idea that had gained the highest score along with a discussion between team members, it would become the focal point of the solution to the design challenge. This was once again checked to ensure that it would still satisfy the design challenge and met the personas needs. Please see Appendix 12.12.3 for rate sheets to view the ideas being rated and appendix ideas to view the ideas proposed. (Note: The images with numbers on them are the selected ideas.)

By choosing a single idea, this dictated the final 'How Might We' question that the team will be using for the remainder of the project. "How might we reduce the amount of accidents caused by distracted drivers?" .

Using the final idea, the project progressed onto a gut check. The gut check allowed the team to describe the idea and how it will be applied. It summarized the design challenge, the 'How Might We' question, description of the idea and how it will impact the challenge that the team is addressing. Using the gut check, the idea was defined as containing a physical and digital component. There would be three components to this solution, a physical console used within a car that can be manufactured or fitted into a car. This console contains a screen called a digital dashboard where the typical dashboard elements are now digitized and factors such as speed, fuel usage etc can be tracked. The driver must place their phone in a space beside the digital dashboard to allow the user to drive. The mobile phone will act as a key to the car and must remain in position while driving. Once the driver has completed their journey they can access the mobile application where they can view information about their driving and see how have their ability has improved. Each driver who uses the system will be required to register an account and input their car information in order to analyse appropriately for each car. To understand the proposed solution please refer to the gut check in appendix - 12.12.4

With the gut check complete, a storyboard was then drawn up to test out the idea and see how it could be implemented. The storyboard outlined the beginning, middle and end of using the proposed solution. The storyboard entailed a title, image and description. This was followed-up with creating 'How Might We Test It" questions which were attached to each part of the storyboard. (Appendix - 12.12.5) These questions opened the possibility of whether or not could the various stages of the solution be tested and possibly work. The team believes that it is in fact a valid solution and one that employs potential future and current technologies.

7.1 - What Was Learned

The team has learned the importance of completing a gut check. The team learned that by having gut check it allows for a deeper understanding of the solution and an opportunity to ensure it meets the design challenge and that it is suitable for the persona. The gut check provides a chance to spot any holes or parts of the proposed solution that do not make sense and be able to re-evaluate the proposed solution and how it is implemented.

7.2 - What Would Be Changed

If the team were to change an aspect of this stage, it would be gut checking more than one idea for a solution. This is believed as the team feels like they could have proposed other fitting solutions and would have thought it would be interesting to outline other ideas and evaluate which one is the most befitting for the design challenge and persona. The team did successfully complete one gut check but due to time constraints they did not have the time to do more gut checks.

7.3 - What Was a Surprise

The team found that storyboarding the proposed solution to be surprising as it gave the team insights into how the user would use the solution in a practical scenario and it allowed them to spot any flaws. It was surprising as it detailed a lot of aspects that displays the implementation of the solution.

7.4 - Challenges Faced

The team didn't face many challenges during this stage but found that they did struggle with creating the 'How Might We Test It' questions as the proposed solution is based on current and futuristic technologies. The team felt that the 'How Might We Test It' questions were getting repetitive and the team were consciously trying to propose new questions rather than the same or similar ones. With some time and discussion the team were able to overcome this challenge.

8.0 - Inspiration

Throughout the entire process, inspiration was drawn from many sources. During the interviews certain topics which subjects would bring up could be jotted down and discussed at a later stage as it brought insight into the design challenge. While creating How Might We statements, the statement would be starred as the team felt it would add something greater during later stages of the design process.

One statement from a subject which was thought over was that it is important for a driver to always have their license on them at all times (Appendix 12.5.24). Subject 5 mentioned this and during the analysis of the interview, the statement was stared for later use and critic. Through the How Might We questions the team came up with a statement for the particular statement as it felt to be one of the more important points from the interview.

Once the design process had reached the brainstorming phase, the statement was worked out and did not make the top 3 brainstorming ideas as the team felt that it would not be applicable for the design challenge at hand, but may add to the overall experience of the end design.

Throughout wireframing and prototyping, the team was inspired by many applications for their usability and their layout as this allowed for improved usability within the overall design of the end product. The homepage of the application portion of the project was inspired by Apple Heath as the team was seeking a way to reduce the number of clicks while creating an application which users would be familiar with. This design allows for users to see exactly what is available to them at a quick glance and allows them to easily return back to content without needing to go through a standardized menu.

Functions within the settings were also inspired by apps such as Google Hangouts and Apple Heath as it gave an understanding to certain aspects like once a setting is updated, where should the user go? It was debated that they would go back to the home page, but with research into these apps, the team was inspired to take after them and lead the user back to the settings page where they would have the option to continue editing settings or to go to the home page.

8.1 - What Was Learned

During this process, the team learned how valuable inspiration can be to a project as it improved upon the overall design and functionality of the design. As the team members are looking into UX and UI as their fields of work, every bit they can pull from other companies who have successfully implemented friendly user designs.

8.2 - What Would Be Changed

The amount of time spent on collection inspiration and looking to other companies who have successfully implemented user friendly designs. This would be changed as seeking inspiration helps with the knowledge and understanding of good UX design. Due to the time restraints on the project, time had to be cut short as it was vital that the team move on to the development of wireframes and the prototype.

8.3 - What Was a Surprise

Places of inspiration was a surprise throughout the design process as it was not anticipated most times. The interviews conducted were thought to be more for verifying what would improve upon the user experience and what they would want. They also were inspiration for the team as they brought forth possible ideas for users and what was seen that they may be missing.

8.4 - Challenges Faced

Beginning to seek inspiration was a challenge as it hides in the background and comes along when it is least expected. Inspiration was sought after during the brainstorming and throughout the design process, but was found when it was not expected. Small statements from interview subjects and playing through applications brought the most inspiration to the team as it was not sought after most times, and was seen as enjoyment rather than a task.

9.0 - Prototype

During the prototyping stage, the team was required to determine the type of prototype that would be suitable and appropriate to showcase their findings and visually demonstrate a solution to the design challenge. In order to determine the type of prototype the team would be building, an exercise was carried out to help outline and test a possible solution as proposed during the brainstorming stage. This exercise, involved creating a story of where the user goes through using the proposed solution. The exercise contained assigning a title, an image and asking two questions - What is the most important question to answer and how might we test it. (Appendix 12.12.5).

During this exercise, the team used the story which was initially created during the storyboarding stage of Brainstorming to delve deeper into the scenario. Using a start, middle and end the team was able to go along with each step and ensure that the correct exercise activity were carried out for each storyboard. These were used to outline the various stages in which drivers would use our proposed solution whilst answering the set criteria of the exercise.

From completing this exercise, the team went on to decide which aspects of the storyboard are the priority and essential components. The team came to the conclusion that the app, digital dashboard and accompanying features were key to the successfulness of the proposed solution.

Once the team confirmed what are the key components that the prototype must have, an agreement was made based on what and how it should be prototyped. The team decided the best approach was to initially create wireframes of the solution, design an interactive digitally based version and create a physical prototype also.

As the team was creating wireframes, it was treated like a brainstorming activity as the team used the opportunity to map the components of a car's dashboard and the pages that should be within the application. To view these maps, please see appendix 12.14.1, and 12.14.2 - mind maps. Using these maps, the team was able to draw up a number of wireframes based around

a final statement that was decided during the gut check stage during brainstorming - “How might we reduce the amount of accidents caused by distracted drivers?” - Keeping in mind this question, our design challenge and our primary persona Bob, as a team, each member drew up a number of wireframes. The wireframes being created went through an iterative process where each team member suggested a number of wireframes some for different screens, some for the same screens, when the team analysed the wireframes, a number of features and parts were taken from various wireframes to form the final wireframe. Please see appendix 12.13 for wireframes and final wireframe.

Once the wireframes were completed the team decide to give the solution to the design challenge a name, this was given some thought and the team quickly came up with a name, the team settled on IVEN, this stands for Intellectual Virtual Engine Noticeboard.

The team then went on to use Balsamiq to create a digitally interactive prototype of the final wireframe. The team felt it was important to create digital prototype as it would show the flow of the solution and how users are meant to interact with it. It also helped the team to understand how they wanted the proposed solution to flow. The digital prototype outlined all the screens for each device and shows in a practical sense the layout of the solution. The team chose to use Balsamiq for prototyping as it was easy to use, easy to create and provided the team with the opportunity to link components of the prototype to make it interactive. This was important as the team could test how it worked and fix any problems with the flow. Balsamiq allowed the team to create something that was low fidelity but very effective in communicating the solution to the design challenge. See separate PDF in ZIP for the interactive prototype, you will be able to interact and test the prototype.

Once completing the digital prototype the team also wanted to develop a physical prototype so tester and the team themselves can get a feel of the solution with the ability to move to different screens. It was decided by the team to develop a physical representation of both the in-car digital dashboard and the mobile application as it allowed for getting an understanding for both devices. The physical prototype allowed the team to test out physical sizes and get a tactical understanding if using the solution.

Below is a diagram of the IVEN Digital Dashboard that is used within the car. The digital Dashboard has two screens, a welcome screen before your driving journey begins and driving dashboard. The welcome screen greets the registered user and notifies them of the current time and weather conditions. The driving dashboard contains all the features a driver needs. Along the left is the miles you've travelled and the miles you are going to travel if you have the GPS active. The dashboard has a built in GPS. A key feature of this design is voice activation. With voice activation the driver can speak to the car to activate features such as making a phone call, starting and selecting music, setting a new travel course and other information the driver may want to find out while driving. It also contains a speedometer, RPM, notification and warning symbols. Another key element of this design is the speeding warning light, this light will only activate if the user goes above the speed limit. It was from the team's research that it was discovered that one of the best ways to notify or get a user's attention would be to have a light appear on the dashboard that quickly notifies the user of their actions. The reason why the team took on this design was to improve road safety while driving by removing the use of mobile phones completely as the key features has been integrated into the functionality of the digital dashboard. It helps reduce distractions, again mainly the mobile phone. This digital dashboard is in replacement of the traditional dashboards found in cars though fore it is within the drivers line of sight and not something to be a distraction. In the background IVEN is analysing, tracking and monitoring the driver's ability. This information is used in the IVEN application.

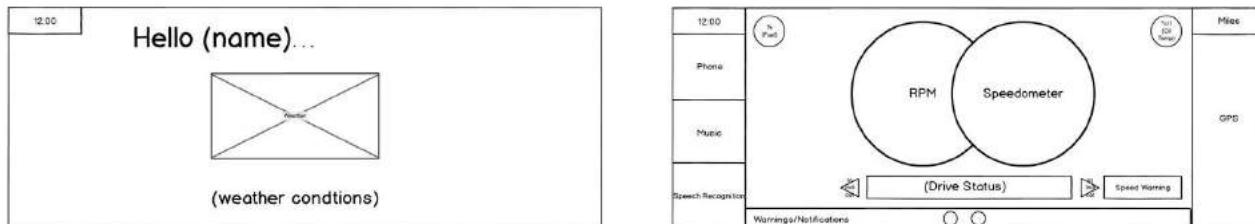


Diagram - 1.0 IVEN Digital Dashboard

You will also find below a diagram for the IVEN application. This is an application that is installed on the drivers mobile phone. The application outlines information about the drivers ability and driving in general. It outlines details about the drivers speed, technique, fuel and distance. The application will also give recommendation and advice to the driver to help them improve if they wish. The driver can also get satisfaction out of learning about their fuel usage

and the distance they have travelled as it is not directly linked with advising the driver but informing them of aspects that may peak their interest. The team also included settings so the user of the application can register for an account and enter car model details in order to tailor IVEN for an improved performance. The setting also entail appearance and preferences, these features allow users to customize their digital dashboard and how information is displayed on the application. The team felt this was important as they were thinking of situations for visually impaired or colour blind drivers. In preferences users of the application can also set things such as time, date, language etc.



Diagram - 2.0 IVEN mobile application

The team recognises that the prototyped solution does contain feature creep as the persona did not require for example a setting for customisation and colour alterations for assisting with colour blindness and visual impairment or monitoring on aspects such as fuel consumption but the team feels that these features compliment to the overall experience for the user and thus the team decided to included them. These features have an added benefit to satisfying the users by not constricting them too tightly to the raw monitoring and reviewing of the driver's abilities but offering them alternative information that the driver may be interested in knowing.

9.1- What Was Learned

Throughout the prototyping stage, the team learned about the benefits of creating a prototype. The team found that it provided them with insight into the layout, structure, flow and interaction of their proposed solutions. It allowed for an understanding around how the solution should work and how users should interact with it. It allowed for us to come up with a variety of solutions thus improving the quality of our solution as it evolved. The team were also able to identify any problems with our designs and quickly remedy them. For example, some of our wireframes would pose more of a hazard and distraction which is something the team were trying to eliminate, and were able to find other aspects that were better at targeting the design challenge. The team found that the solution evolved into something where mobile phones which pose to be a major distraction and danger on the road according to our research the team was able to combat this and design a futuristic system where the driver uses the phone to drive the car by plugging it into the dashboard console and connects with it to track and analyse the driver. This solution reduces mobile phone usage and mobile phones as a distraction.

The team learned about the various tools available to prototype. As the team decided to build wireframes and two implementations of the final wireframe, there was many opportunities to use different prototyping tools. The team looked at using Invision and Balsamiq. For the purpose of the assignment and due to time constraints, the team decided to use Balsamiq which gave the team insight into building a prototype and allowed them to quickly build an interactive low fidelity prototype to test the solution. It was by looking through these different prototyping tools that the team got an understanding of how these tools worked and which tools provided them with the creation of the prototype in the way the most suited the team, this included easy to use, easy to export and outputting a good prototype with in the time allowed.

The team also learned about creating a better design solution. The team found that by using an iterative process, they could eliminate designs that constricted or hindered the remedy to the design challenge. The process allowed the team to select certain features and elements that worked whilst removing those that didn't.

9.2 - What Would Be Changed

If the team were to redo the prototyping of the design challenge, the team would try and see about getting access to the full version of Balsamiq as the team used the online web trial as Balsamiq is a paid service. By using this trial, the team was limited to accessing Balsamiq in 1hr intervals while with the full version the team would not have had to worry about time running out and whether the latest design has been saved and downloaded as the hour expired and the next began.

The team would also have made the physical prototype using cardboard or thicker paper as the team found the paper to be flimsy and worried about getting tears. This was a concern of the team as the physical prototype could easily get ripped or ruined. The team would like to use a materials that is slightly more durable.

Another aspect that the team would change is how the pages are connecting in the physical prototype. If one were to use the physical paper based prototype they will notice as they move screens that the pages can get tugged and caught on the phone template. The team would want to look connecting the pages in a different way to prevent this.

The team would also change how the ranking of the prototyping storyboard was completed. These ranking were based on placing a priority on the different aspects of the storyboard, the team's priorities included the digital dashboard, application and various features that align with the needs of the persona. The team felt they took a broader view on prioritising the main components of the solution. Looking back on it now the team feels they could have applied prioritisation to the various features and smaller details rather than just looking at the 'bigger picture'. For example, the team could have prioritised features such as analysing a driver skills or the interaction of syncing data from digital dashboard with the mobile phone application but instead chose the mobile application instead and the entire digital dashboard, rather than parts of it.

9.3 - What Was a Surprise

The team found it surprising when forming the ‘How Might We Test’ questions and found this to be slightly difficult as the proposed idea was heavily component based with the integration of future technologies. The team felt that since the idea was heavily component based the ways of testing were limited. With this ‘felt’ limitation the team surprised themselves with the kind of questions being formed and although limited there is always a question to be asked and an answer to be found by looking into each scenario closer.

9.4 - Challenges Faced

One of the challenges the team faced was time management in terms of wireframing. The team found during the wireframing stage that time management was a problem as the team initially started creating wireframes together and decided to continue the wireframing individually and during the next meeting the team would decide on the wireframe that would be the most successful in relation to the design challenge and meeting the personas needs. The process meant the wireframing stage took up more time than the team has allocated and this lead to reduced time in other areas of the project.

Another issue the team faced was when printing out the physical prototype, the team faced a problem with sizing. As the team wanted to make a physical prototype that reflected a real phone, there were issue with printing at the correct size. It took the team three chances in order to get the sizing correct for the mobile prototype.

The team faced another challenge when trying to keeping the main persona - Bob - included during the prototyping and wireframing stage. The team found that they were having to consciously think about the persona they were designing for as sometimes the team felt the persona Bob was an afterthought to the process but as the team progressed they did improve on this but they feel it should have been fore front thought at all times.

Finally, the team faced a challenged on choosing the end design. Throughout the process, the team found that at times they were indecisive in making a decision on the design, they feel this

was due to personality styles as both team members were being considerate of one another choices and considerate of one another personal designs and inputs on the design challenge.

10.0 - Future Developments

If the project were to continue into the next stages, the team would like to analyze the wireframes and prototypes in a way that the design can be justified. They would look at applying Shneiderman's 8 Golden Rules of interface design to improve on usability and ensure the experience is tailored to users frame of mind. At a low level, the team believes the design meets some of the rules but it is not something that has been applied or used in the duration of the project but is something the team would have like to look at.

The team would also like to carry out user testing. As this project was time constrained the team didn't get the opportunity to test their solution but understands the value of user testing to help further enhance and develop the solution for users. The team was indeed prepared for a basic user testing as the digital prototype is an interactive PDF which allows users to test out the flow of the proposed solution. This prototype can be found as part of the project submission.

Along with user testing the team would like to conduct further observations, possible with the user testing to see where problems are arising with the designed solution and whether there is anything that needs to be changed.

Finally, the team would look at for future developments would be the actual development of the solution or other possible means of implemented the solution as the team understands that the proposed solution is based on current and futuristic technologies.

11.0 - Conclusion

Throughout the process the team developed a better understanding of the design process and the many stages which construct it. Interviews tended to be where most time was spent and most information was gathered. The interviews were helpful as they provided a greater insight into the target audience of the design challenge chosen at the beginning of the project. Card sorting during interviews assisted with the collection of data on certain topics as it gave the user's insight on the topic while being straightforward and easy to perform. Observation was another form of data collection used, which helped gather vital information for refining the design challenge throughout the design challenge. The amount of time spent on collecting data was a surprise as each week the team put in a total of roughly 9 - 20 hours throughout each stage of the design process.

Interviewing subjects was a stage in the process which the team improved upon as interviews progressed. Refining the interview guide and allowing constructive feedback allowed for the team to move forward to the next interview with a better interview guide and a sense of what to improve. The creation of empathy maps and identifying appropriate statements was a task that was greatly improved upon. The team completed each interview and then listen back to the interview during the analysis to ensure no vital points were missed.

Building a persona was a new aspect for the team, but was met with great enthusiasm. After analyzing the interviews and plotting out behaviour variables, the team proceeded to construct two personas, one a primary persona and the other the secondary. During the process, communication was kept open. Certain aspects of a persona assigned in earlier stages were found to contradict other statements and were found to suit the other persona more than the original persona it was assigned to. Developing personas greatly improved upon the later stages of the design process as the team has to keep ideas to what would work for their primary persona.

Throughout the brainstorming phase, the persona was constantly brought into account for what they would potentially want to assist them with the challenge. The team found themselves

having to pull back from ideas and having to remain open minded as to prevent focus on a specific idea. Brainstorming allowed the team to throw any idea out as anything could potentially work. Once the ideas were refined, debates on ideas began to happen which ensured the ideas were well thought out as they had to be explained to the team in a logical way which would make sense not just to the team, but also to the user.

During the prototyping phase, wireframes were created for the final idea before a prototype was created. Inspiration was primarily drawn during this phase as the team did not want to close off possible ideas during earlier phases. Pulling inspiration from other applications and interviews conducted allowed for the creation of the prototype for the design challenge presented within this report.

In conclusion, the design process is a constant cycle of designer to developer to user which is vital in the development of user centered products. The team learned a lot about the process and truly benefitted from this experience. The team was introduced them to the full design process and the was has to offer to UX and UI design. Going through the process allowed for mistakes to be made and lessons to be learned. Every stage of the process was embraced and experienced fully as without doing so would reduce in the final prototype.

12.0 Appendix

Appendix 12.0.1

Design Challenge:

"How to educate experienced drivers to improve on road safety"

Knowledge Known:	Knowledge UnKnown:
Rules of the Road	Statistics on People's knowledge on rules of the road
From experience, non-plated experienced drivers tend to be casual drivers	Statistics on People's knowledge on road safety
Small knowledge of Driving Legislation	Is road safety specific to a particular type of driver, eg. age, gender ?
	Full knowledge of Driving Legislation

What we understand:	What we don't understand:
Some driving techniques	Full comprehension of driving technique
Some of the rules of the road	

Constraints / Barriers:

- Technology integration with driving
- Not a distraction to the driver

Research:

- RSA (experts)
- Different leveled drivers - Beginner, Intermediate, Experienced, Experts
- <http://www.irishstatutebook.ie/eli/2010/act/25/enacted/en/html>

Appendix 12.0.2

Empathy Map

Interviewee: _____

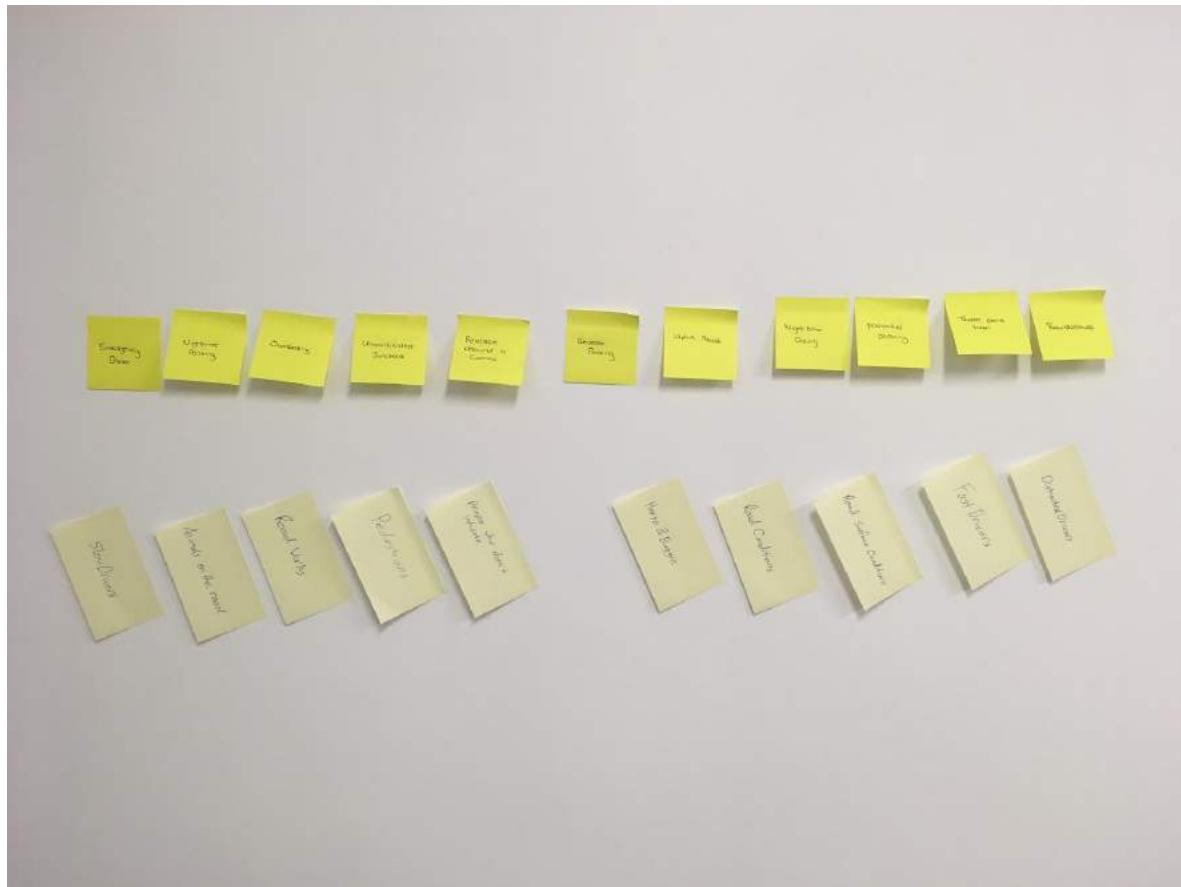
Date: _____

Time: _____ Location: _____

Said:	Feel:
Think:	Do:

12.1 Subject #1

Appendix 12.1.1



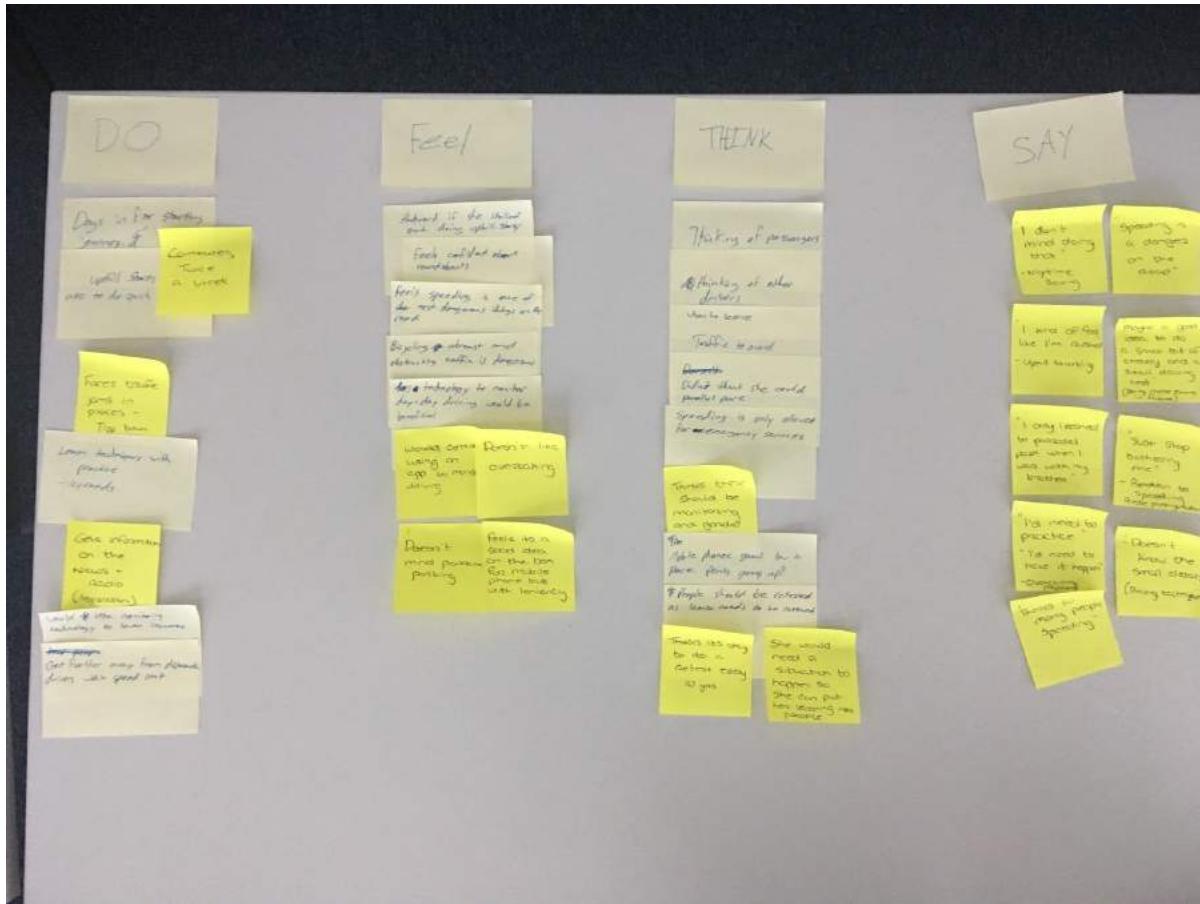
(Subject 1: Card Sorting. Top: Technique Card Sorting. Bottom: Dangers.)

Appendix 12.1.2



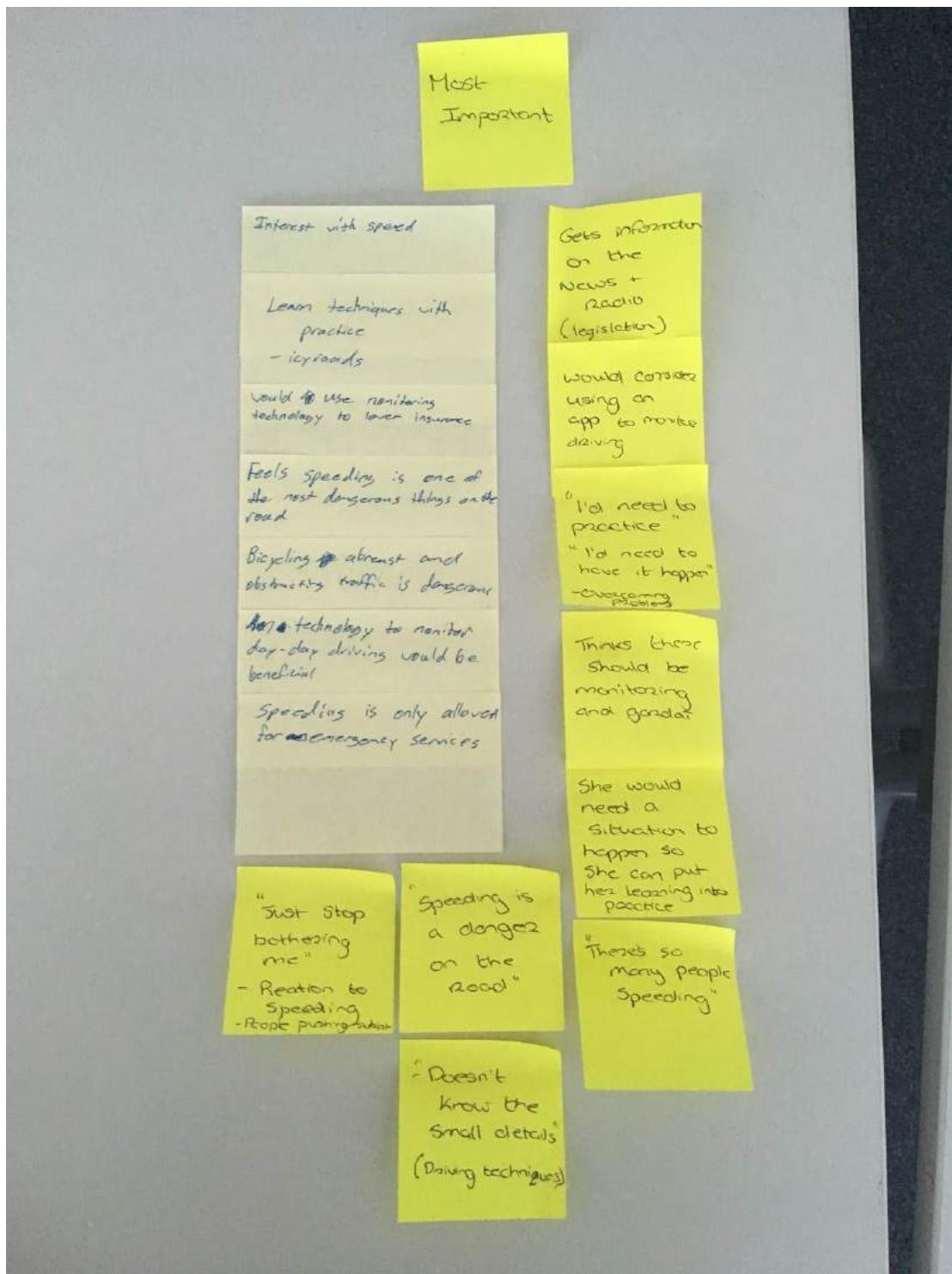
(Subject 1: Card Sorting. Clustering.)

Appendix 12.1.3



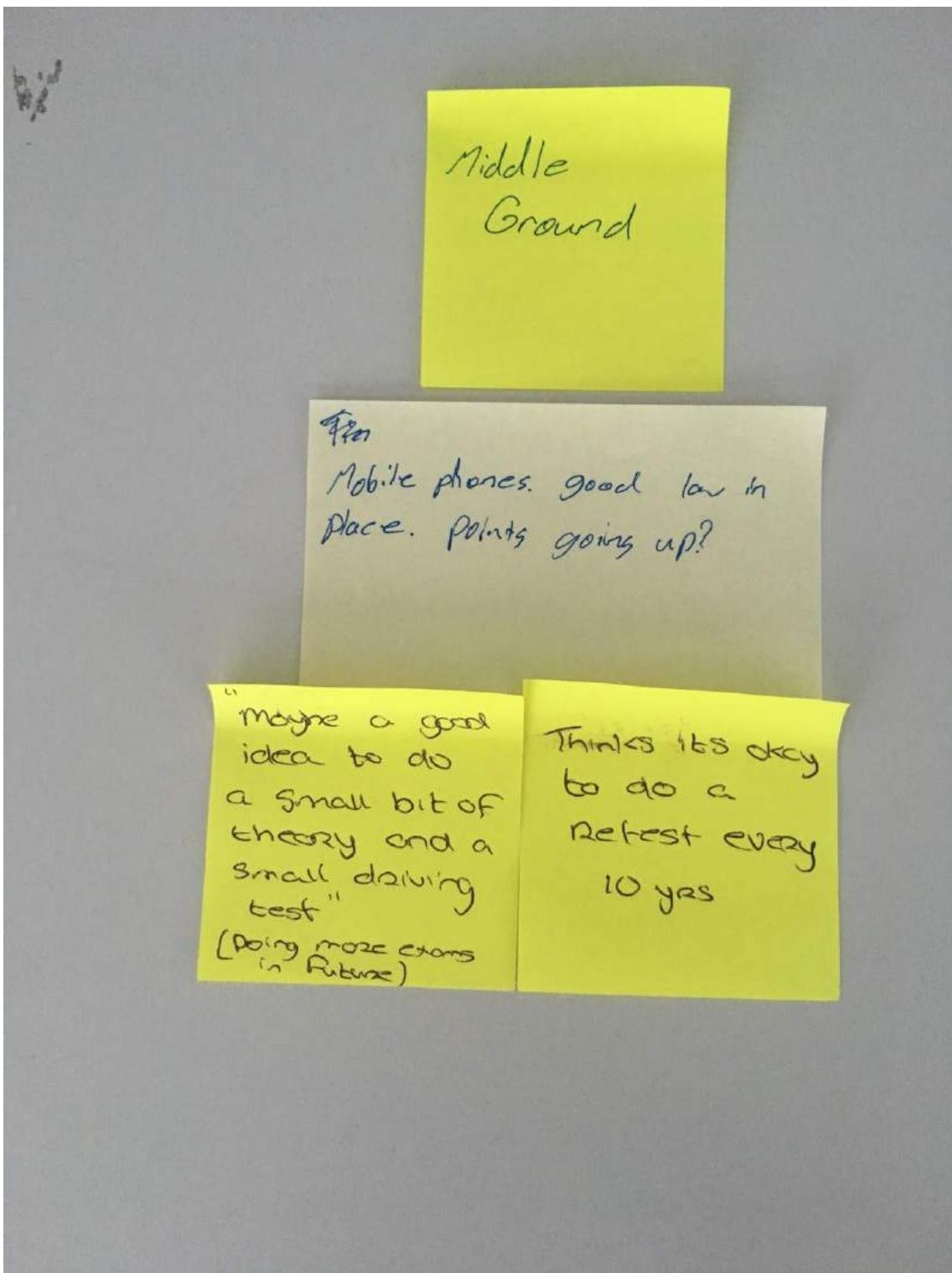
(Subject 1: Empathy Map of Interview)

Appendix 12.1.4



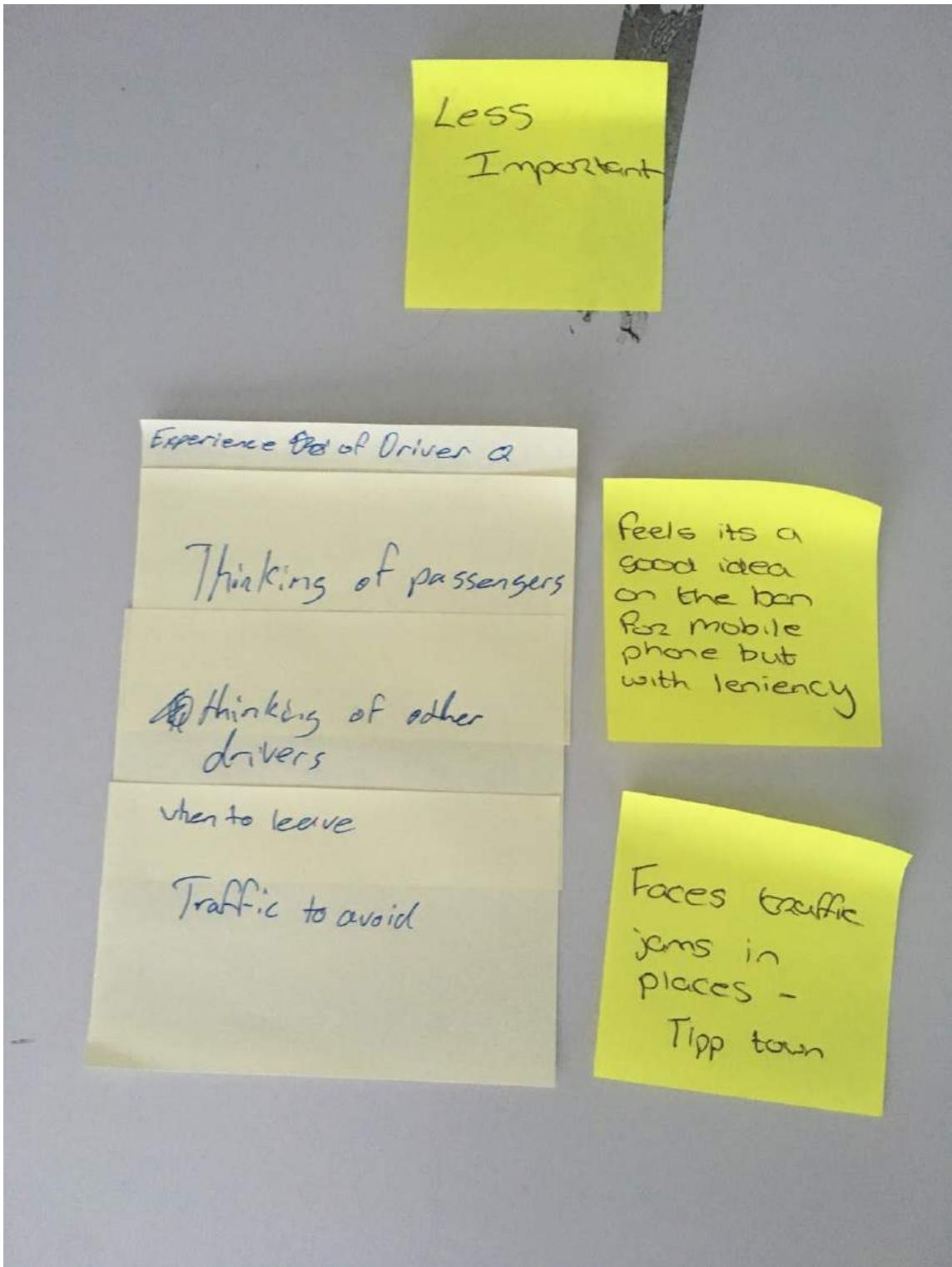
(Subject 1: Most important cards from empathy map regarding the design challenge)

Appendix 12.1.5



(Subject 1: Middle ground cards pulled from empathy map regarding the design challenge.)

Appendix 12.1.6



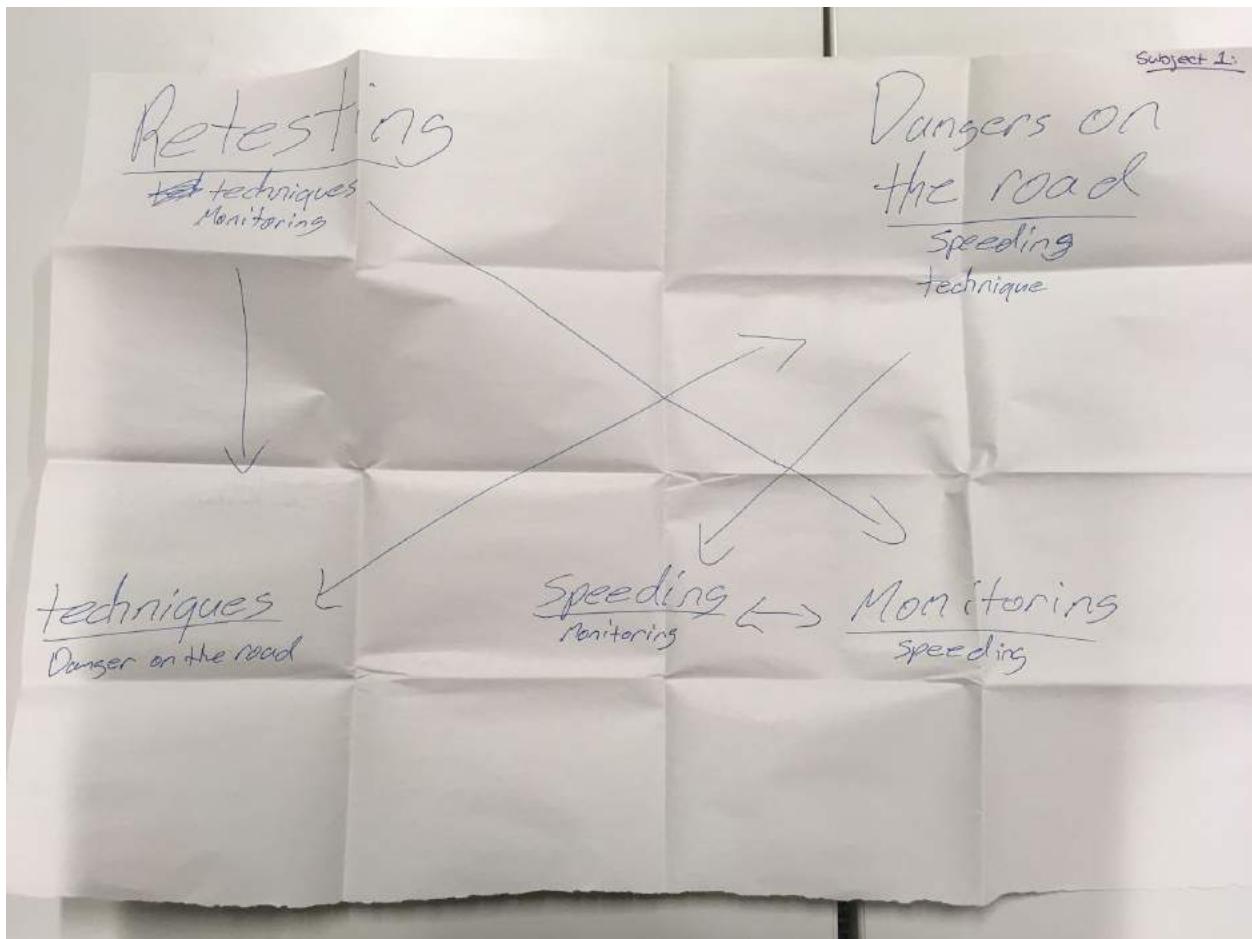
(Subject 1: Less important cards from empathy map regarding the design challenge)

Appendix 12.1.7



(Subject 1: Clustering Most Important, Middle Ground, Less Important cards into sections regarding design challenge)

Appendix 12.1.8



(Subject 1: Themed Cluster Relations from subject 1's interview)

Appendix 12.1.9
(Subject 1)

Interview Guide 1.0

1. How long have you been driving
 - a. How would you describe your experience level with driving
2. How do you begin your journey before driving
 - a. Do you have a ritual you follow
 - b. Why ?
3. Can you tell us about a typical driving trip to the shop, college, etc.
 - a. How do you normally know when to leave - do you plan ?
 - b. Do you ever face traffic jams during your trips ?
4. Where is your favourite place to drive ?
 - a. Why ?
5. In terms of comfort level, how do you feel aboutINSERT TECHNIQUE.... ?
 - a. Can you tell us about a time where you did said techniques
 - i. What was it like ?
 - ii. Positive, negative ?
6. What would be your strongest driving technique ?
 - a. Why ?
7. What would be your weakest driving technique ?
 - a. Why ?
 - b. What are your thoughts when you have to do it
 - c. What do you feel

8. What are your thoughts on speeding
 - a. Do you think in certain conditions that speeding is acceptable/non-acceptable
 - b. Why?

9. What is your perspective on the dangers of the road - thoughts ?

Agreements/Disagreements with the legislation ?

- a. Why ?

10. There are so many different regulations in driving, Do you keep up with the rules and regulations of the road

- a. How do you keep yourself updated ? (What medium)
- b. Why ?

11. What do you think about the laws in relation to mobile phone usage while driving

12. Do you think drivers should get retested every 10 years when they renew their licence?

- a. Why ?
- b. From your own perspective would you mind getting retested on your driving ?
- c. Reasoning ?

13. If your insurance company offered an app that monitored your actions while driving, that in turn would help to lower your monthly/annual rate, would like be an option that you would consider ?

Appendix 12.1.10

(Subject 1:)

Insight statements and How Might We:

Speeding

Insight Statement: Speeding shouldn't be as lenient and Gardi should be more frequent and less known.

Insight Questions: How might we monitor drivers speeds more effectively?

Techniques

Insight Statement: Techniques are best learned when put to practice.

Insight Questions: How might we encourage drivers practice driving techniques to ensure they grasp the concept?

Retesting

Insight Statement: Retesting should be introduced to ensure correct technique is being applied.

Insight Questions: How might we encourage users to perform their own evaluation on their driving techniques?

Dangers

Insight Statement: It would seem that one of the largest factors of dangers of the road is speeding.

Insight Questions: How might we measure speedings in comparison to the danger to the road?

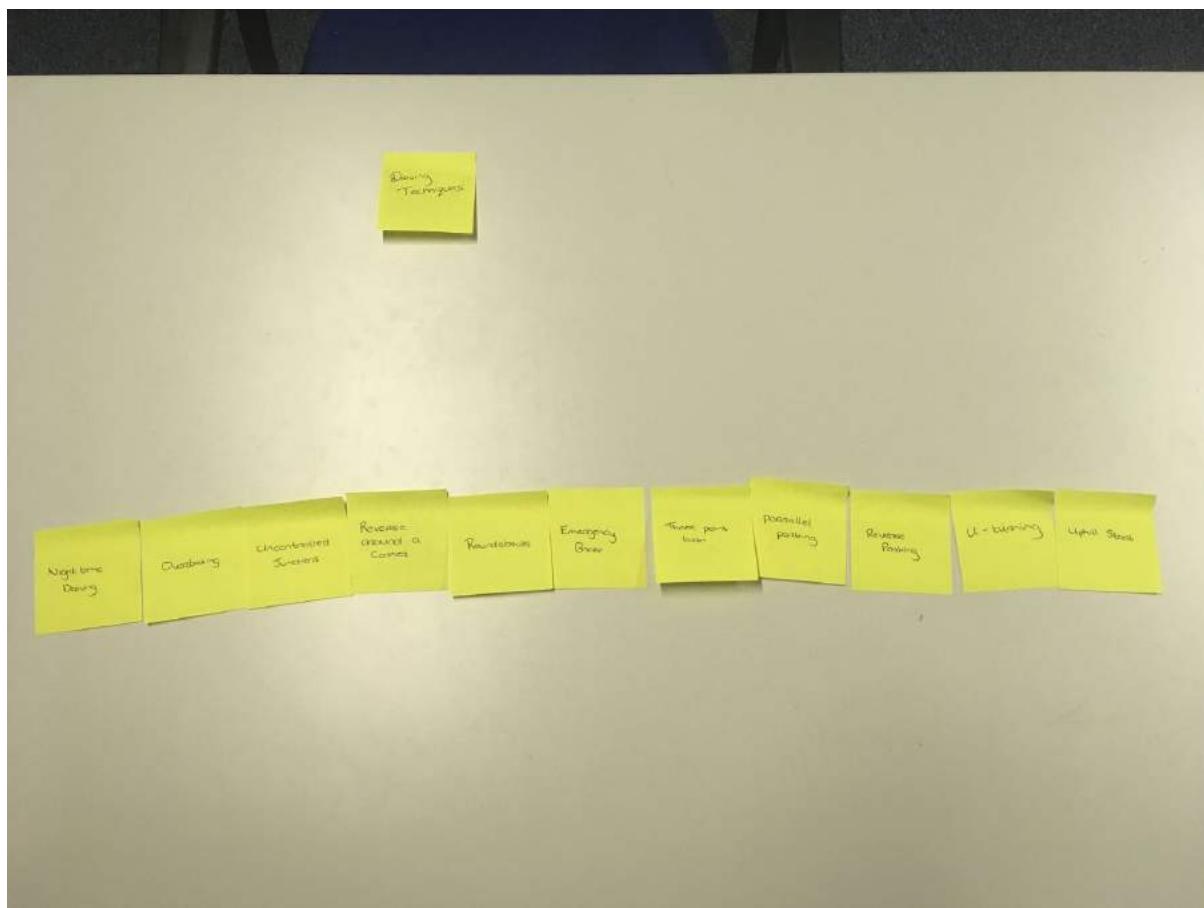
Monitoring

Insight Statement: Monitoring speed is an aspect which should be considered.

Insight Questions: How might we monitor speed more frequently?

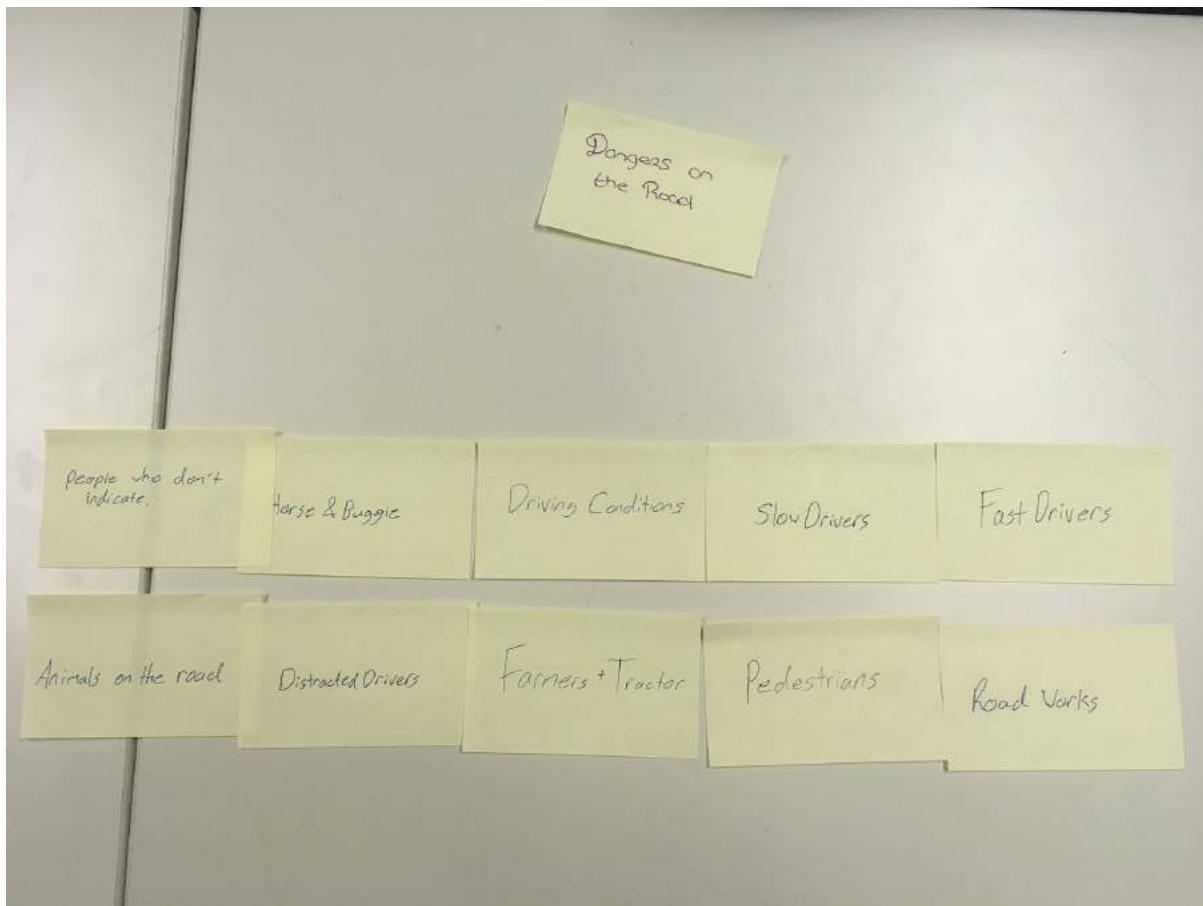
12.2 Subject #2

Appendix 12.2.1



(Subject 2: Driving techniques card sorting for subject 2 depicting their best to worst driving techniques)

Appendix 12.2.2



(Subject 2: Dangers on the road card sorting for subject 2)

Appendix 12.2.3



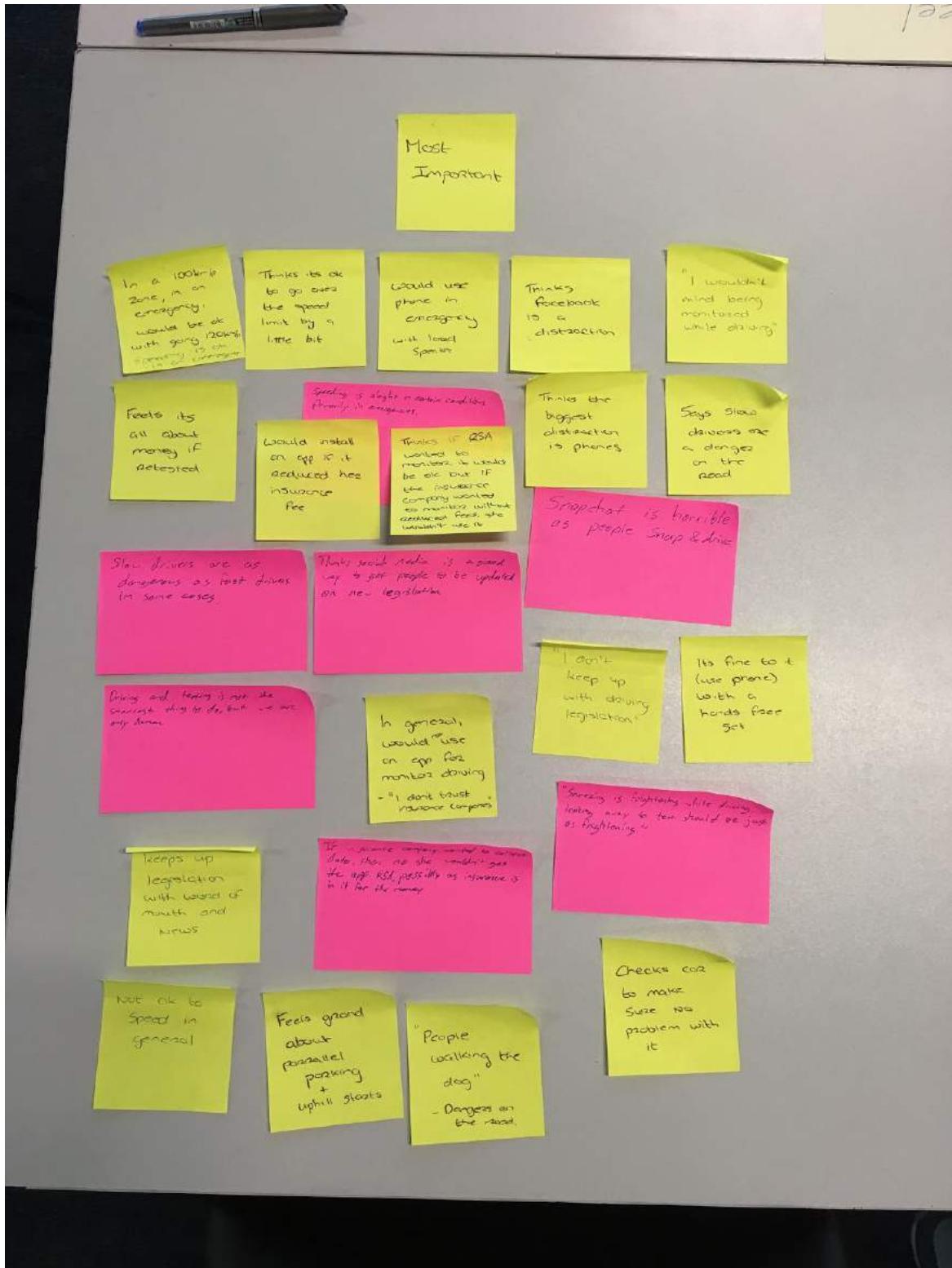
(Subject 2: Clustering of different aspects related to design challenge. Sorted by subject 2)

Appendix 12.2.4



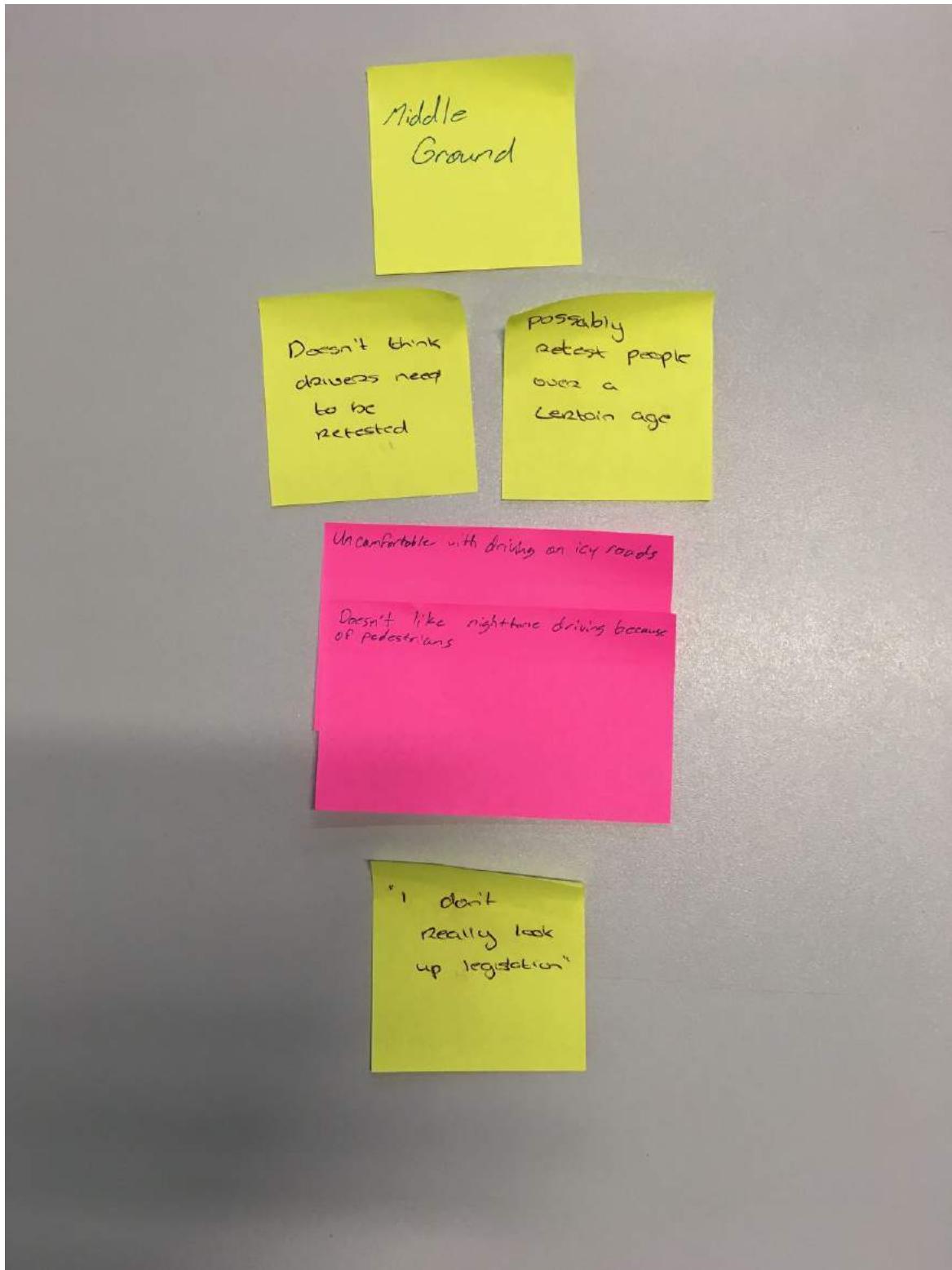
(Subject 2: Empathy Map laid out after listening to subject 2's recorded interview)

Appendix 12.2.5



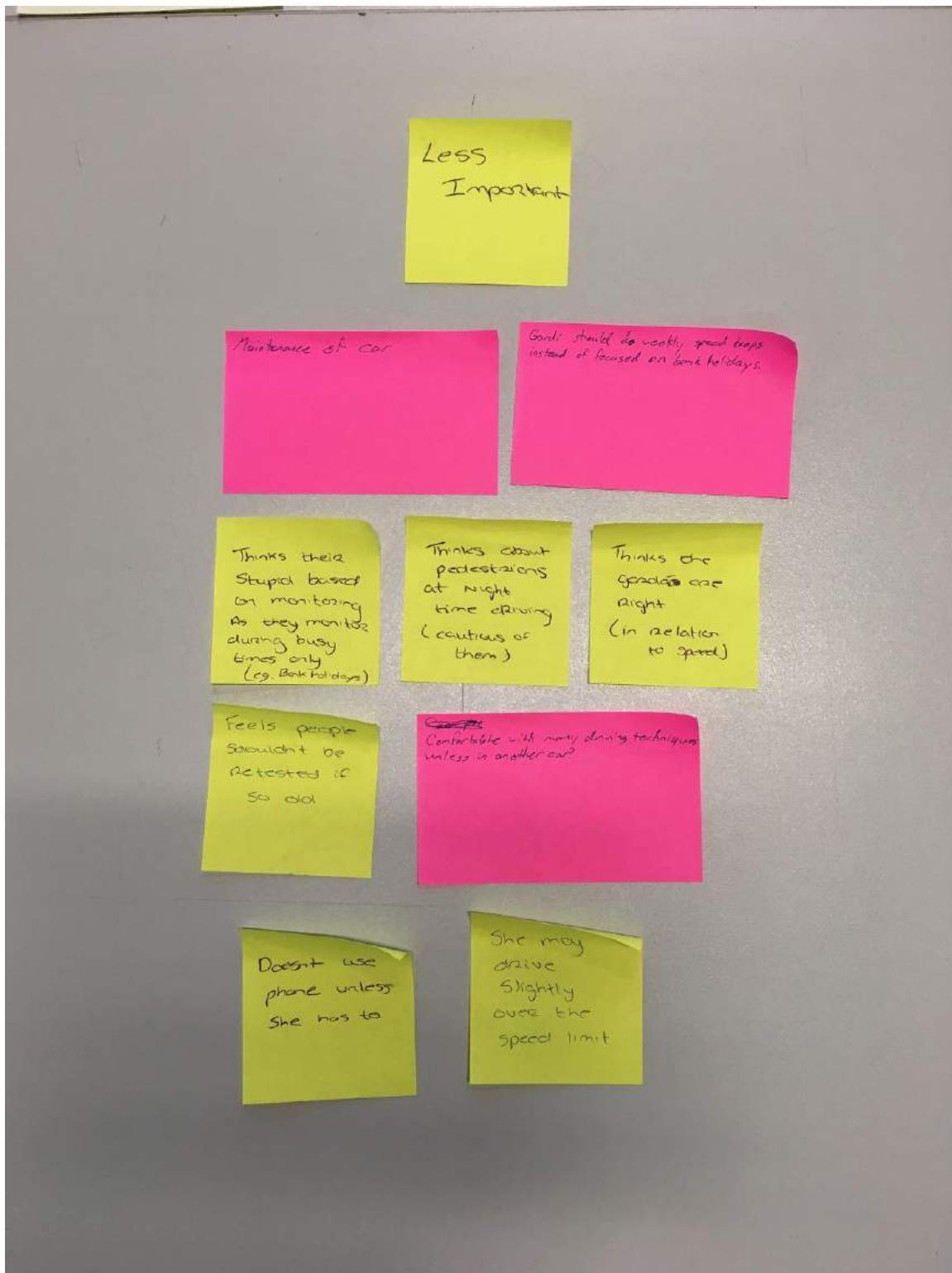
(Subject 2: Most Important points from subject 2's interview with regards to the design challenge)

Appendix 12.2.6



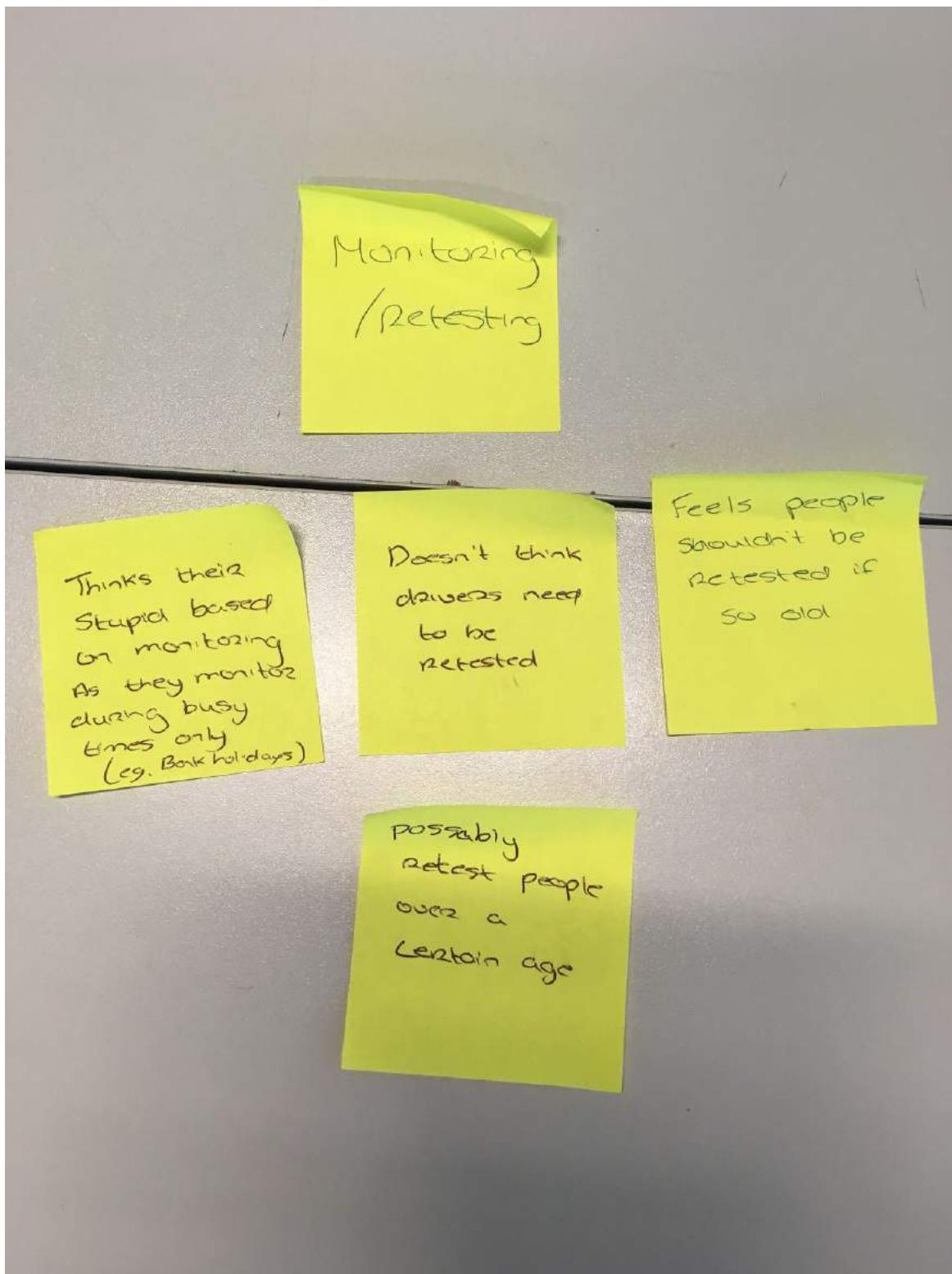
(Subject 2: Middle Ground points from subject 2's interview with regards to the design challenge)

Appendix 12.2.7



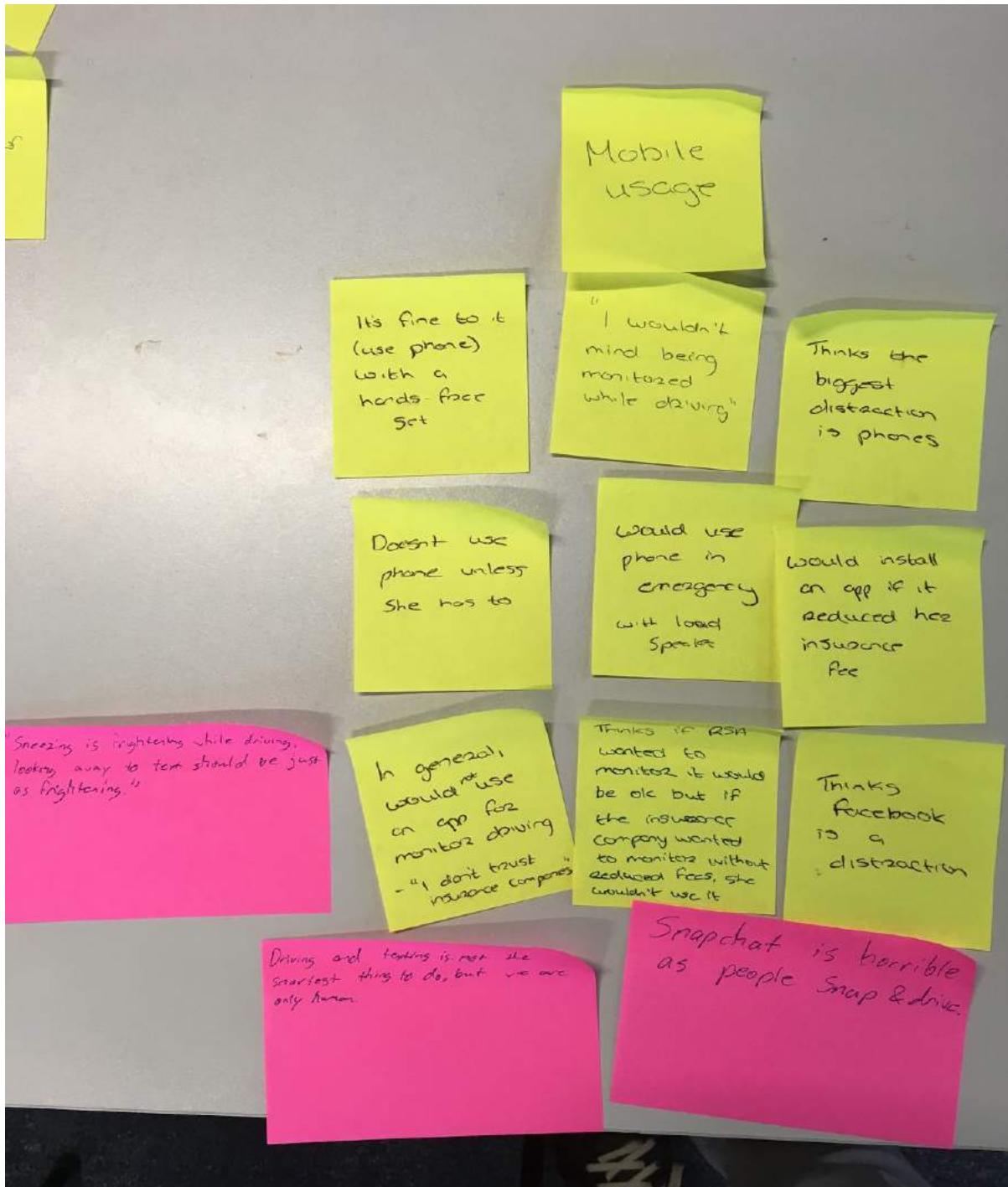
(Subject 2: Less Important points from subject 2's interview with regards to the design challenge)

Appendix 12.2.8



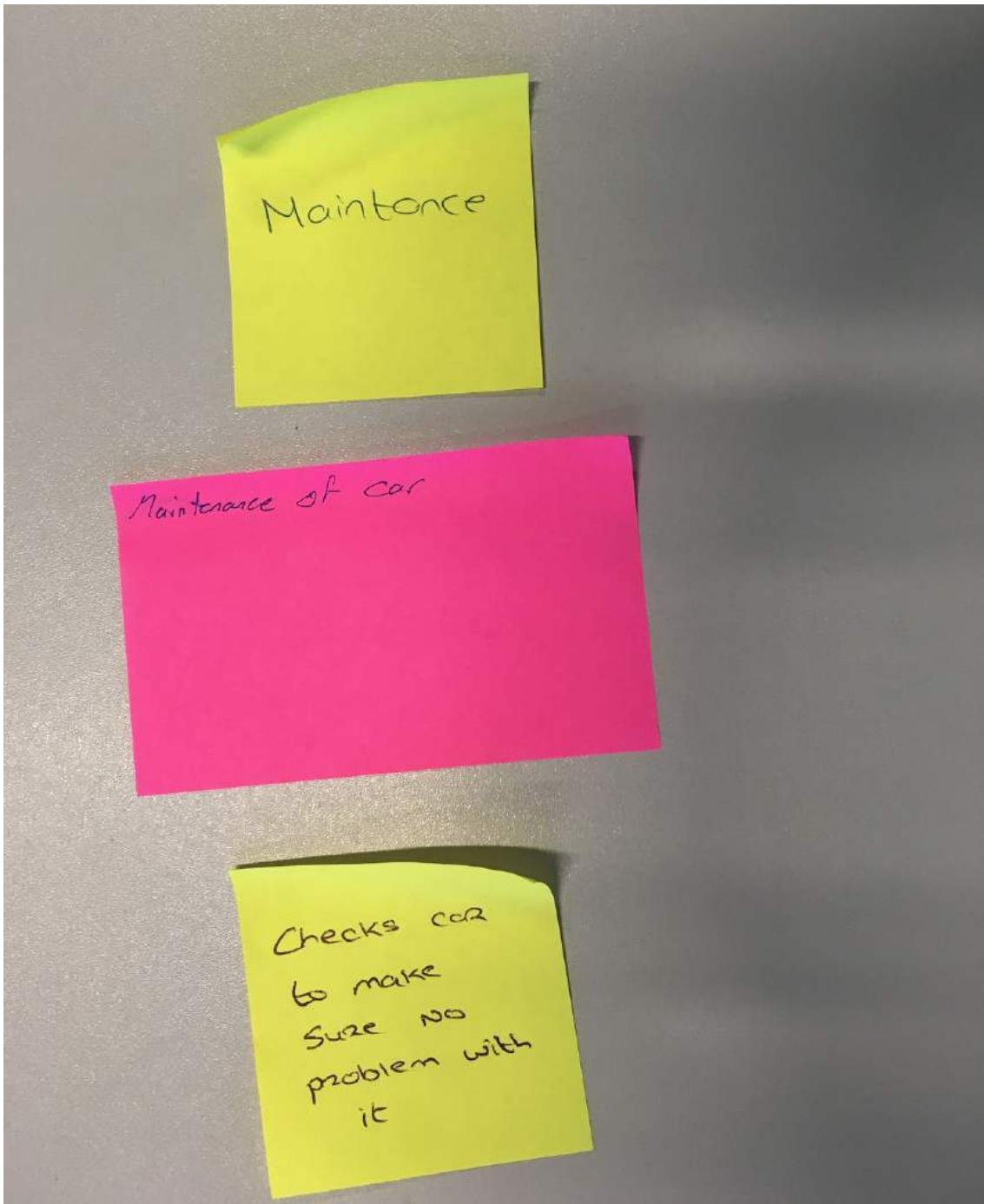
(Subject 2: Points about Monitoring & Retesting from subject 2's interview)

Appendix 12.2.9



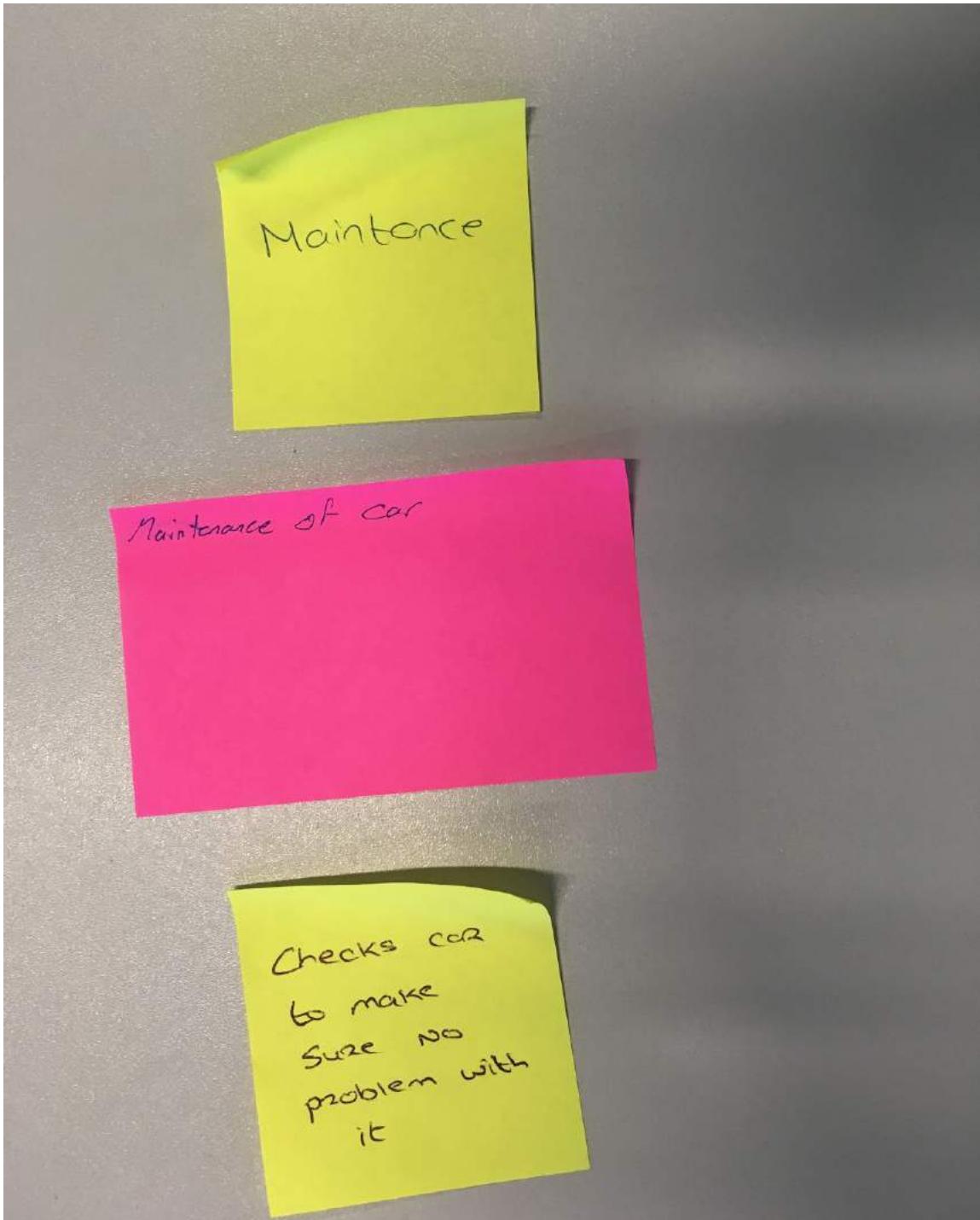
(Subject 2: Points about Mobile Usage from subject 2's interview)

Appendix 12.2.10



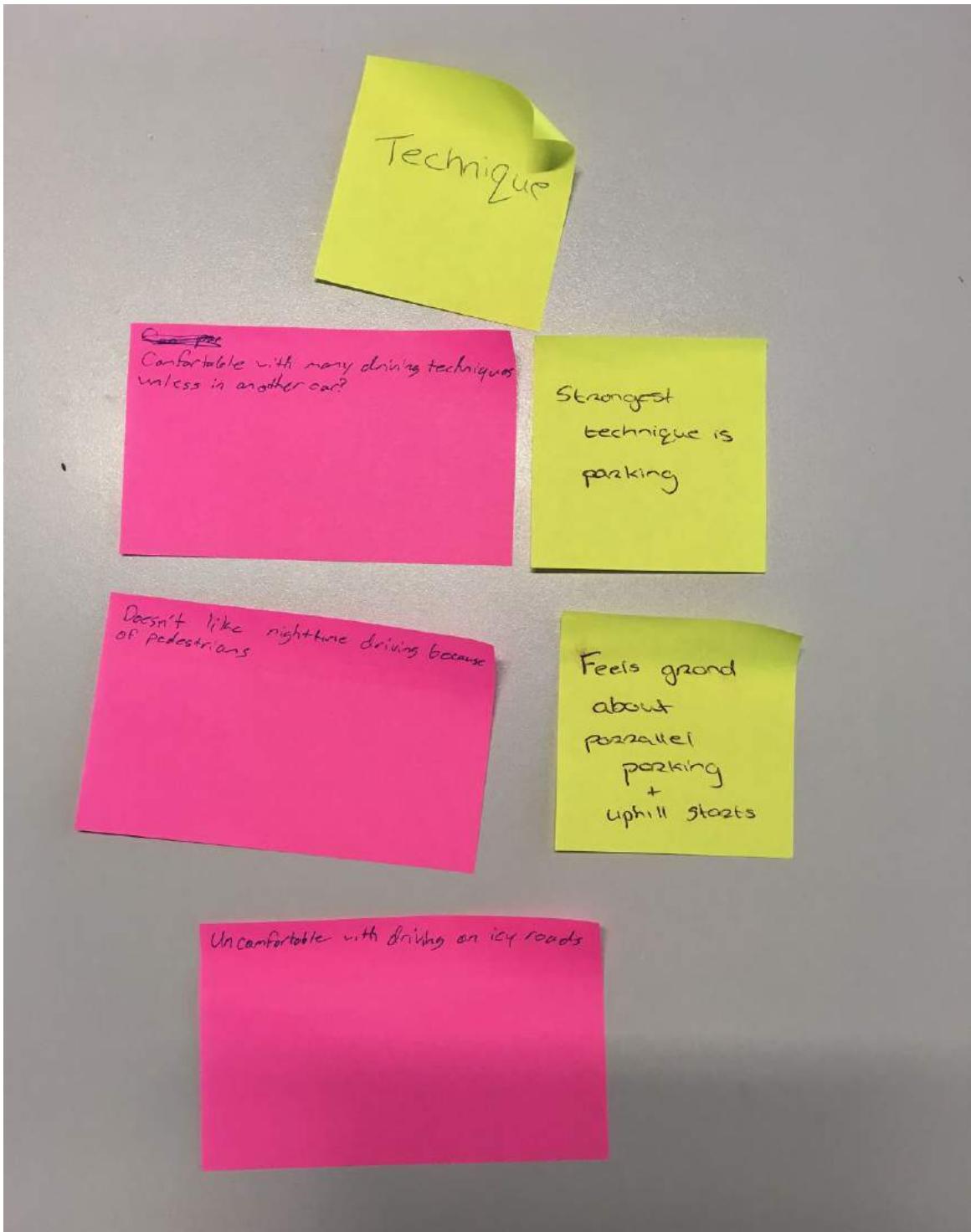
(Points about Car Maintenance from subject 2's interview)

Appendix 12.2.11



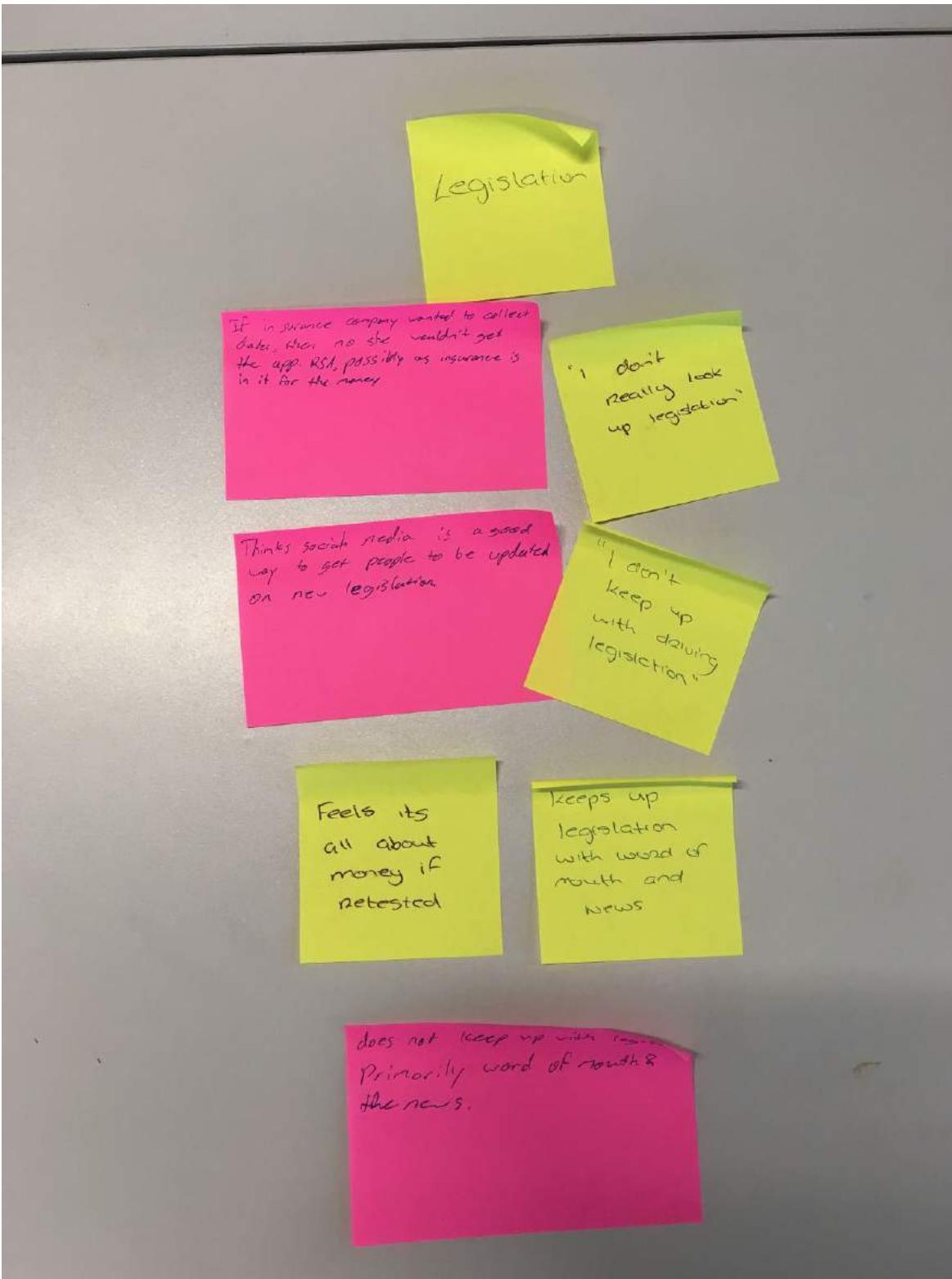
(Subject 2: Points about Speeding from subject 2's interview)

Appendix 12.2.12



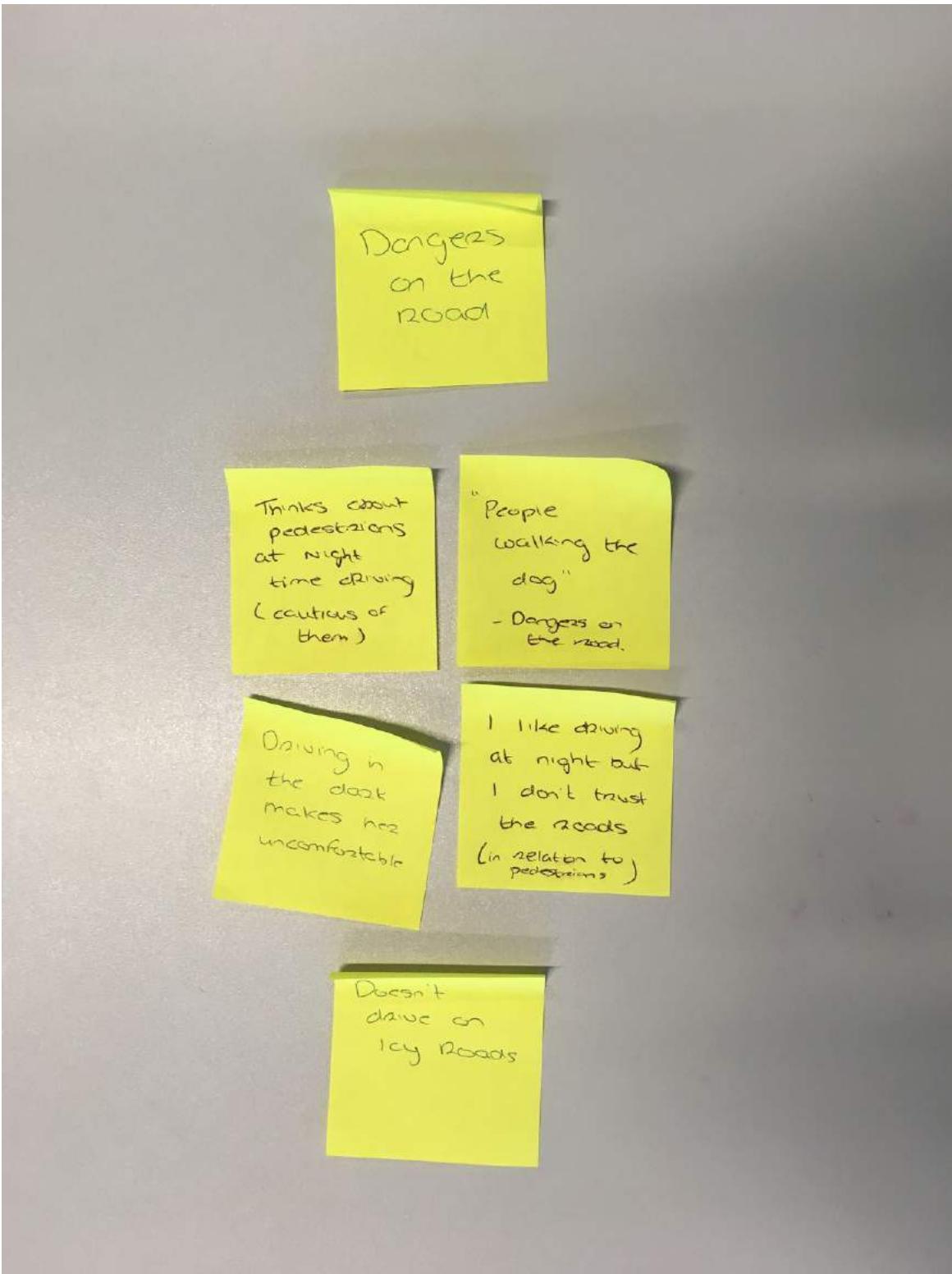
(Subject 2: Points about Technique from subject 2's interview)

Appendix 12.2.13



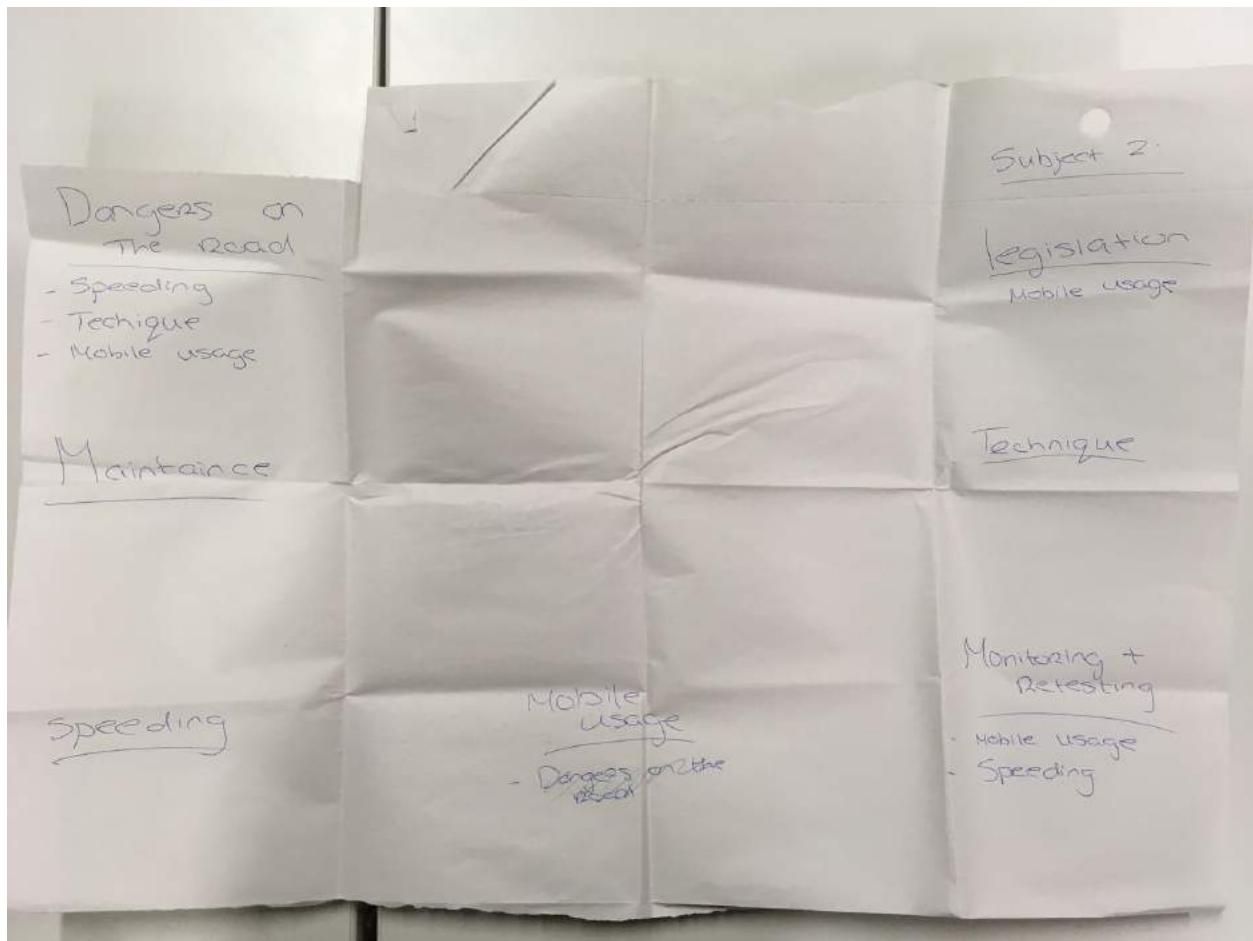
(Subject 2: Points about Legislation from subject 2's interview)

Appendix 12.2.14



(Points about Dangers on the Road from subject 2's interview)

Appendix 12.2.15



(Themed Cluster Relations from subject 2's interview)

Interview Guide 2.0

1. How long have you been driving
 - a. How would you describe your experience level with driving
2. Can you tell us about a typical driving trip to the shop, college, etc?
 - a. Ask Why
 - b. How do you start off your trip, in detail.
 - c. How do you normally know when to leave - do you plan ?
 - d. Do you ever face traffic jams during your trips ?
3. In terms of comfort level, how do you feel about(Uphill Starts, Parallel Parking, Uncontrolled Junctions, Reverse Around A Corner).... ?
 - a. Can you tell us about a time where you did said techniques
 - i. What was it like ?
 - ii. Positive, negative ?
4. What would be your strongest driving technique ?
 - a. Why is this your strongest driving technique?
 - b. Do you practice this technique a lot?
5. What would be your weakest driving technique ?
 - a. Why is this your weakest driving technique?
 - b. What are your thoughts when you have to do it?
 - c. Why do you feel this is your weakest?
6. What are your thoughts on speeding
 - a. Do you think in certain conditions that speeding is acceptable/non-acceptable
 - b. Do you yourself speed?

- c. Do you think Garda should be more strict on speeding?
- 7. Do you ever find yourself getting distracted ?
 - a. How ?
 - b. What are your thoughts on other distracted drivers?
- 8. What is your perspective on the dangers of the road - thoughts ?
Agreements/Disagreements with the legislation ?
 - a. Why might you agree/disagree with legislation?
 - b. What do you think is the biggest danger to the road?
- 9. There are so many different regulations in driving, Do you keep up with the rules and regulations of the road
 - a. How do you keep yourself updated? (What medium)
 - b. Do you think there could be a better/easier way to keep up with the rules and regulations of the road?
- 10. What do you think about the laws in relation to mobile phone usage while driving
 - a. Agree/Disagree with them ?
 - b. Would you change them in any way ?
- 11. Do you think drivers should get retested every 10 years when they renew their licence?
 - a. Why?
 - b. From your own perspective would you mind getting retested on your driving ?
 - i. Reasoning?
- 12. If your insurance company offered an app that monitored your actions while driving, that in turn would help to lower your monthly/annual rate, would this be an option that you would consider ?

Insight statements and How Might We:

Dangers on the road:

- Speeding seems to be a common danger on the road
 - How might we reduce the amount of drivers speeding on the road?
- Poor technique can lead to being a danger on the road
 - How might we improve a drivers driving techniques?
- Mobile phones seem to be a large component with the cause of accidents making it a large danger on the road
 - How might we reduce the amount of accidents caused by distracted drivers?

Maintenance:

- Maintenance of a car seems to be important to a driver
 - How might we assist the driver in the daily maintenance of their vehicle?

Speeding:

- Slow drivers going at slow speeds can also be as dangerous as fast drivers
 - How might we inform drivers on maintaining a reasonable speed?
- Speeding within reason is socially acceptable
 - How might we encourage drivers to drive within the speed limit?
- Speeding in an emergency appears to be justified within society
 - How might we discourage speeding in emergency situations?

Mobile Usage:

- People wouldn't mind being monitored via mobile usage with incentive
 - How might we encourage monitoring with the use of incentive?
 - How might we encourage monitoring without the use of incentive?
- A concern of users would be battery life and mobile reception if monitoring was conducted on mobile phones
 - How might we improve the battery life of the user's phone while they are monitored?
 - How might we consider the reliability of the mobile network in Ireland?

Monitoring and Retesting:

- People wouldn't want to be retested after being tested to get their license
 - How might we convince drivers to be retested?
- People feel that retesting would be more of a money grab
 - How might we demonstrate to drivers that a retest is for the safety of others?
- People wouldn't mind being monitored if incentive is given
 - How might we provide incentive to drivers? (Cash, "points", discount)

Technique:

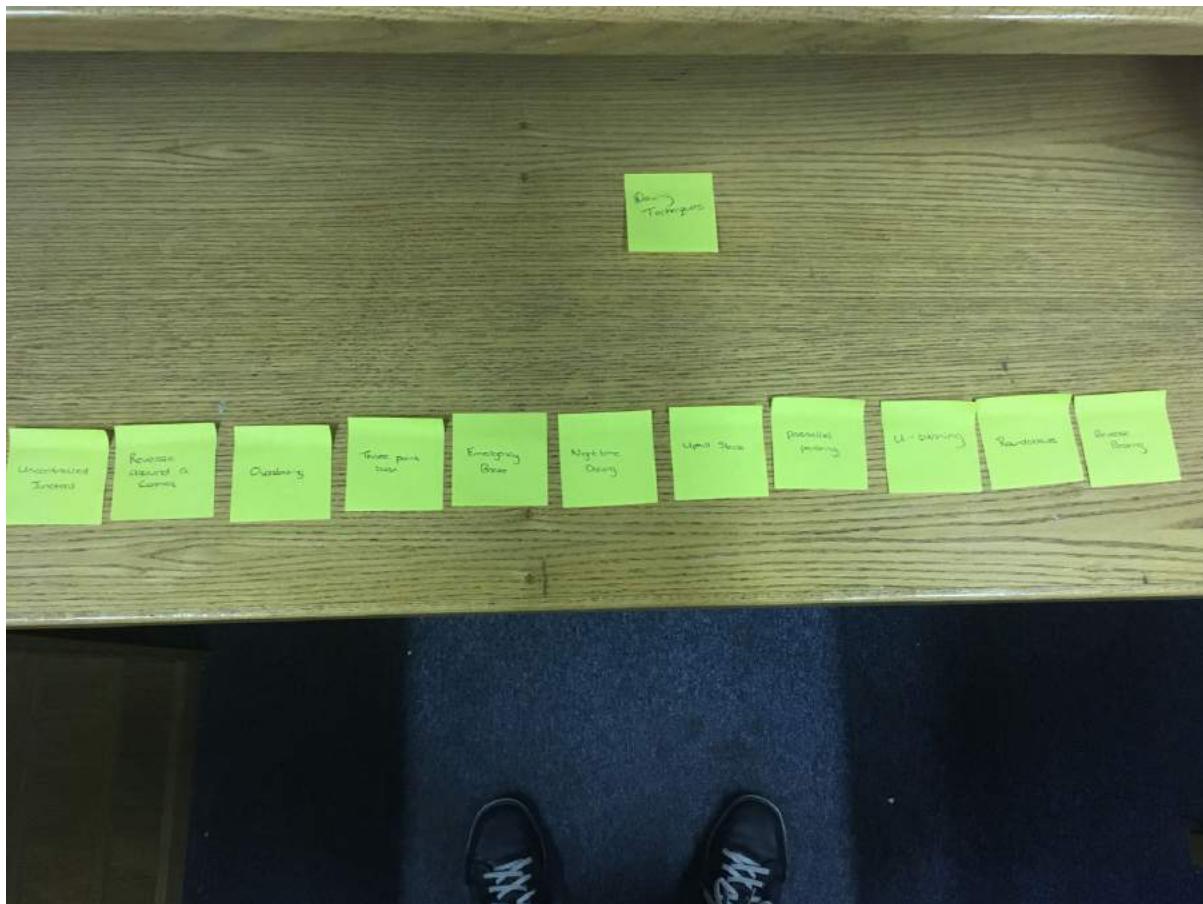
- People tend to learn when put to practice
 - How might we put driver's technique to practice?
- Nighttime driving is something drivers are concerned about
 - How might we better a driver's skill while nighttime driving?
 - How might we better nighttime driving in rural areas?
- Icy conditions is a general concern among drivers
 - How might we refine a driver's ability in icy conditions?

Legislation:

- People tend to learn about legislation through the news
 - How might we encourage people to listen to the radio for new legislation?
 - How might we expand upon the current platforms in which people learn about legislation?
- Social media and word-of-mouth tend to be the medium in which they learn legislation
 - How might we build upon the current foundation of legislation on social media?

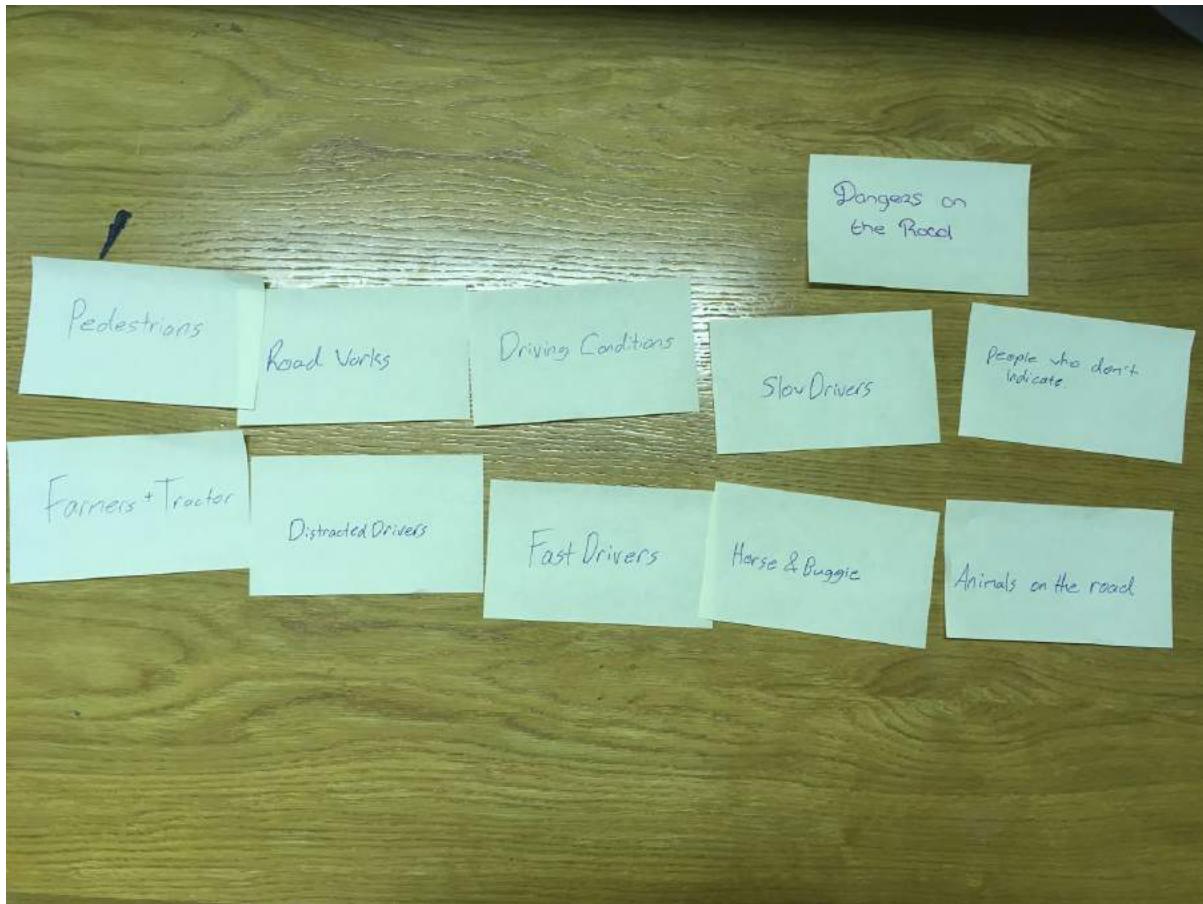
12.3 Subject #3

Appendix 12.3.1



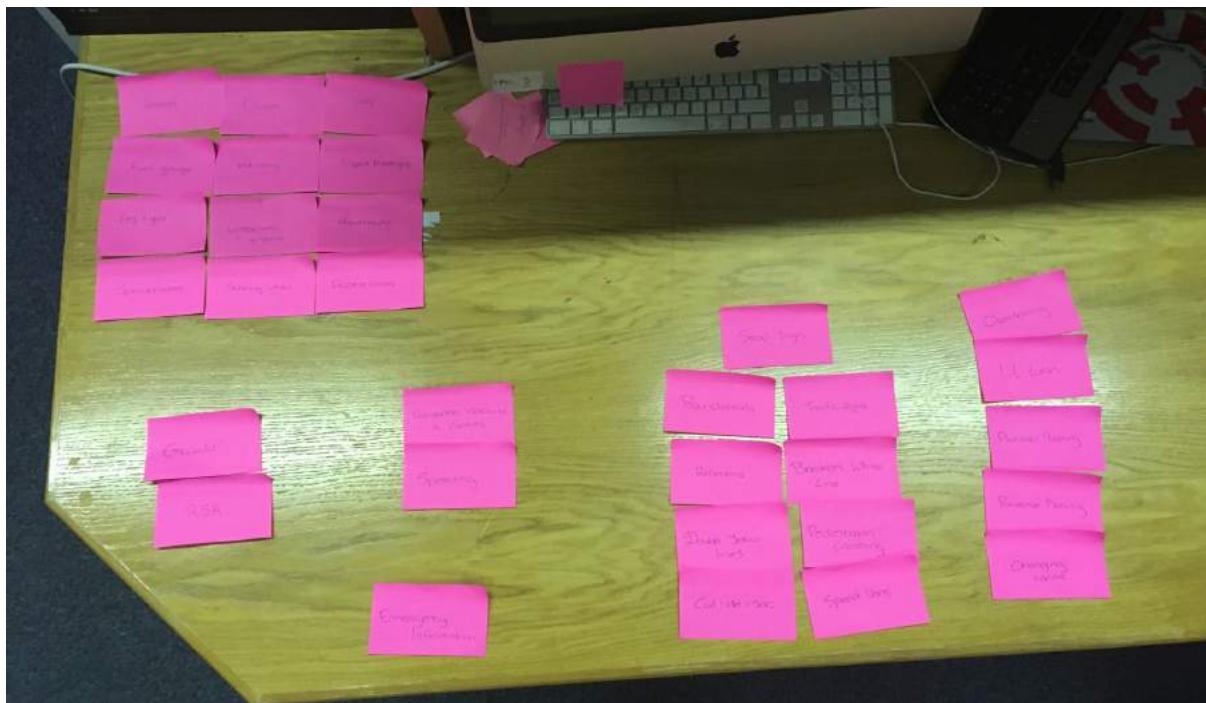
(Driving techniques card sorting for subject 3 depicting their best to worst driving techniques)

Appendix 12.3.2



(Dangers of the Road card sorting for subject 3 depicting the least to most dangerous)

Appendix 12.3.3



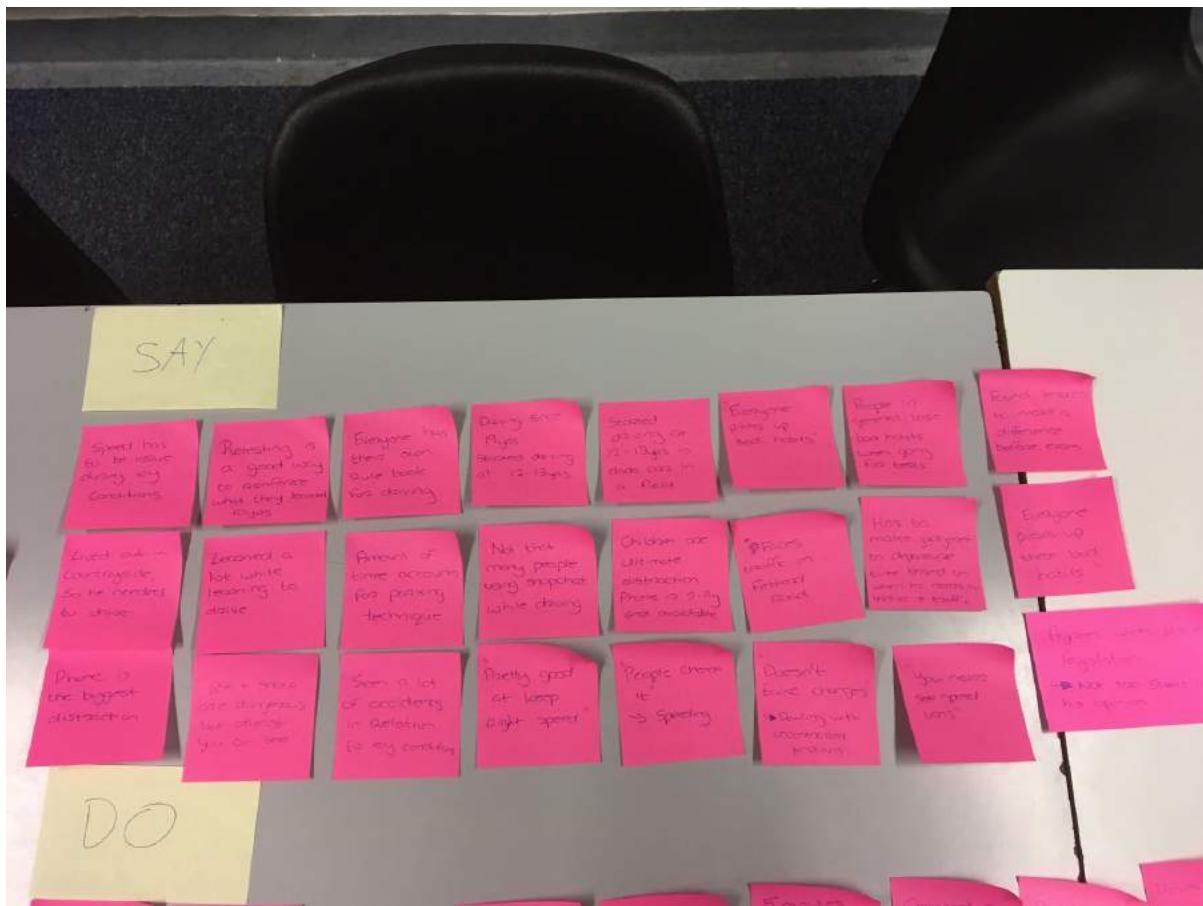
(Clustering of different aspects related to design challenge. Sorted by subject 3)

Appendix 12.3.4



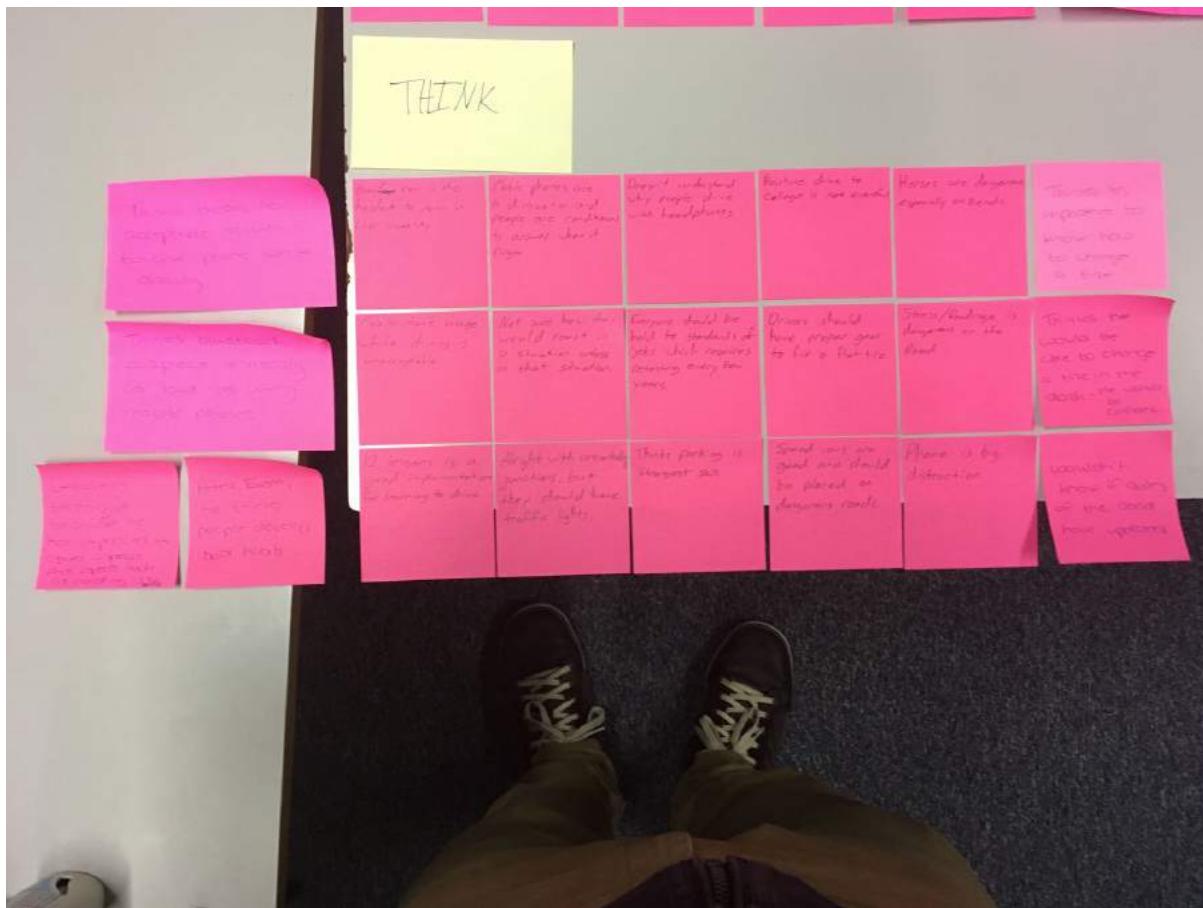
(Empathy Map DO section laid out after listening to subject 3's recorded interview)

Appendix 12.3.5



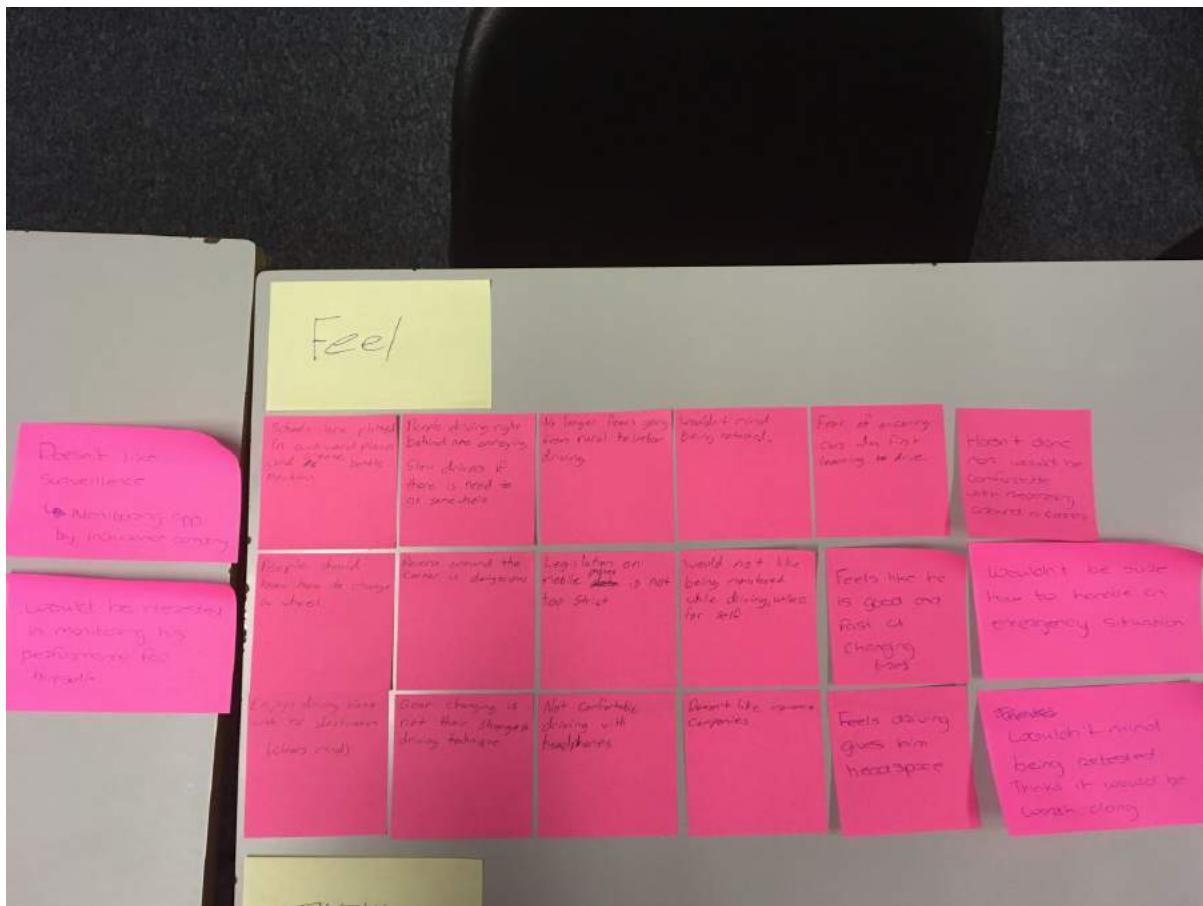
(Empathy Map SAY section laid out after listening to subject 3's recorded interview)

Appendix 12.3.6



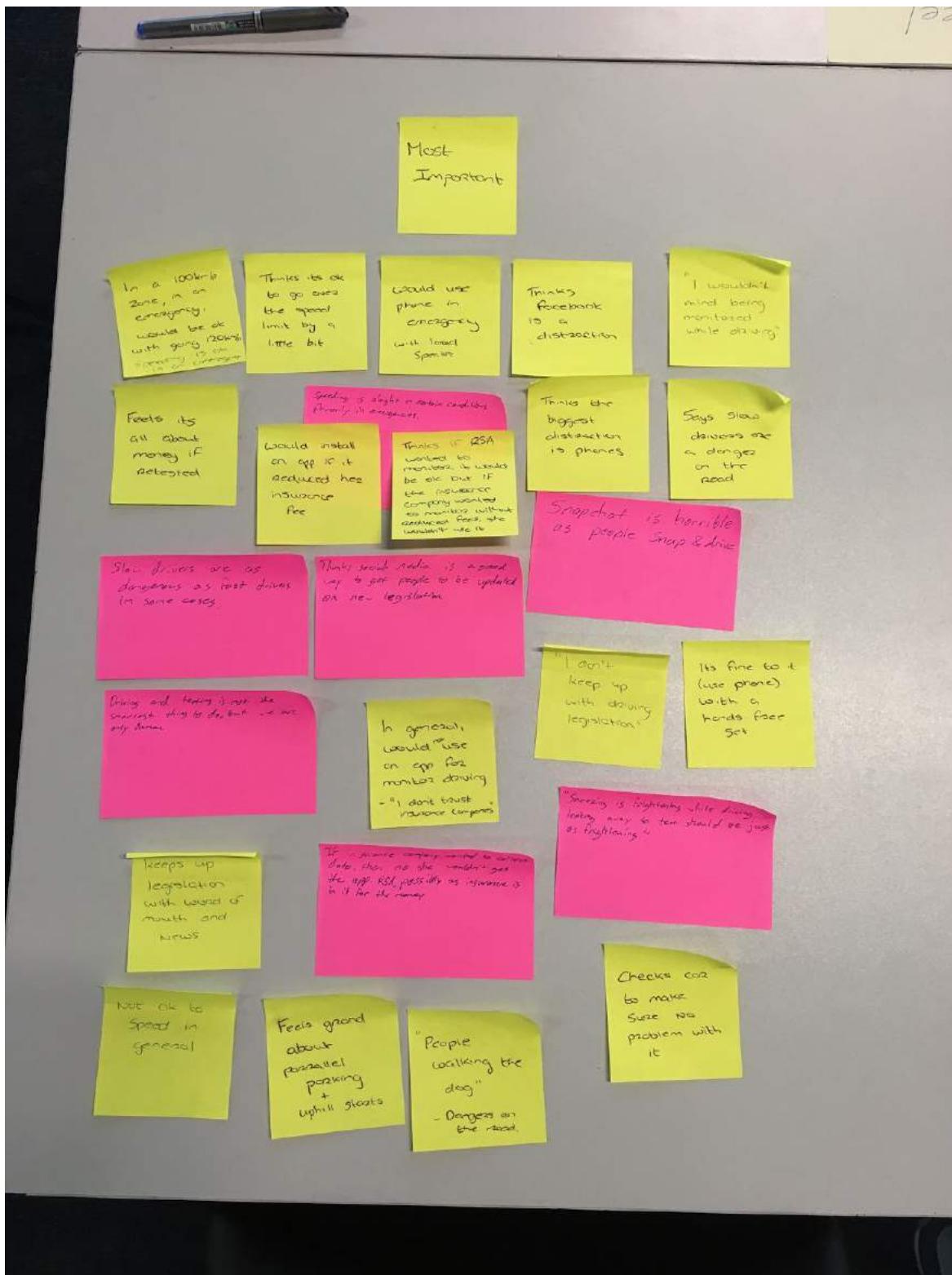
(Empathy Map THINK section laid out after listening to subject 3's recorded interview)

Appendix 12.3.7



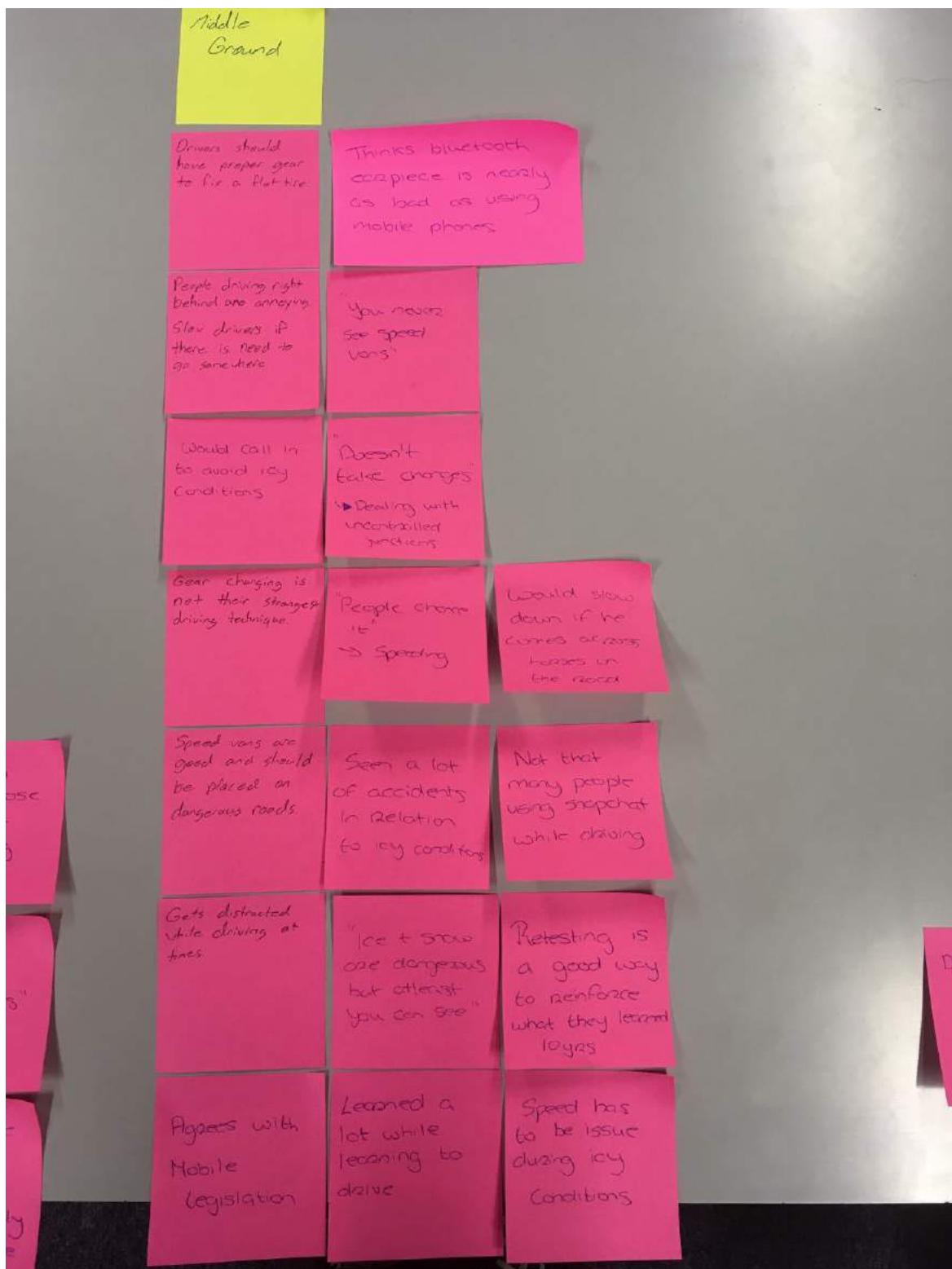
(Empathy Map FEEL section laid out after listening to subject 3's recorded interview)

Appendix 12.3.8



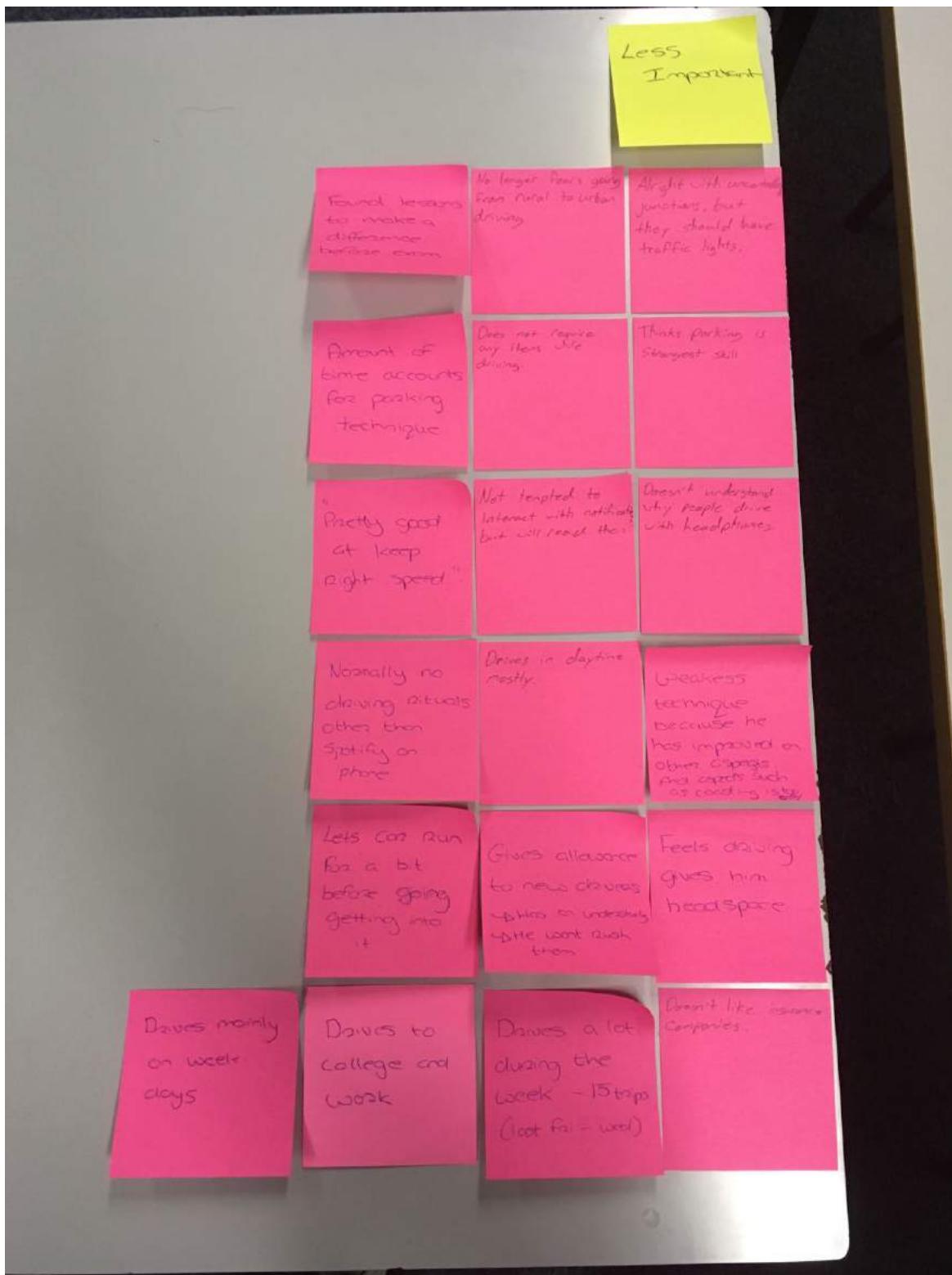
(Most Important points from subject 3's interview with regards to the design challenge)

Appendix 12.3.9



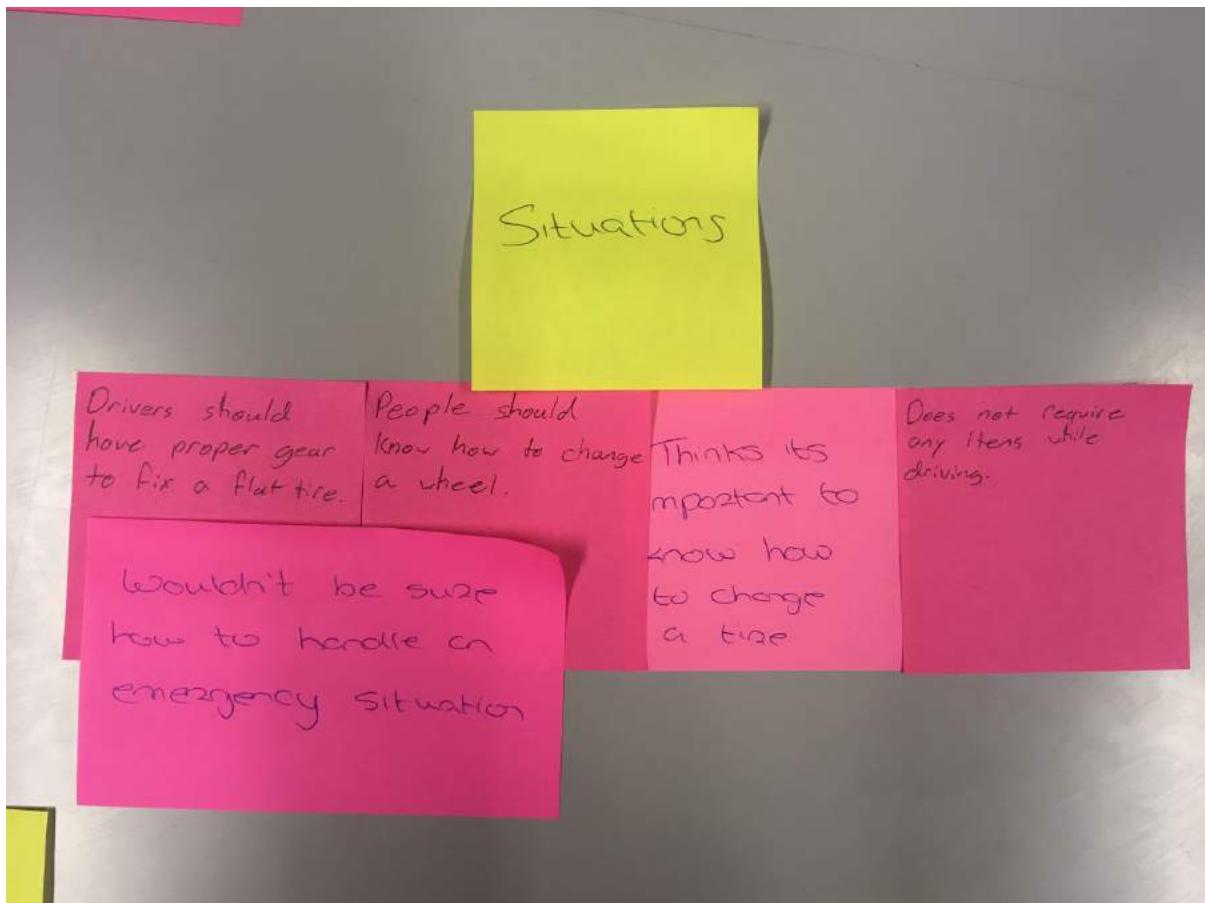
(Middle Ground points from subject 3's interview with regards to the design challenge)

Appendix 12.3.10



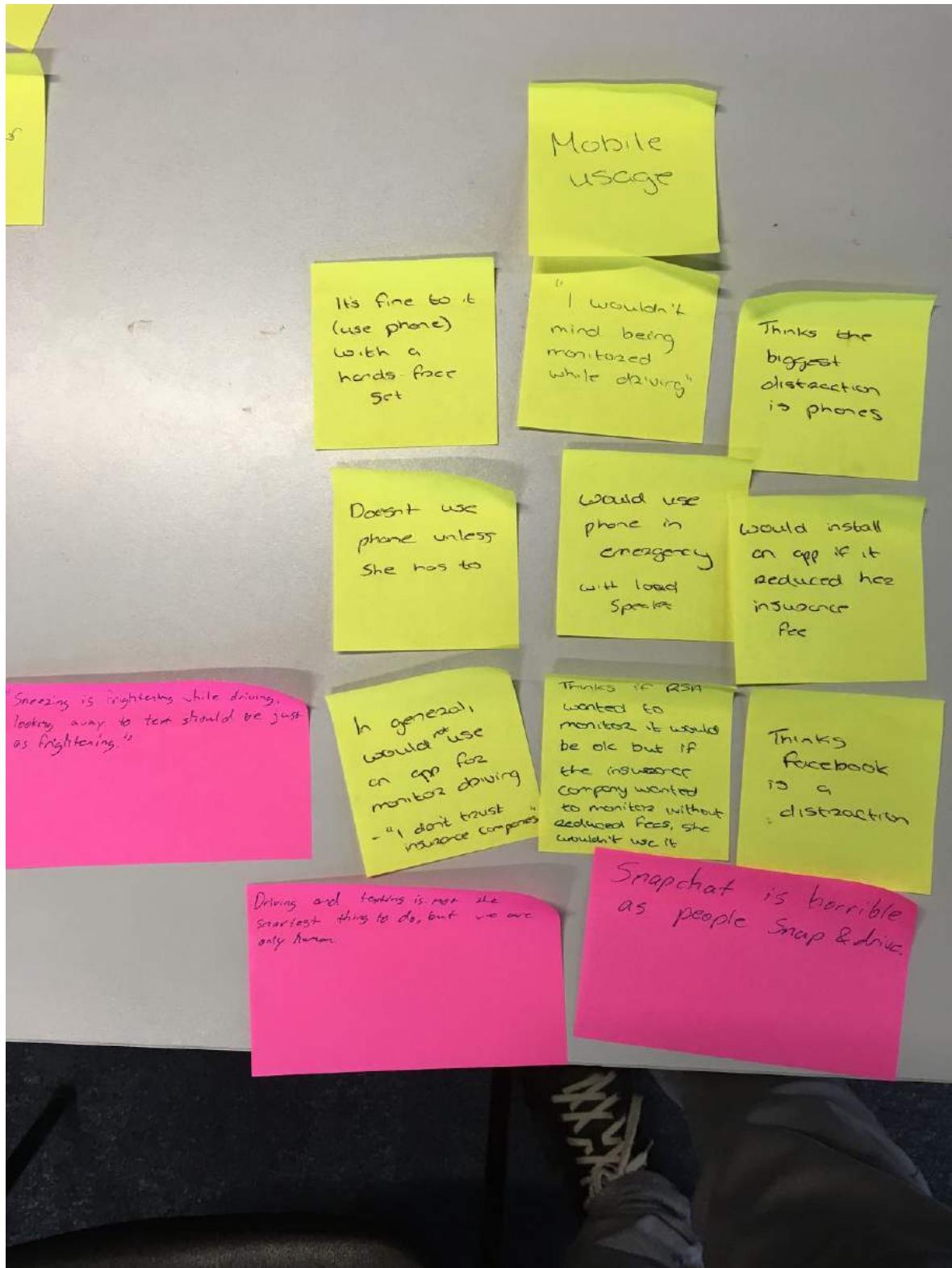
(Less Important points from subject 3's interview with regards to the design challenge)

Appendix 12.3.11



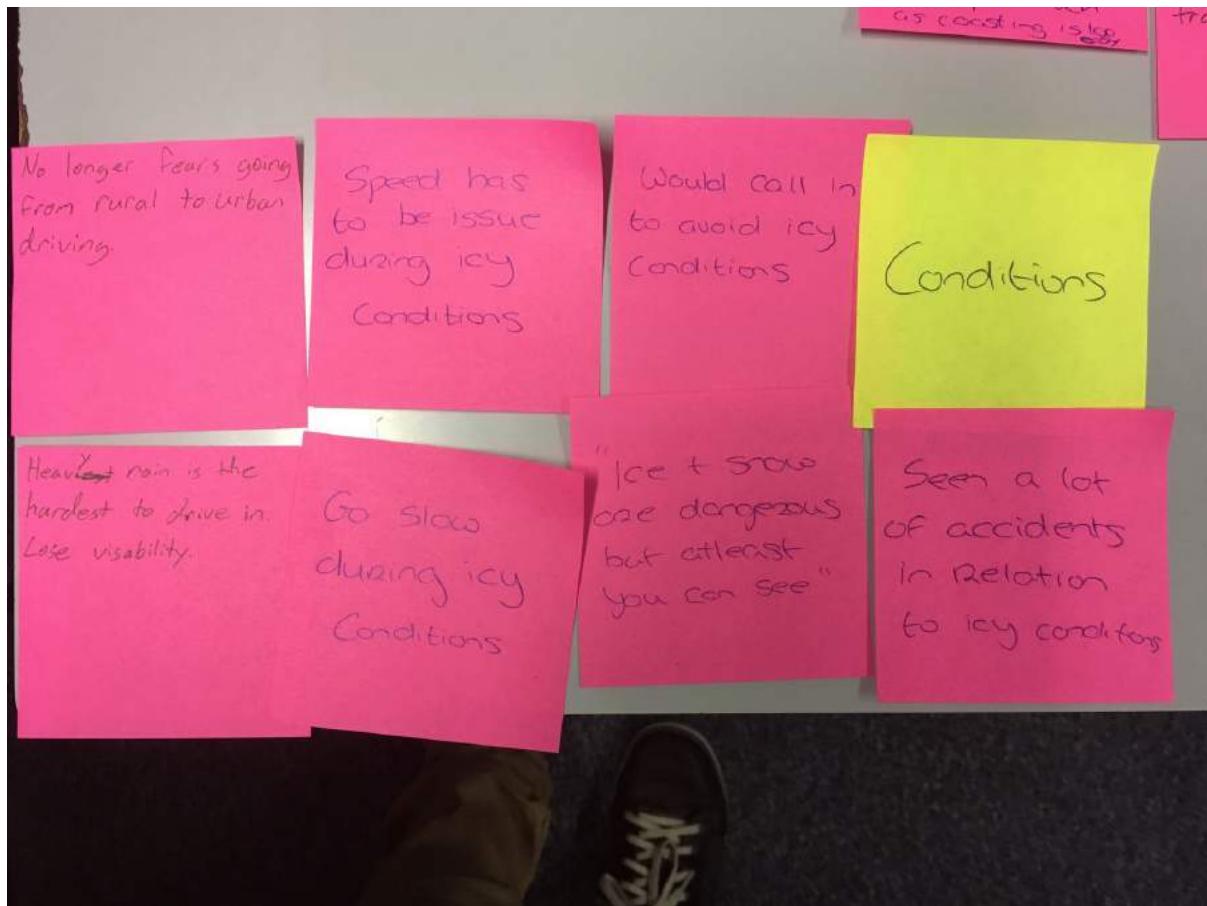
(Points about Situations from subject 3's interview)

Appendix 12.3.12



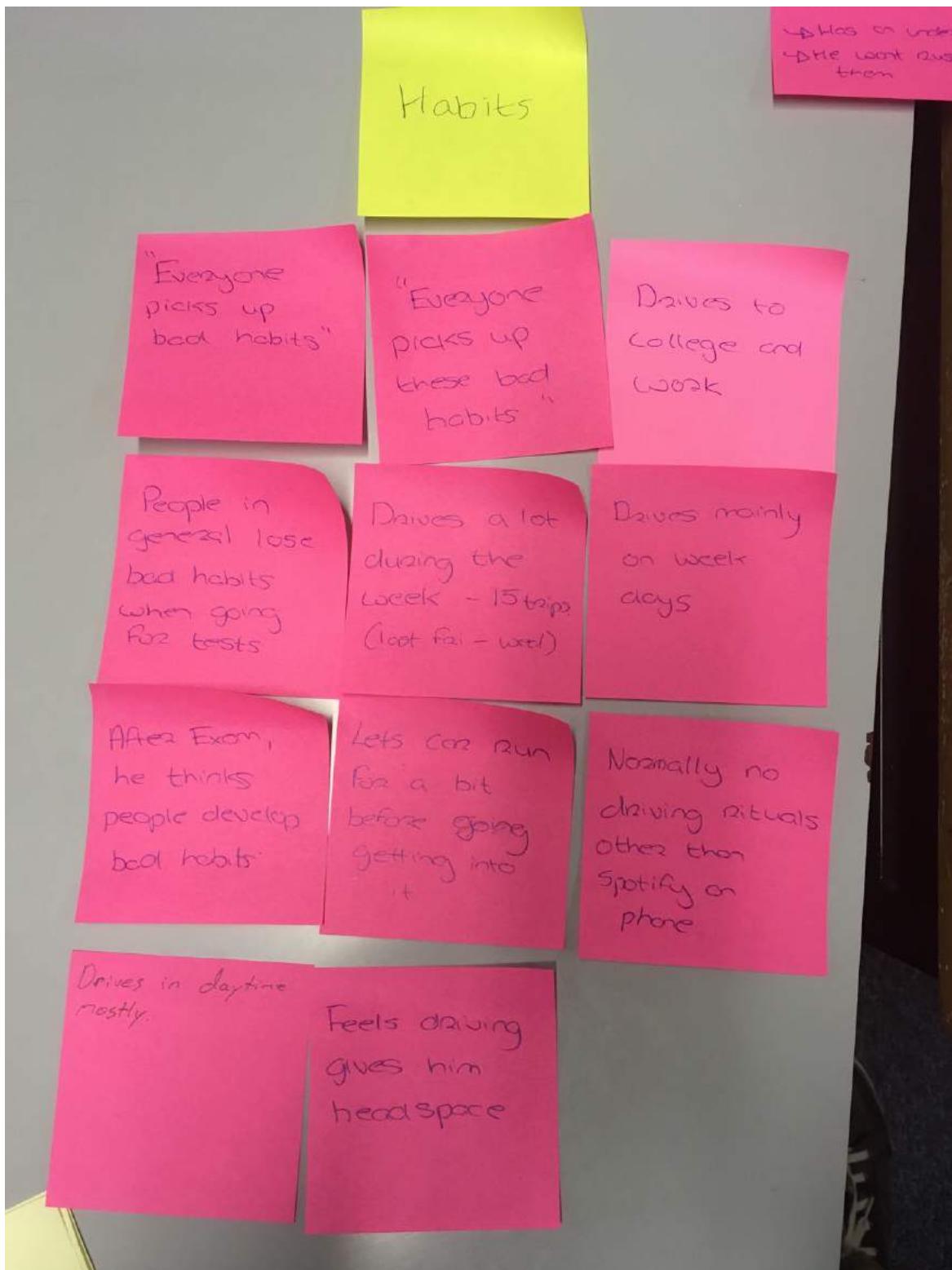
(Points about Monitoring from subject 3's interview)

Appendix 12.3.13



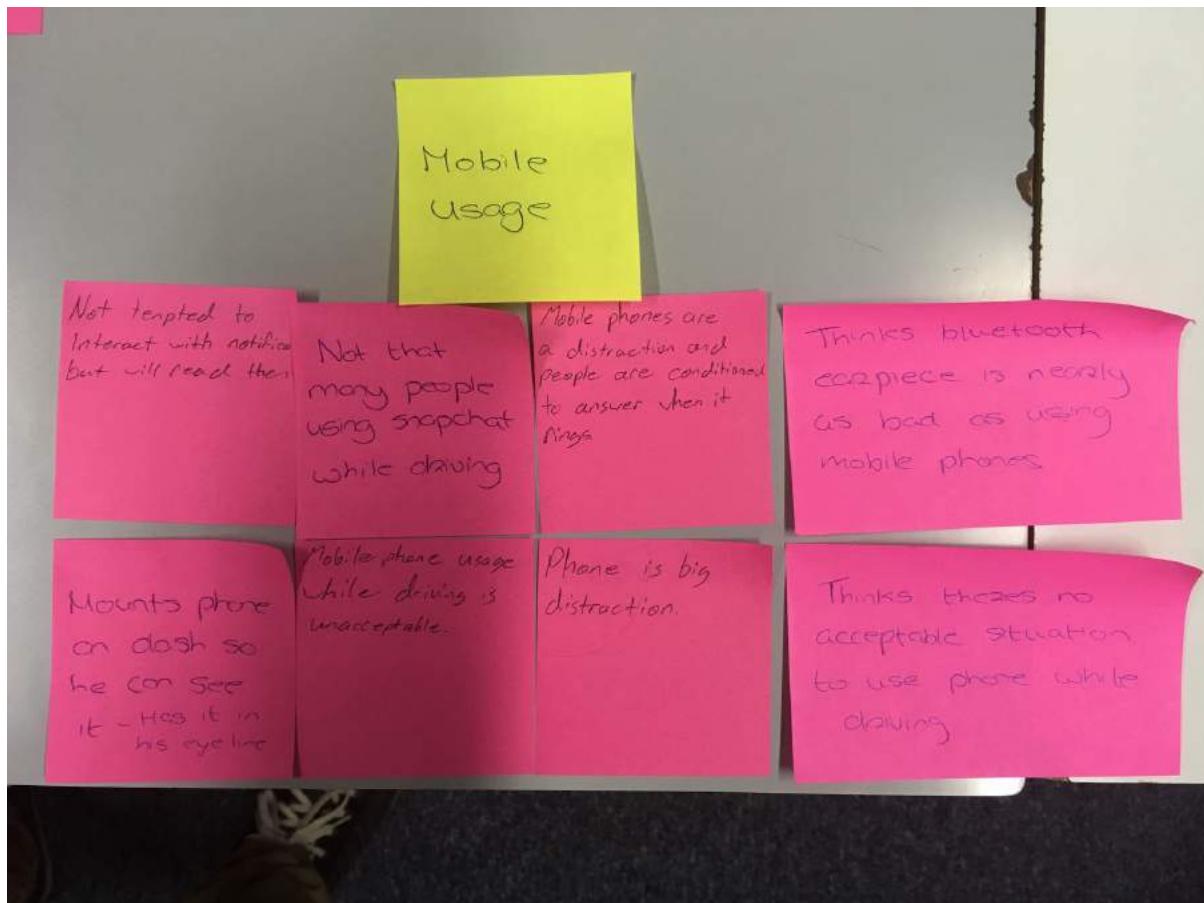
(Points about Driving Conditions from subject 3's interview)

Appendix 12.3.14



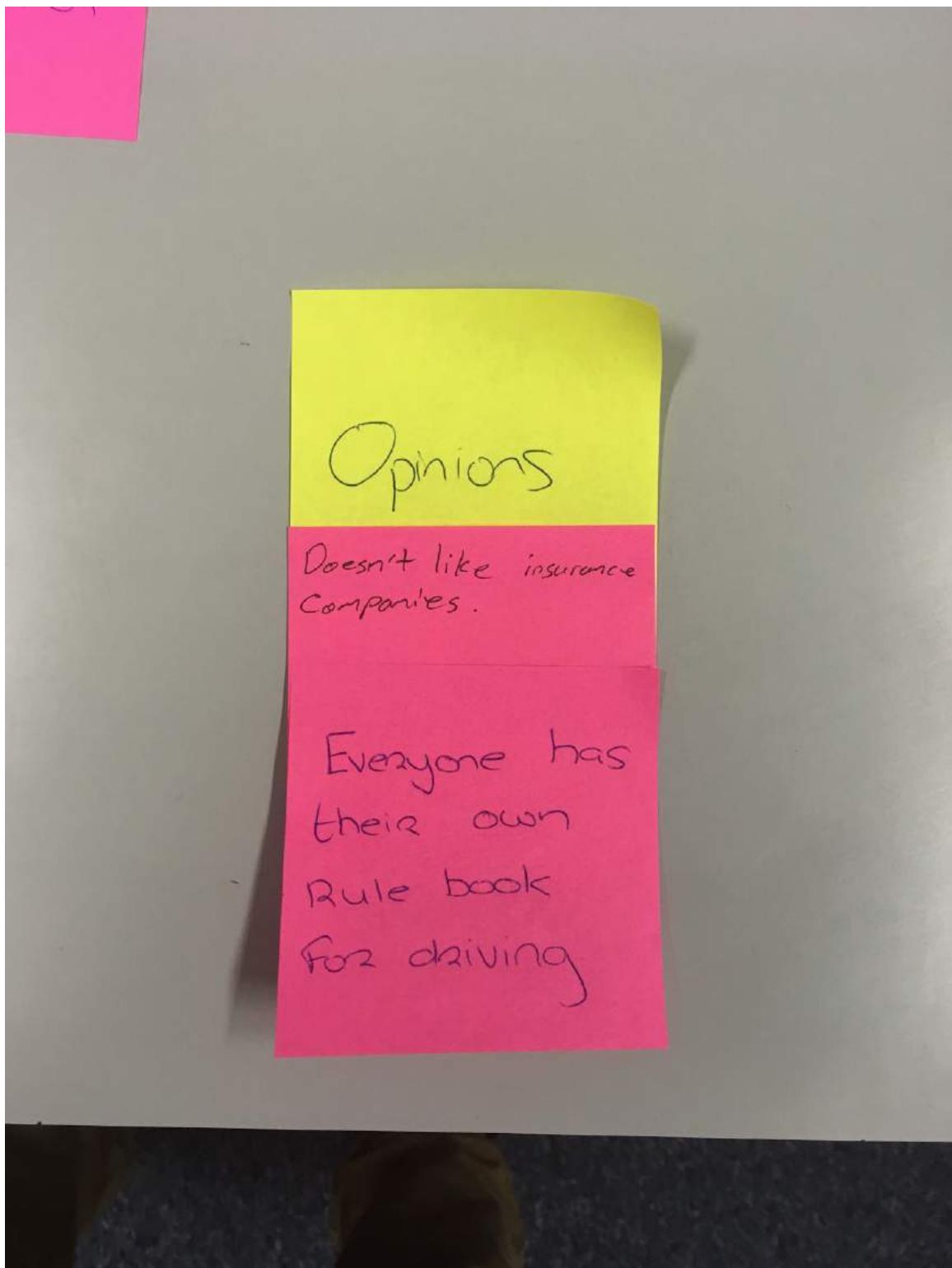
(Points about Habits from subject 3's interview)

Appendix 12.3.15



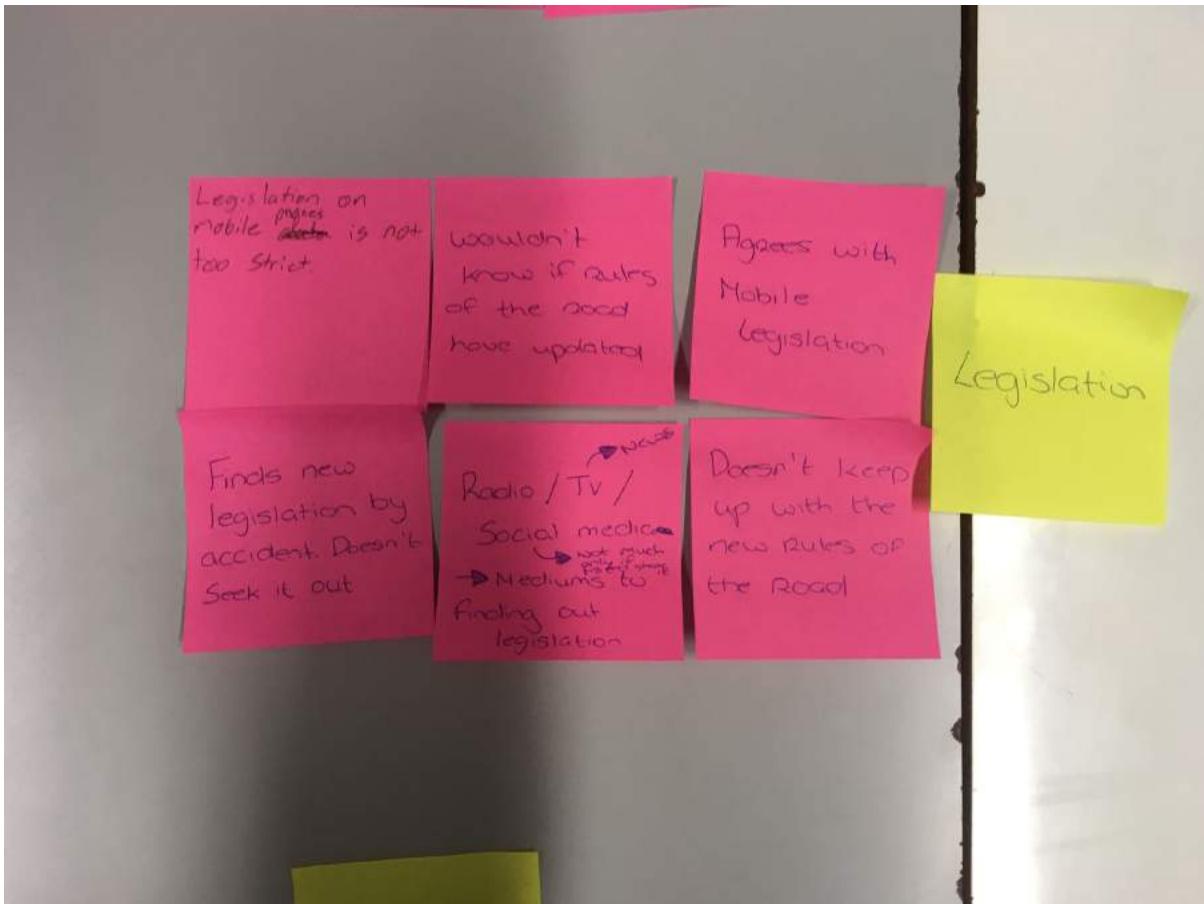
(Points about Mobile Usage from subject 3's interview)

Appendix 12.3.16



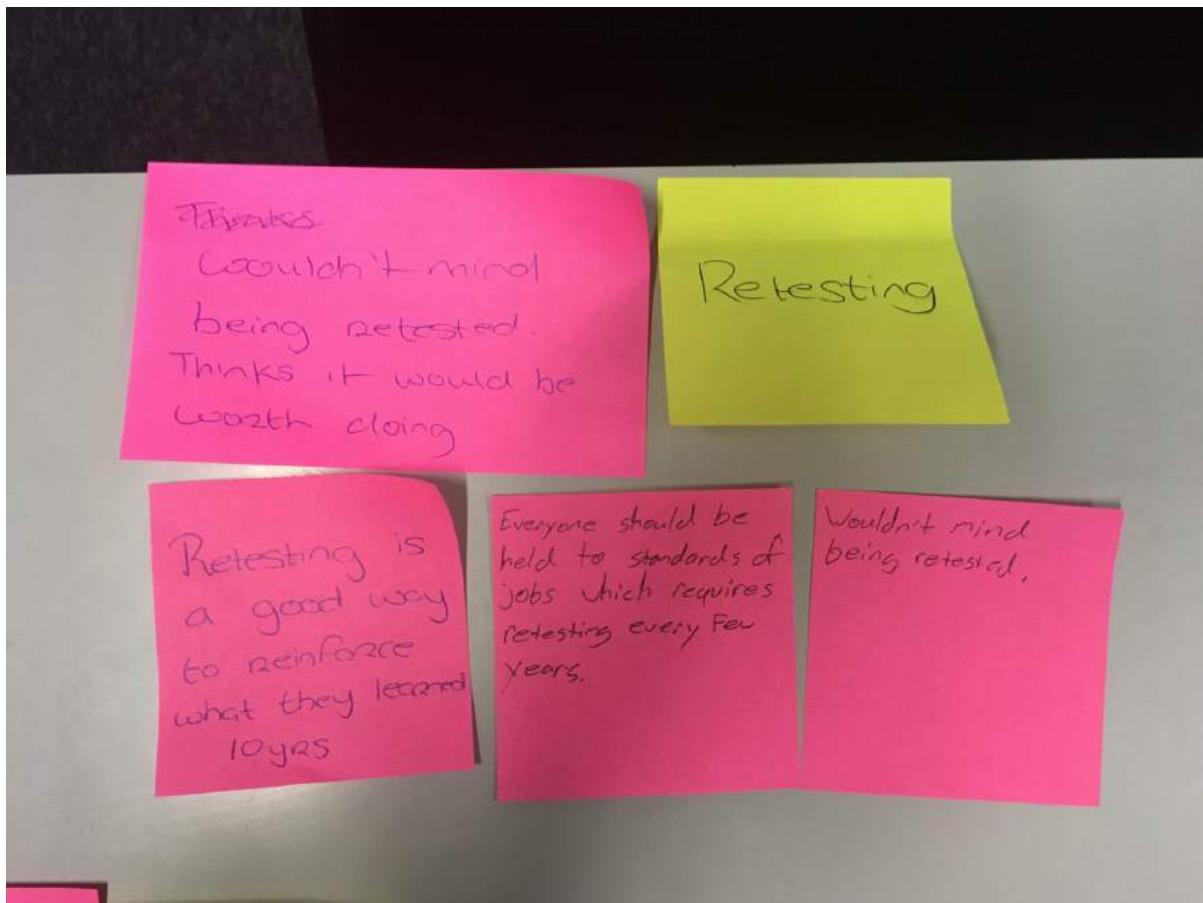
(Points about Opinions from subject 3's interview)

Appendix 12.3.17



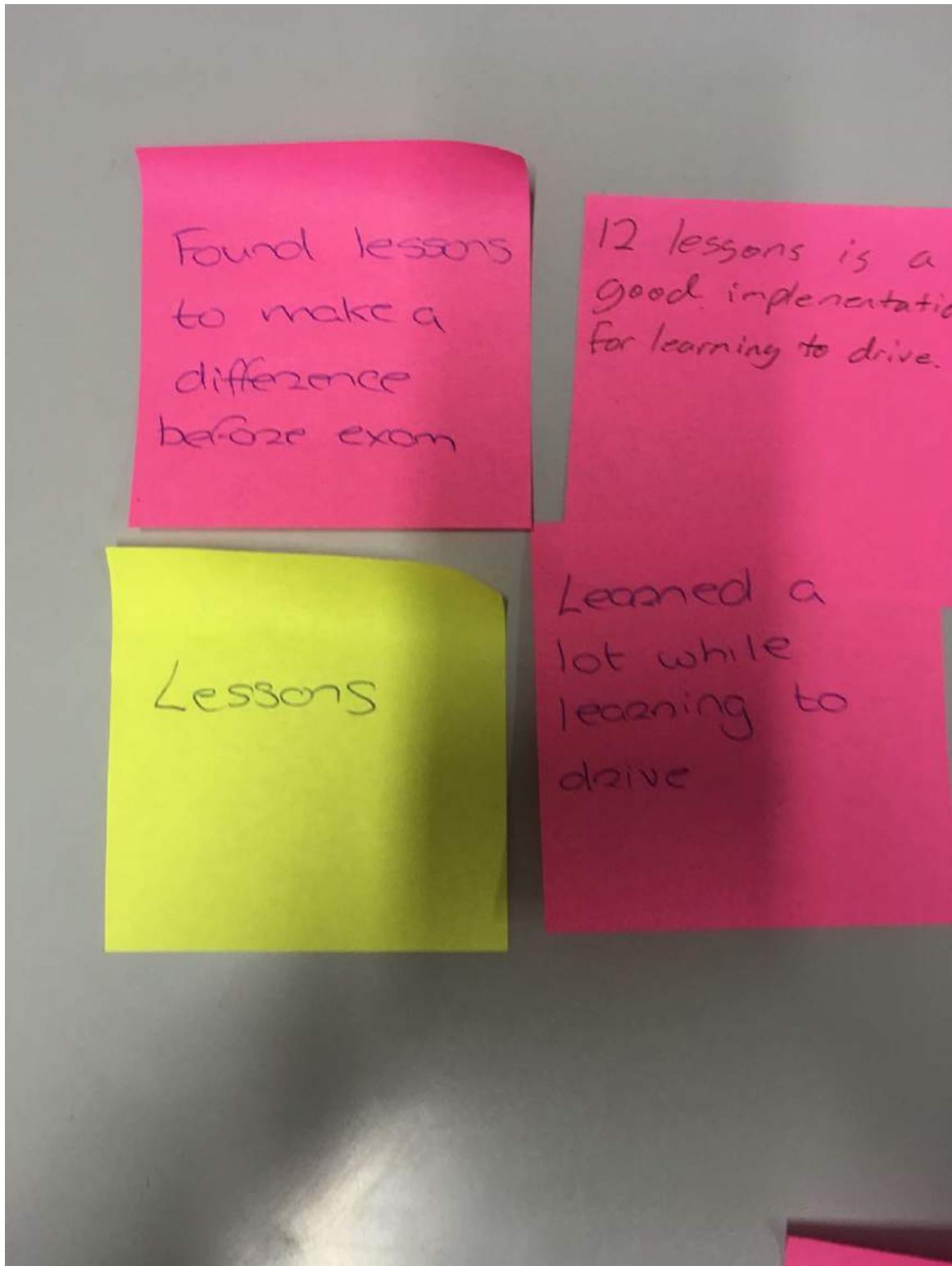
(Points about Legislation from subject 3's interview)

Appendix 12.3.18



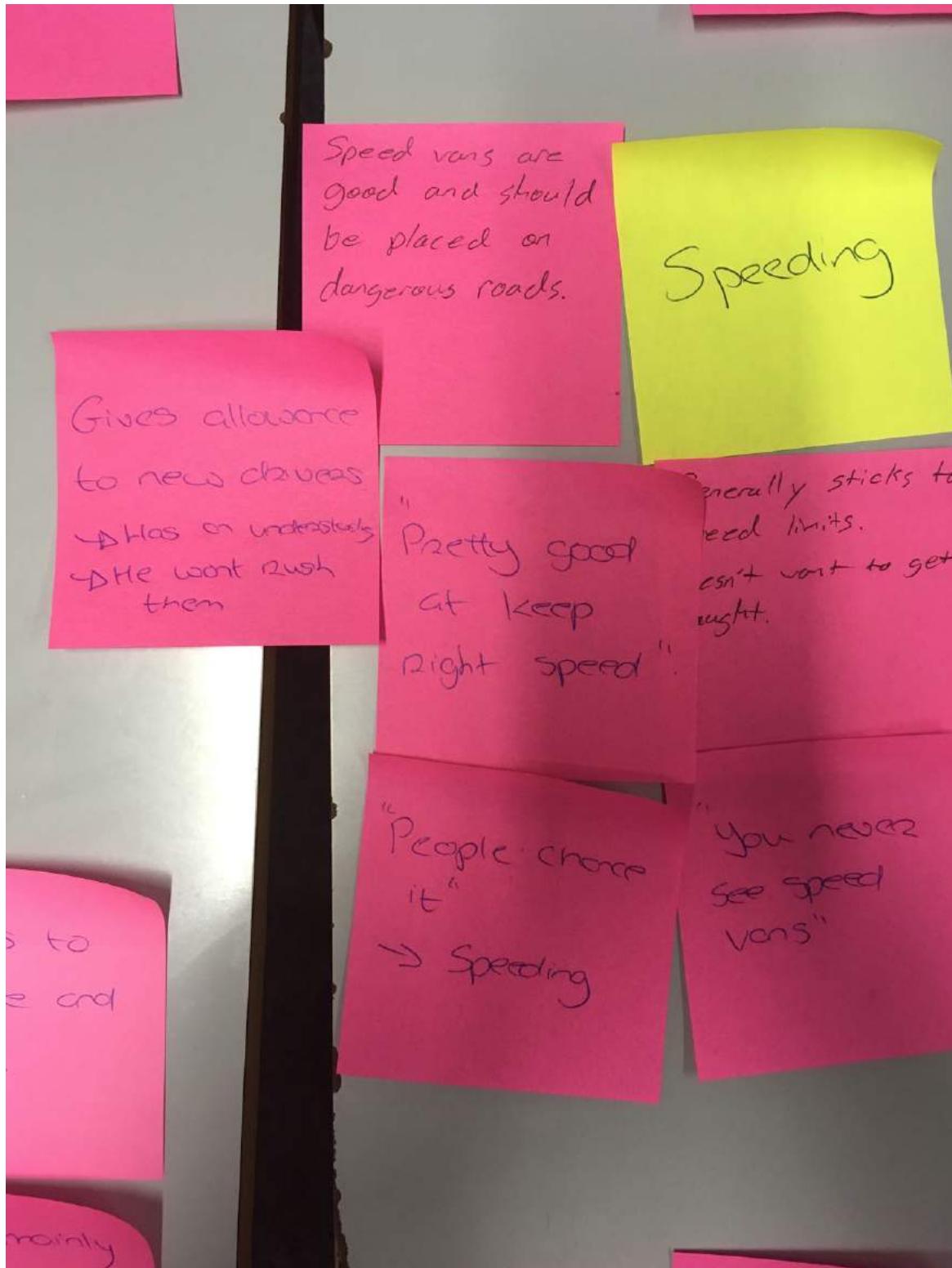
(Points about Retesting from subject 3's interview)

Appendix 12.3.19



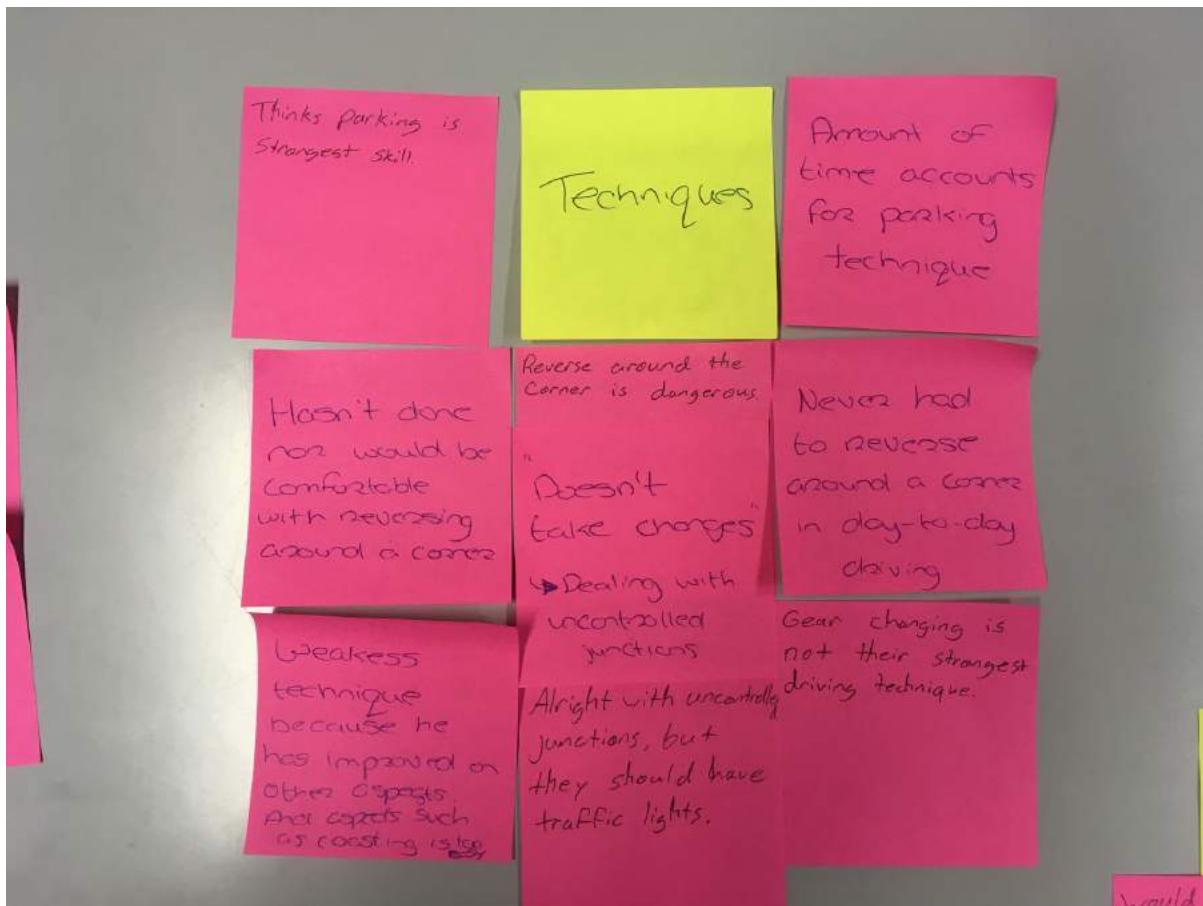
(Points about Lessons from subject 3's interview)

Appendix 12.3.20



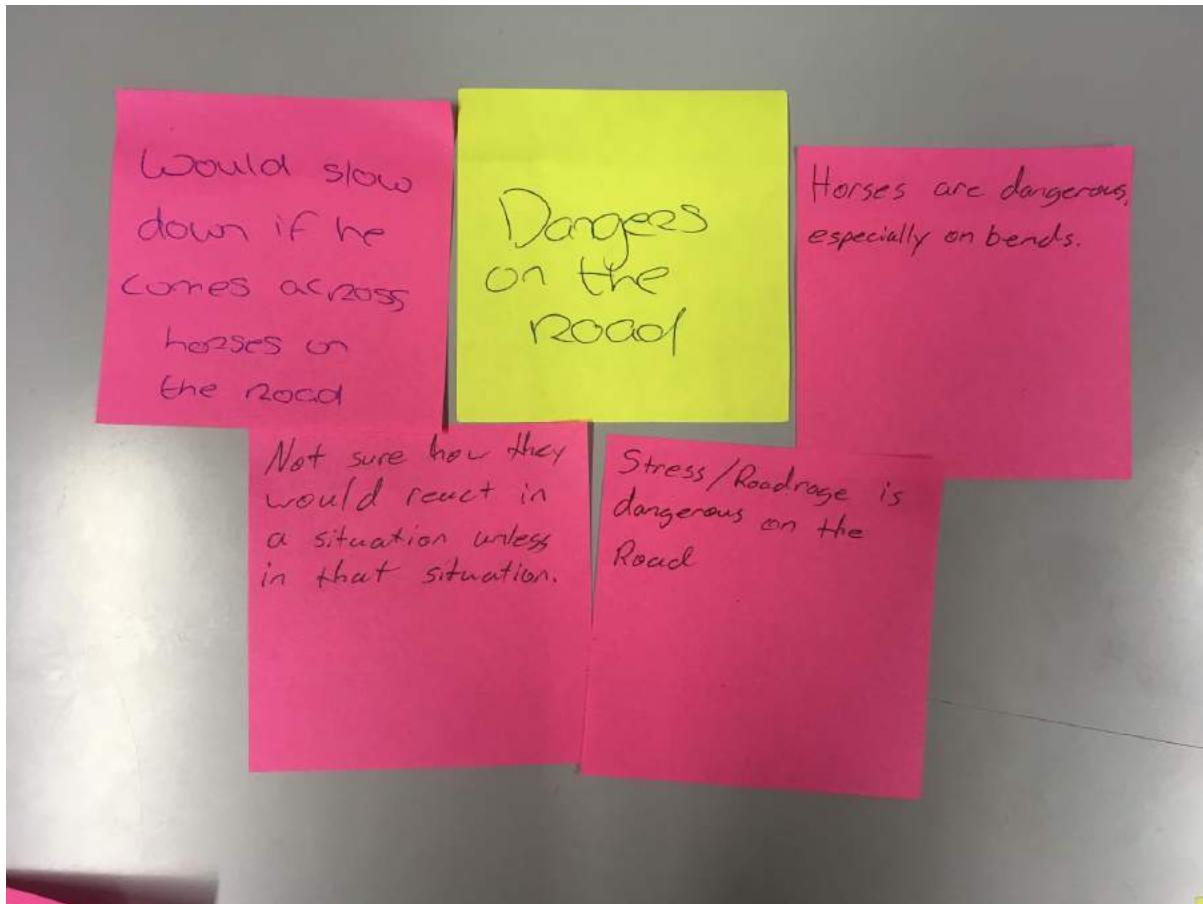
(Points about Speeding from subject 3's interview)

Appendix 12.3.21



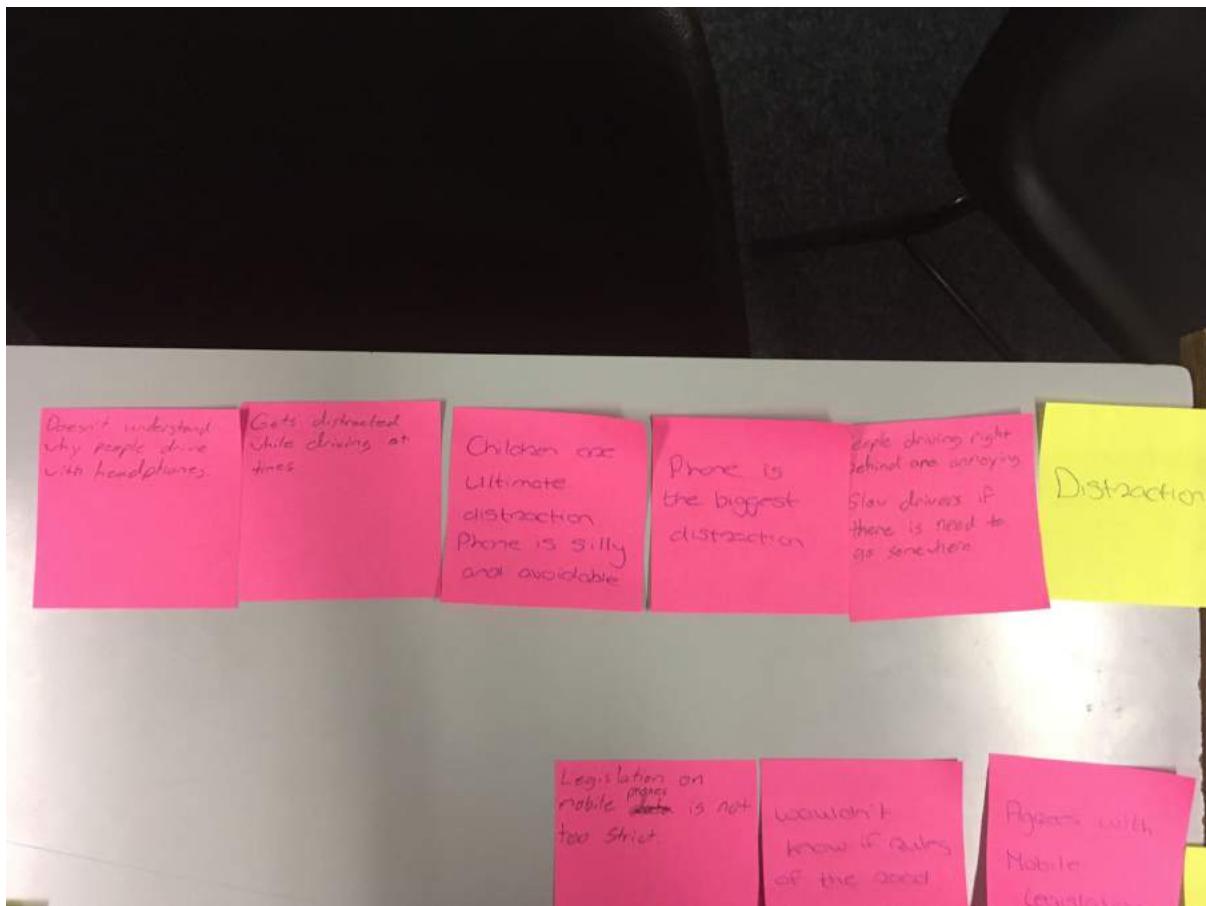
(Points about Techniques from subject 3's interview)

Appendix 12.3.22



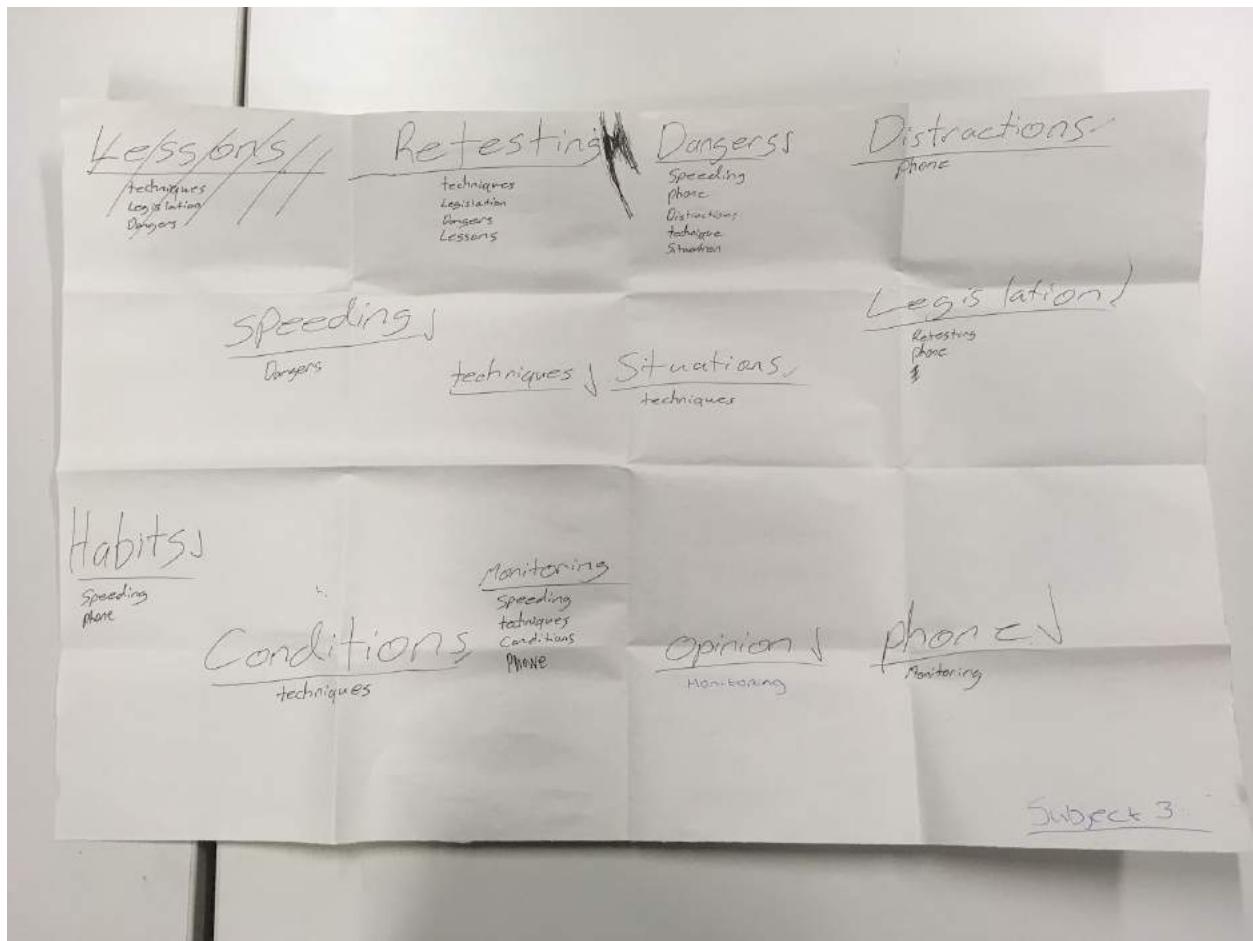
(Points about Dangers on the Road from subject 3's interview)

Appendix 12.3.23



(Points about Distractions from subject 3's interview)

Appendix 12.3.24



(Themed Cluster Relations from subject 3's interview)

Appendix 12.3.25

(Subject 3)

Interview Guide 3.0

1. How long have you been driving
 - a. How would you describe your experience level with driving over time
2. Do you have any driving rituals?
3. Can you tell us about a typical driving trip to the shop, college, etc?
 - a. Ask Why
 - b. How do you start off your trip, in detail.
 - c. How do you normally know when to leave - do you plan ?
 - d. Do you ever face traffic jams during your trips ?
4. What is the one item you always have with you when you go driving?
 - a. Do you have those items in your car currently?
 - b. In your opinion, what are the items every driver should have in their car at all times?
5. How often in a week would you drive?
 - a. This week, how many times did you drive ?
 - b. Week days ?
 - c. Weekends ?
6. When do you drive most - weekdays or weekends?
7. What is the most annoying thing about driving
 - a. Why ?
8. How do you feel about your skill level ?

- a. Has it improved with the length of time you have been driving ?
 - b. Have you relaxed a bit over time ?
- 9. Do you ever find yourself being a casual driver ? Meaning you don't always indicate or forgetting certain rules of the road, going through a roundabout... etc.
- 10. In terms of comfort level, how do you feel about(Uphill Starts, Parallel Parking, Uncontrolled Junctions, Reverse Around A Corner).... ?
 - a. Can you tell us about a time where you did said techniques
 - i. What was it like ?
 - ii. Positive, negative ?
- 11. What would be your strongest driving technique ?
 - a. Why is this your strongest driving technique?
 - b. Do you practice this technique a lot?
- 12. What would be your weakest driving technique ?
 - a. Why is this your weakest driving technique?
 - b. What are your thoughts when you have to do it?
 - c. Why do you feel this is your weakest?
- 13. What is the type of driving you do the most?
 - a. Nighttime driving in urban areas
 - b. Nighttime driving in rural areas
 - c. Daytime driving in urban areas
 - d. Daytime driving in rural areas
- 14. Are you comfortable with the other types of driving?
 - a. Which ones ?
 - b. Why ?
- 15. What are your thoughts on speeding
 - a. Do you think in certain conditions that speeding is acceptable/non-acceptable

- b. Do you yourself speed?
 - c. Do you think Garda should be more strict on speeding?
16. Do you ever find yourself getting distracted ?
- a. How ?
 - b. What are your thoughts on other distracted drivers?
17. What is your perspective on the dangers of the road - thoughts ?
- Agreements/Disagreements with the legislation ?
- a. Why might you agree/disagree with legislation?
 - b. What do you think is the biggest danger to the road?
18. In your opinion, do you think drivers in general have enough knowledge and experience with icy conditions / wet conditions, etc.
19. In your opinion, which do you think are the hardest conditions for driving in:
- a. Heavy rain
 - b. Wind
 - c. Snow
 - d. Very sunny
20. If you got into a situation where you (broke down, were overtaking, emergency services were passing, car parked on roundabout), how would you handle it ?
- a. Why ?
21. There are so many different regulations in driving, Do you keep up with the rules and regulations of the road
- a. How do you keep yourself updated? (What medium)

- b. Do you think there could be a better/easier way to keep up with the rules and regulations of the road?
22. What do you think about the laws in relation to mobile phone usage while driving
- a. Agree/Disagree with them ?
 - b. Would you change them in any way ?
23. Do you think drivers should get retested every 10 years when they renew their licence?
- a. Why?
 - b. From your own perspective would you mind getting retested on your driving ?
 - i. Reasoning?
24. If your insurance company offered an app that monitored your actions while driving, that in turn would help to lower your monthly/annual rate, would this be an option that you would consider ?

Insight statements and How Might We

Retesting

- Drivers feel that retesting would ensure that techniques are up to standard.
 - How might we help drivers with their technique in relation to retesting?
- Some drivers feel that retesting would reduce danger on the road.
 - How might we encourage drivers to be retested in hopes to reduce the danger on the road?
- Some drivers think that it would be beneficial to have retesting as part of the driving legislation.
 - How might we prepare drivers for retesting their driving abilities?

Dangers

- Bad technique can be a danger on the road.
 - How might we assist drivers on improving their driving techniques?
- Distractions while driving can be a danger on the road.
 - How might we reduce distractions that drivers face?
- Drivers under or above the speed limit considerably can be a danger on the road.
 - How might we encourage drivers to drive within the speed limit?
- Certain driving situations may cause danger on the road.
 - How might we make drivers aware of different situations that may be a danger on the road?

Distractions

- Phones are a distraction while driving.
 - How might we reduce a phone's capability to distract drivers?
- Some distractions are not optional.
 - How might we reduce the amount of distractions?

Speeding

- Drivers feel that speeding is a danger on the road.
 - How might we discourage speeding?

Techniques

- Most drivers feel that certain techniques they possess are not up to standard.
 - How might we help drivers keep their techniques up to standard?

- Some drivers feel that their driving techniques improve/decay over time.
 - How might we track a driver's skill progression?

Situations

- Drivers feel that in certain conditions they lack proper techniques.
 - How might we aid drivers in their technique with understanding certain conditions?

Legislation

- Some drivers feel that retesting would be valuable for road safety and should be brought into legislation.
 - How might we ensure drivers that retesting would be beneficial?
- Some drivers feel that mobile phone legislation should be more strict.
 - How might we enforce mobile phone usage legislation?

Habits

- People tend to make a habit out of speeding
 - How might we discourage the habit of speeding?
- For certain drivers, mobile phone usage while driving becomes a habit
 - How might we make mobile phone usage less of a habit?

Conditions

- Certain weather conditions require proper driving techniques to ensure safe driving.
 - How might we ensure drivers have the proper techniques to deal with a range of weather conditions.

Monitoring

- There is a mixed opinion about monitoring actions while driving.
 - How might we ensure drivers that data received while driving is beneficial?
- There are mixed opinions about monitoring drivers actions via mobile devices.
 - How might we reassure drivers about monitoring via mobile devices and its capability?
- Monitoring driving techniques could be beneficial to drivers.
 - How might we show drivers the benefits that can be found through monitoring?

Opinion

- Some Drivers would mind being monitored if data collected was given to third-parties
 - How might we display to drivers where data from monitoring is going?
- Drivers opinions vary on the topic of monitoring
 - How might we demonstrate to drivers the advantages and disadvantages of monitoring?

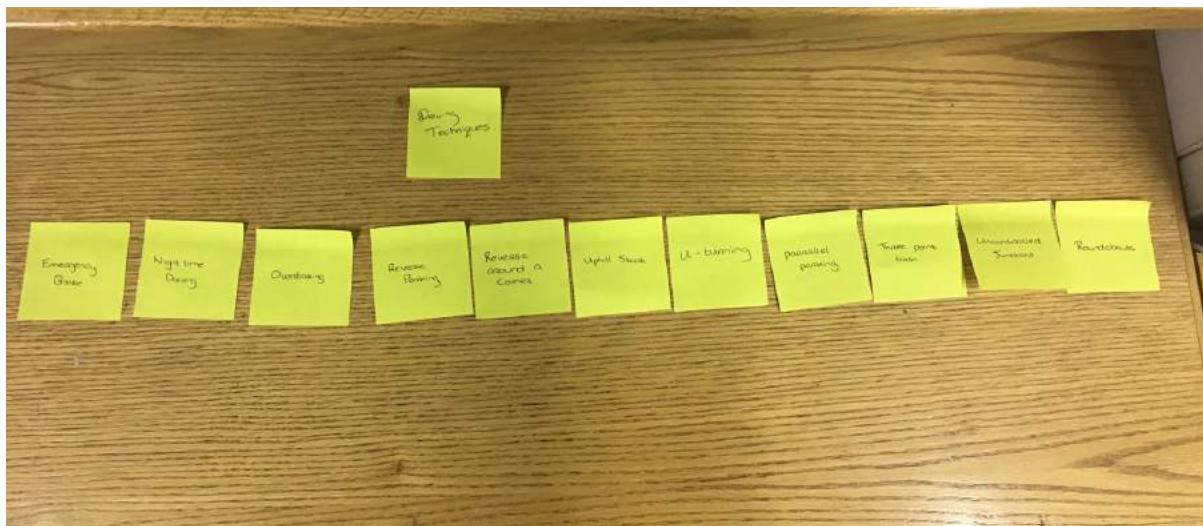
- Some drivers wouldn't mind being monitored if for self use
 - How might we consider monitoring for personal use?

Phone

- Mobile Phones have the ability to monitor certain aspects of driving
 - How might we utilize this technology for monitoring purposes?

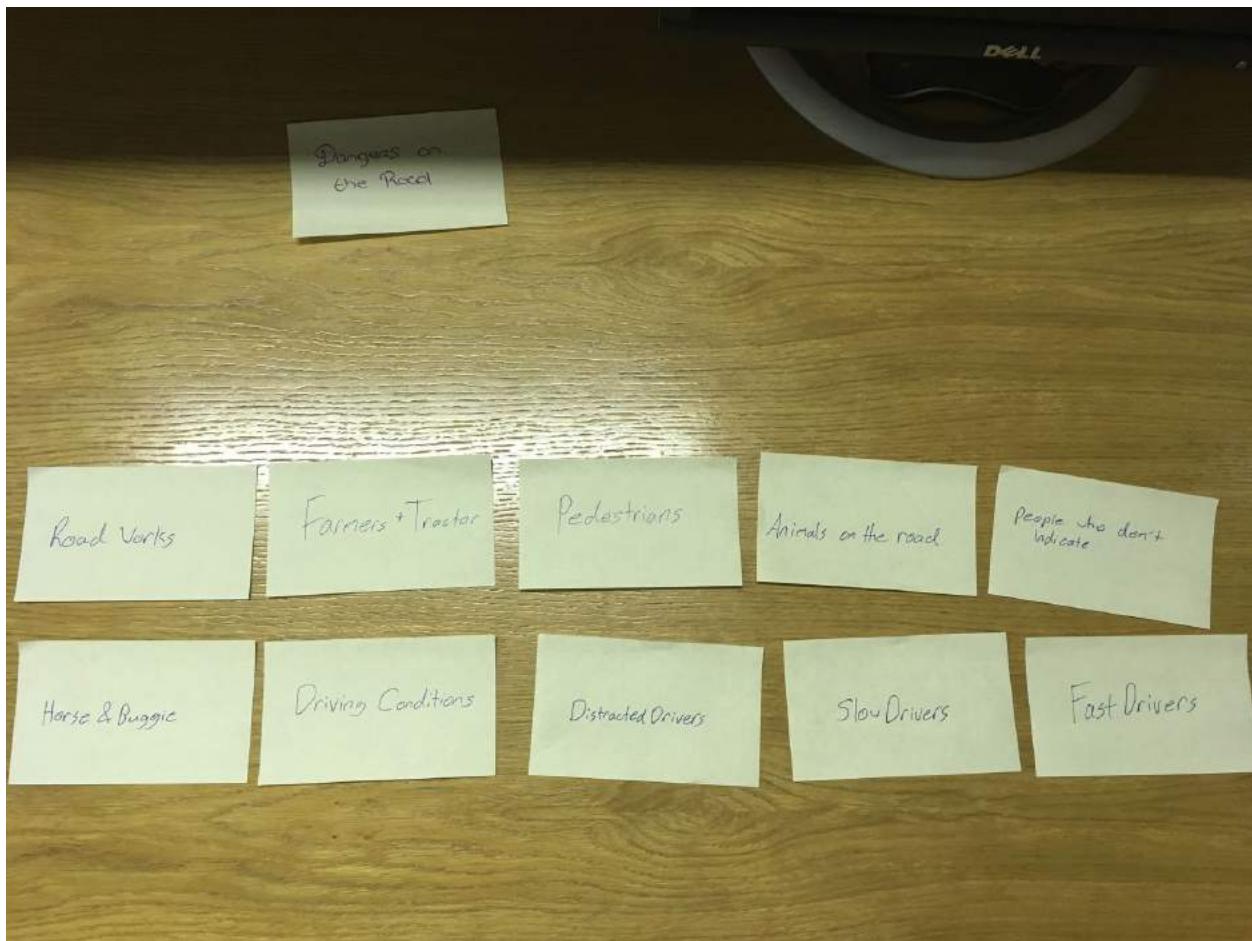
12.4 Subject #4

Appendix 12.4.1



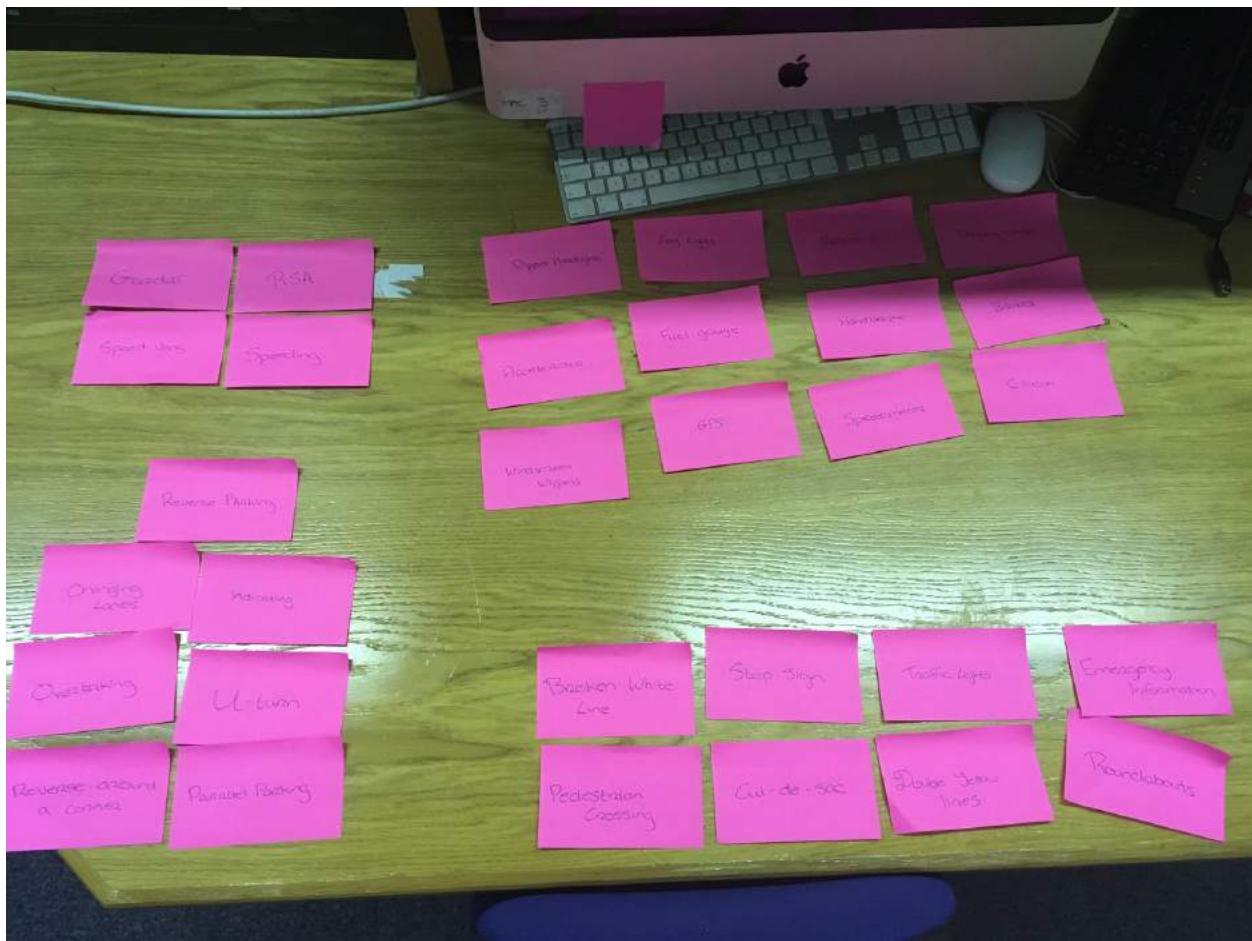
(Driving techniques card sorting for subject 4 depicting their best to worst driving techniques)

Appendix 12.4.2



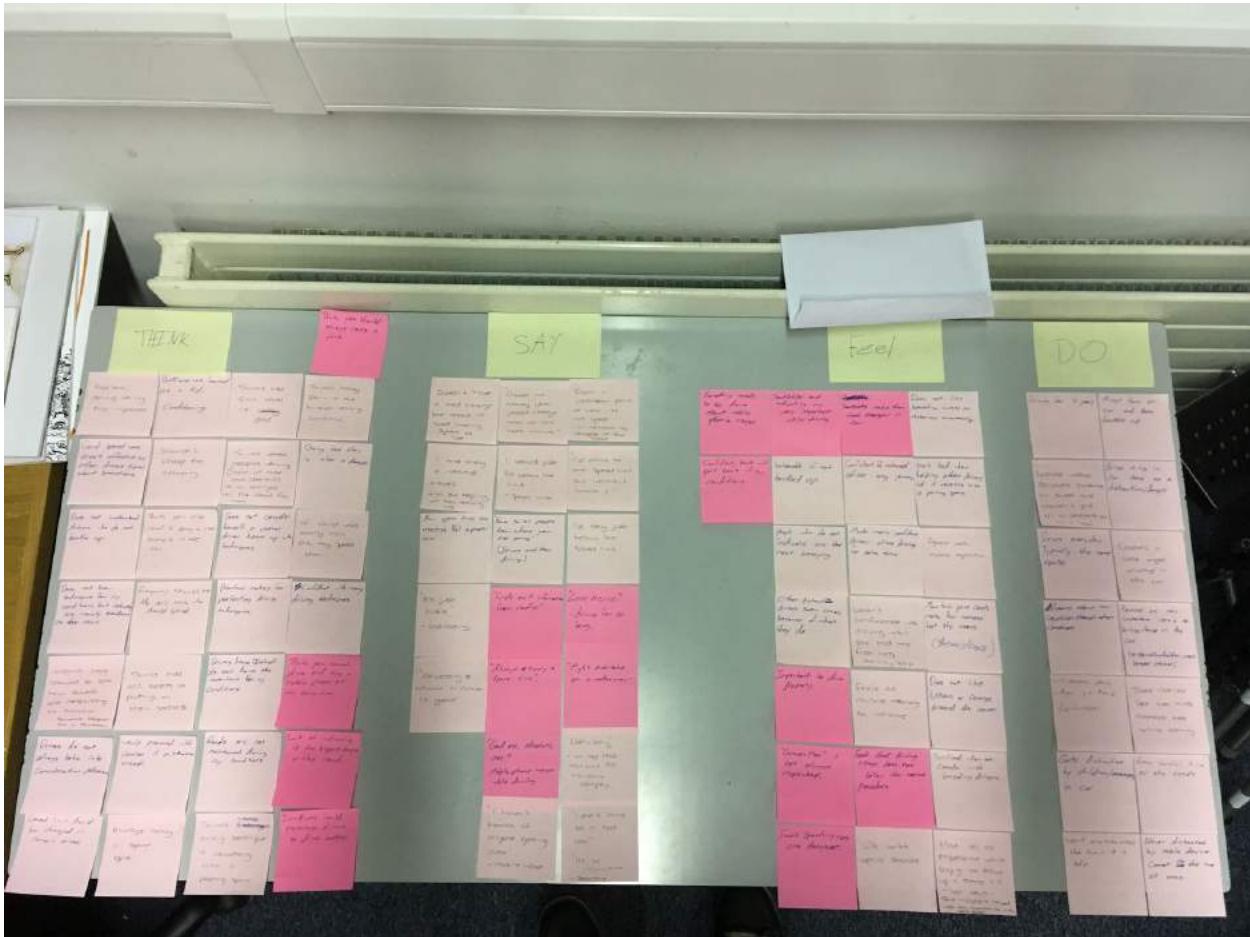
(Dangers of the Road card sorting for subject 4 depicting the least to most dangerous)

Appendix 12.4.3



(Clustering of different aspects related to design challenge. Sorted by subject 4)

Appendix 12.4.4



(Empathy Map laid out after listening to subject 4's recorded interview)

Appendix 12.3.5

Most Important					
Car speed was not as effective as other driving signal about speed limit.	Want another view she knows it is safe.	People who do not indicate are the most annoying.	Going too slow is also a danger.	Thinks having rain is the harshest driving condition.	Thinks you cannot drive and use a mobile phone at the same time.
Brings ices in car. Sees as a distraction/danger	Does not like speeding, unless on motorway occasionally.	Doesn't have a road triangle but knows its good warning signal to use.	"God no, absolutely not!" Mobile phone usage while driving	Thinks you also need to carry a red triangle in the car.	Incentives would encourage drivers to drive better.
Extra control flick on the roads	Agrees with mobile legislation	I'd stay just below the speed limit	"I haven't heard of anyone getting close" - mobile usage	Thinks other people driving (lack of care and attention) is a danger on the road for her.	Lack of indicating is the biggest danger on the road
Never distracted by mobile device Cannot do the two at once.	Does not like driving on ice	I'd drive to the speed limit but wouldn't break it."	Thinks you should always carry a jack	Does not know techniques for icy conditions, but thinks we usually hear about them on the news.	Drives here (Ireland) do not have the experience for icy conditions
Learned about new legislation through about options	Confident, but will put back if icy conditions	"It's just habit" - indicating	Does not understand drivers who do not buckle up	Emergency services are the only ones who should speed	Confident with many driving techniques
Will reverse park when at home. (comfortable)	Something needs to be done about mobile phone usage	Definitely - an app that monitors for insurance company	"Reversing & around a corner is good"	Practice makes for perfecting driving techniques	Roads are not maintained during icy conditions
Gets distracted by children/passenger in car.	Other distract drivers seem crazy because of what they do.	"I don't think it's a bad idea" "It's an insurance - refreshing	"Finds out information from radio"	Thinks even driving technique is necessary into a parking space	Drivers do not always take into consideration pedestrian

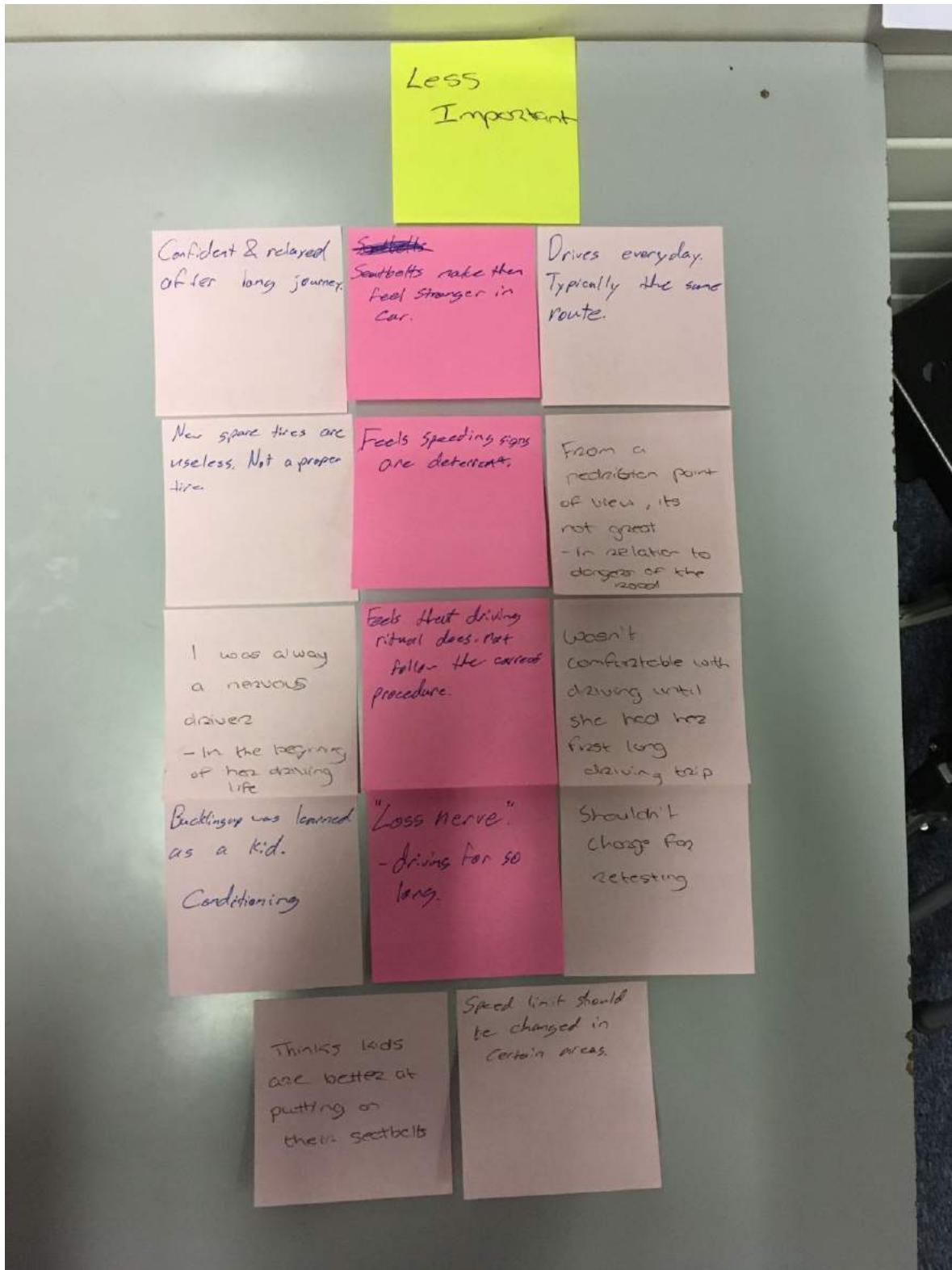
(Most Important points from subject 4's interview with regards to the design challenge)

Appendix 12.4.6

Middle Ground			
Would wear Seatbelt Smothers on buses and wouldn't put on a seatbelt or in a bus.	Tries not to let her kids distract her while driving	feels bad when holding other drivers up if reversing into a parking space.	Does not consider herself a casual driver. keeps up with techniques.
Mountain pass roads make her nervous. Lost the nerve. (sheer drops)	Seatbelts and indicating are very important while driving	Frightened when on roads with speeding drivers.	Would proceed with caution if a situation arises.
Much more confident driver after driving properly for some time.	Important to drive properly.	If child was really sick she may speed then	Always carry a spare tire
Feels its muscle memory to indicate	"Green Man" is not always respected	"Drives me crazy when people change lanes at the last minute!"	Would look around to see how others are responding to situation - Someone stopped at a roundabout
OK with uphill starts	"Might overtake on a notaryman."	I would just sit below the limit - Speed limits	Over time, driving ability has improved
Have to let people know where you are going. (Drivers and their driving.)	"Always & carry a spare tire."	Thinks her skill level is okay good.	

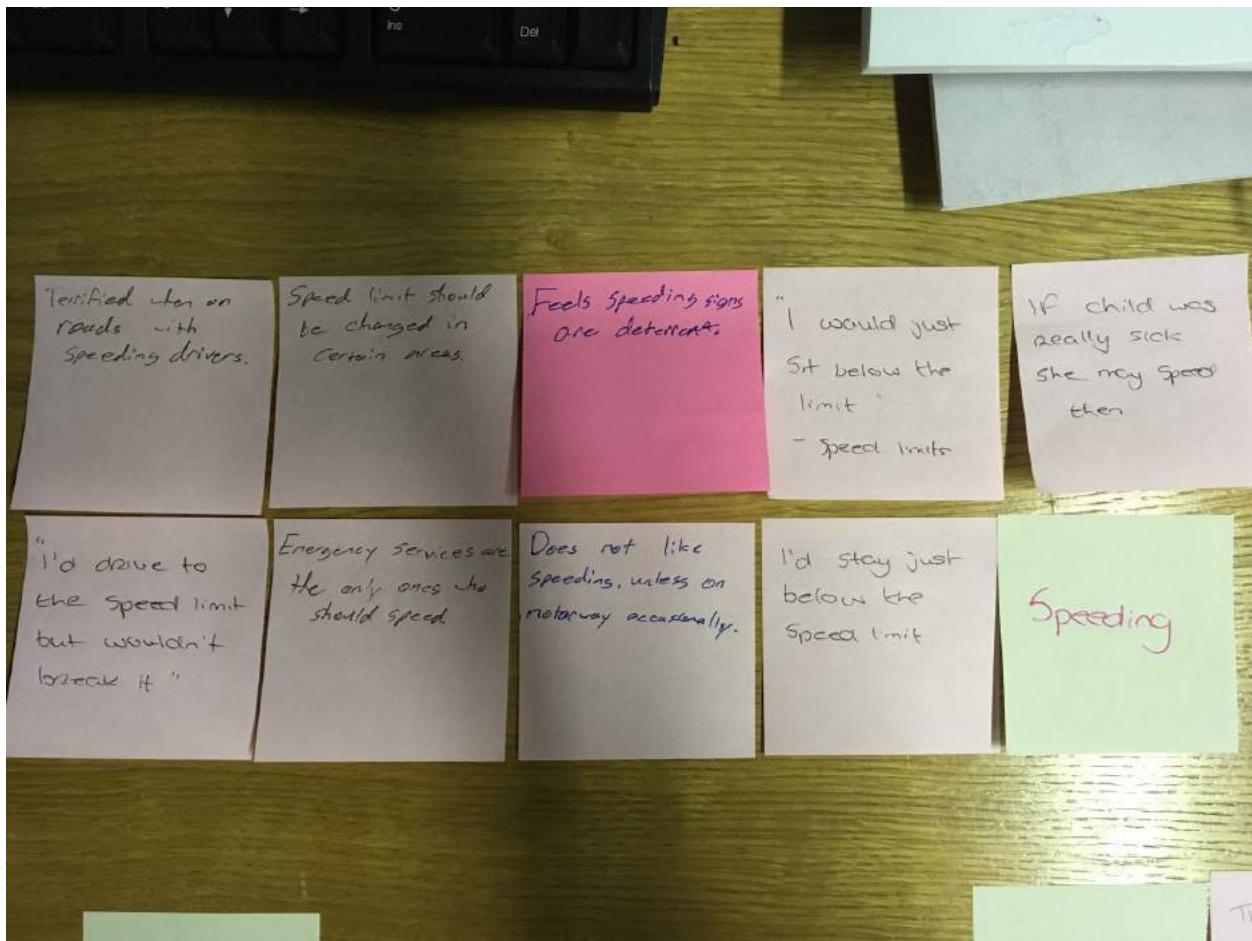
(Middle Ground points from subject 4's interview with regards to the design challenge)

Appendix 12.4.7



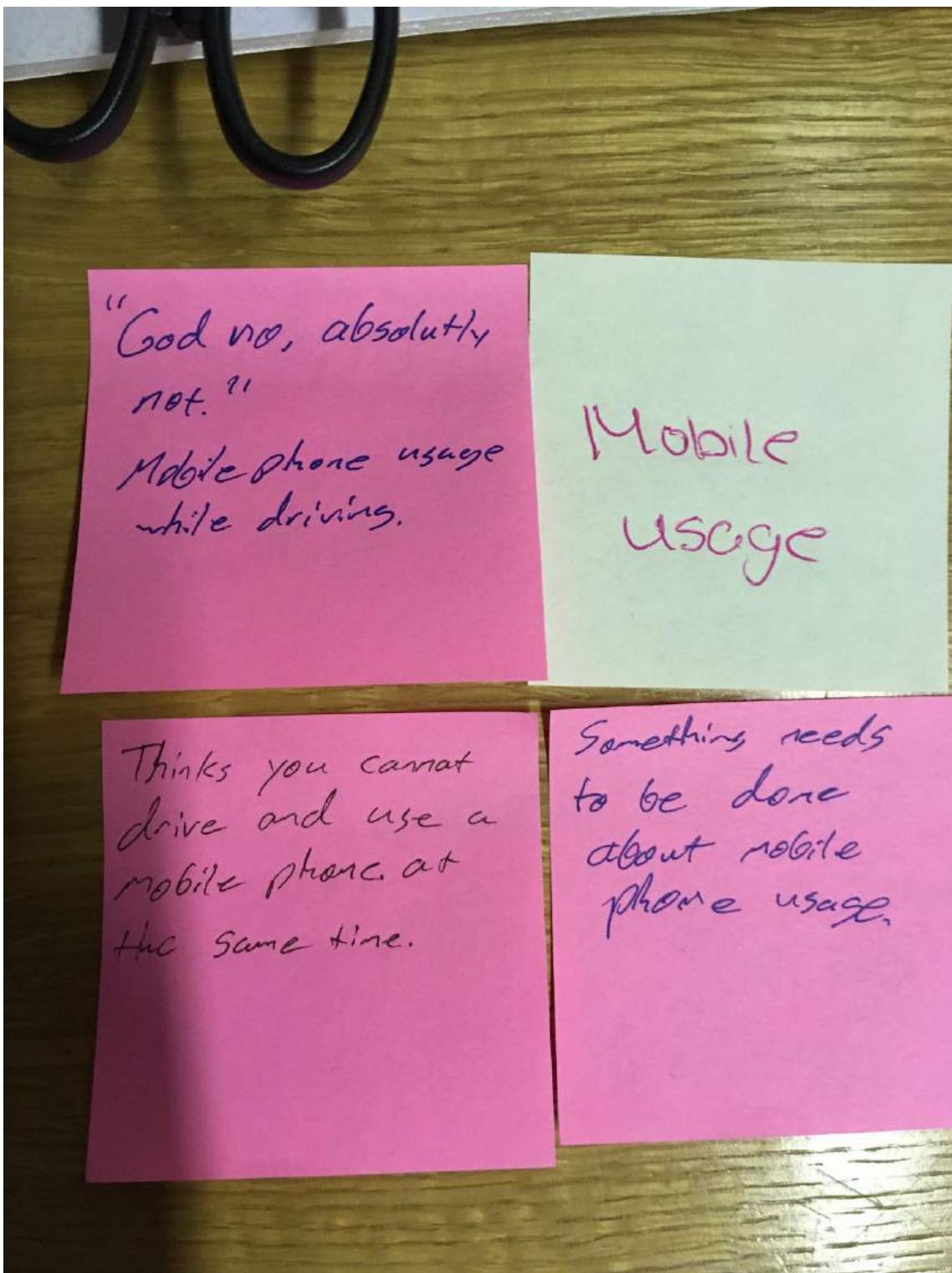
(Less Important points from subject 4's interview with regards to the design challenge)

Appendix 12.4.8



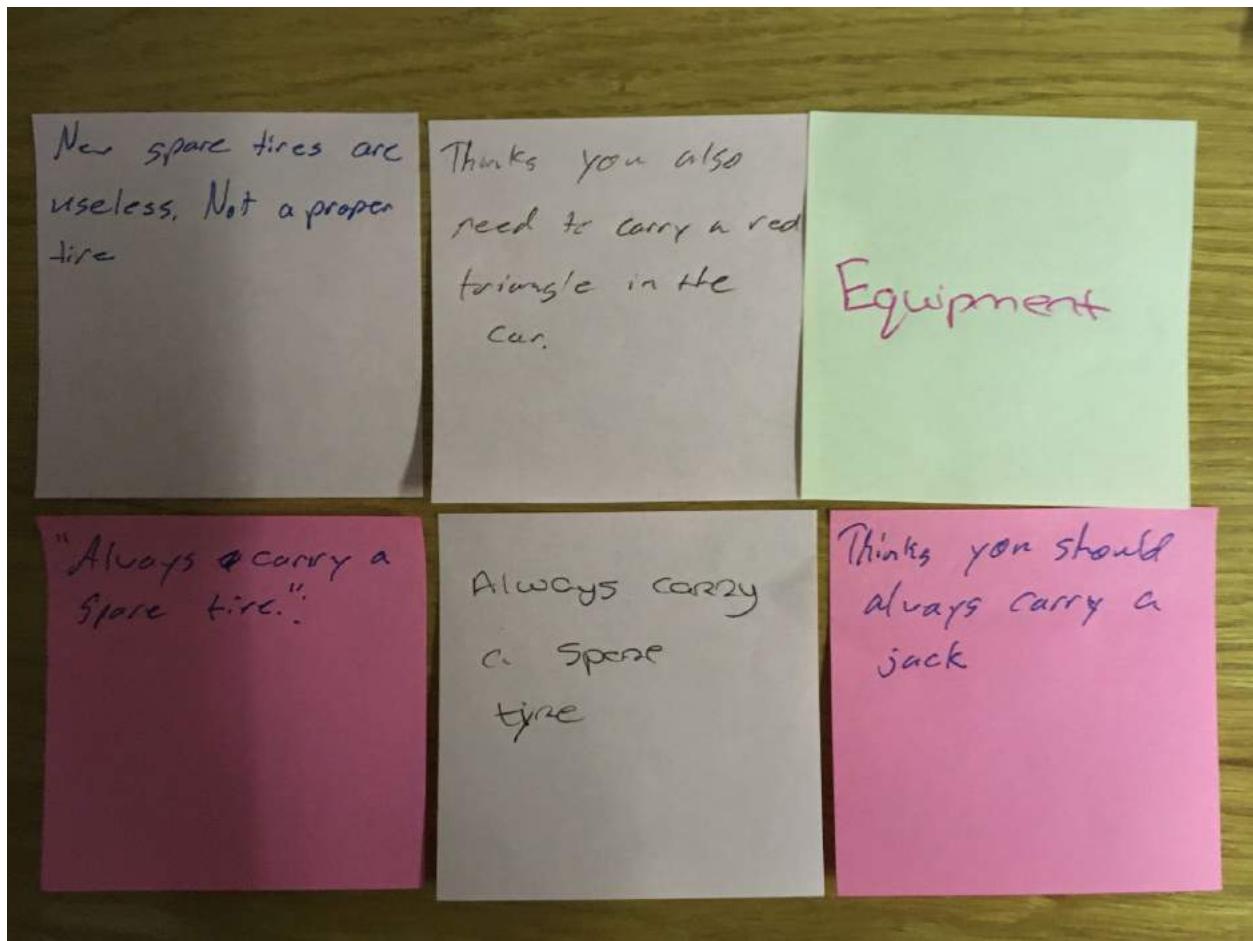
(Points about Speeding from subject 4's interview)

Appendix 12.4.9



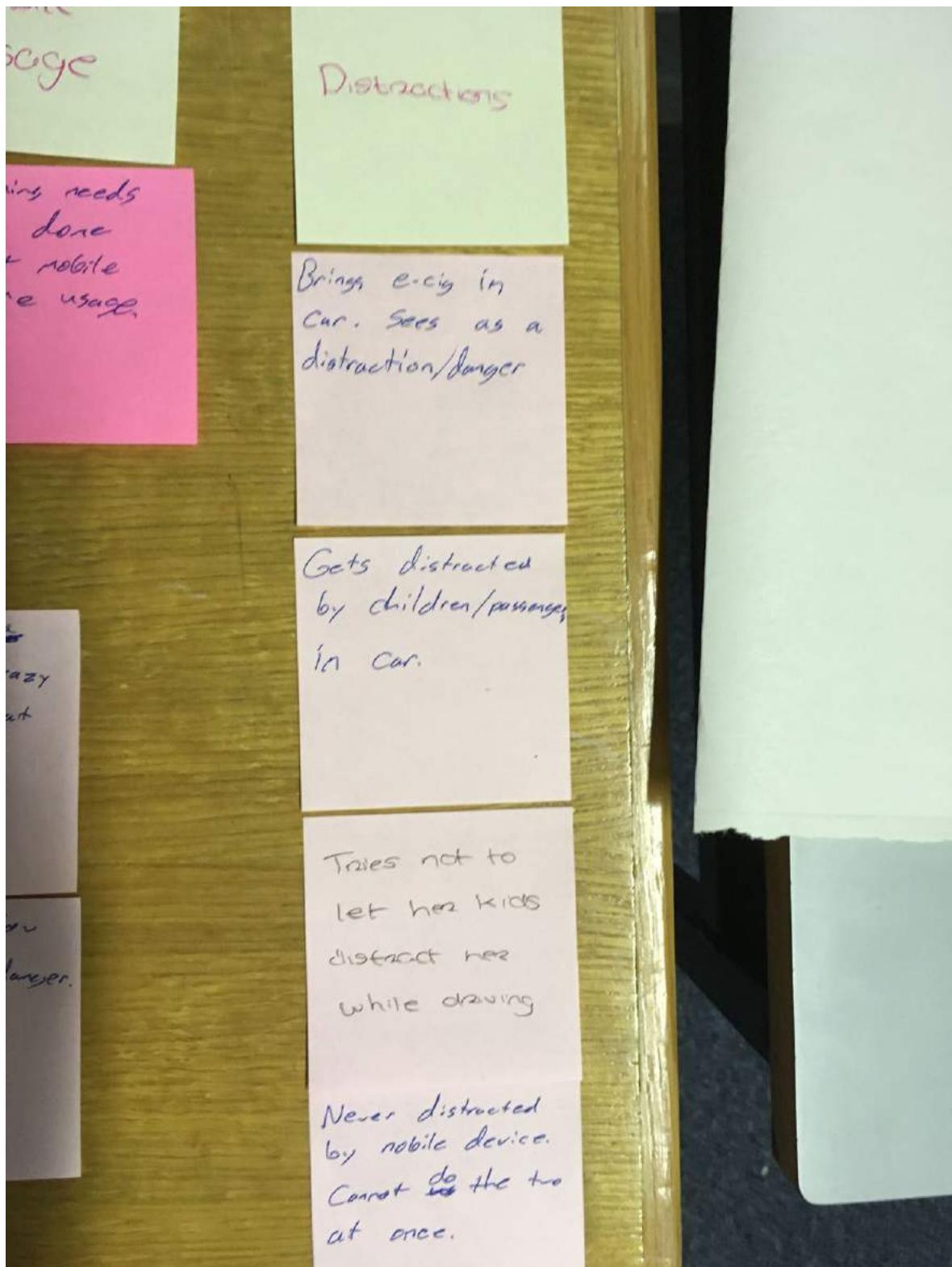
(Points about Mobile Usage from subject 4's interview)

Appendix 12.4.10



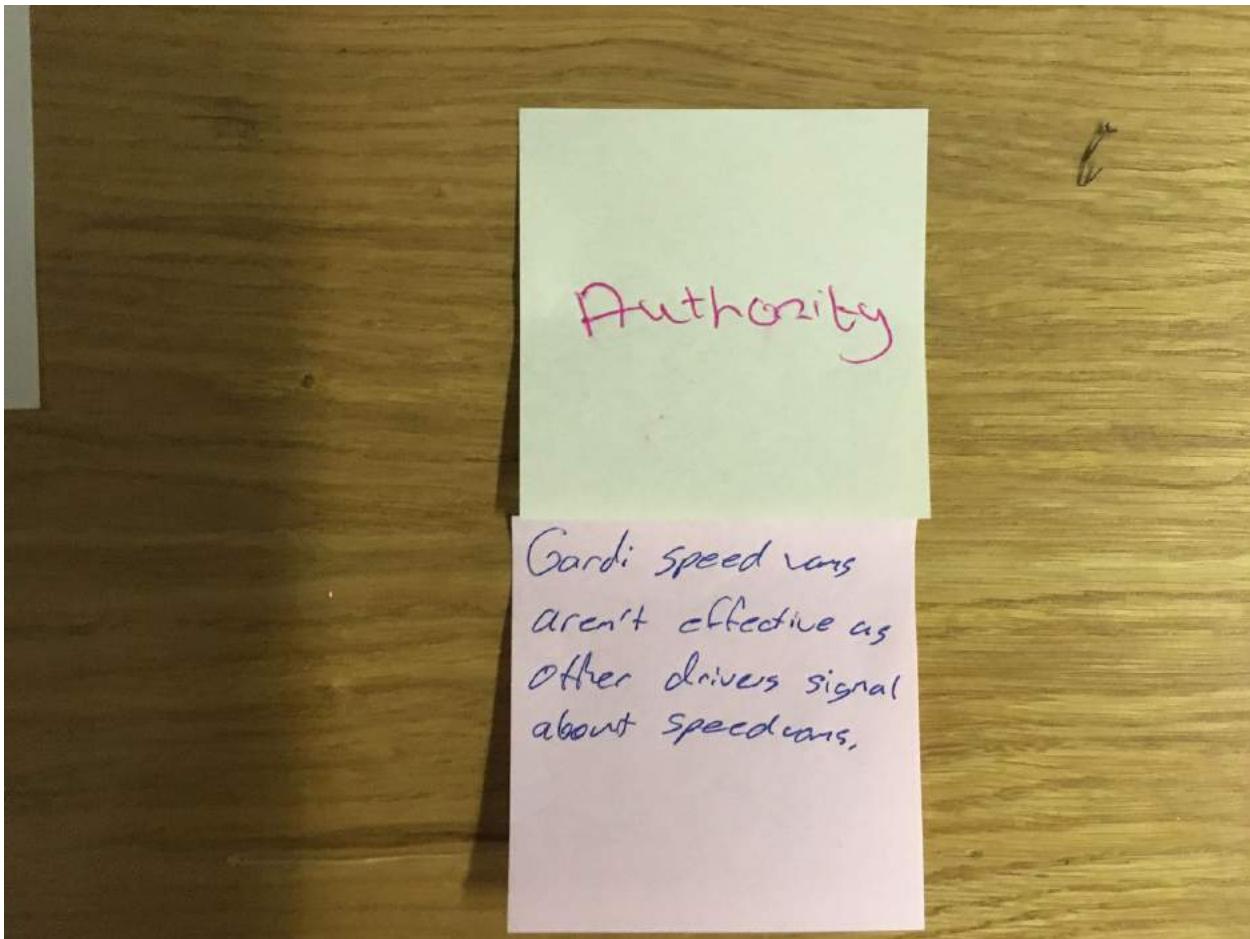
(Points about Equipment from subject 4's interview)

Appendix 12.4.11



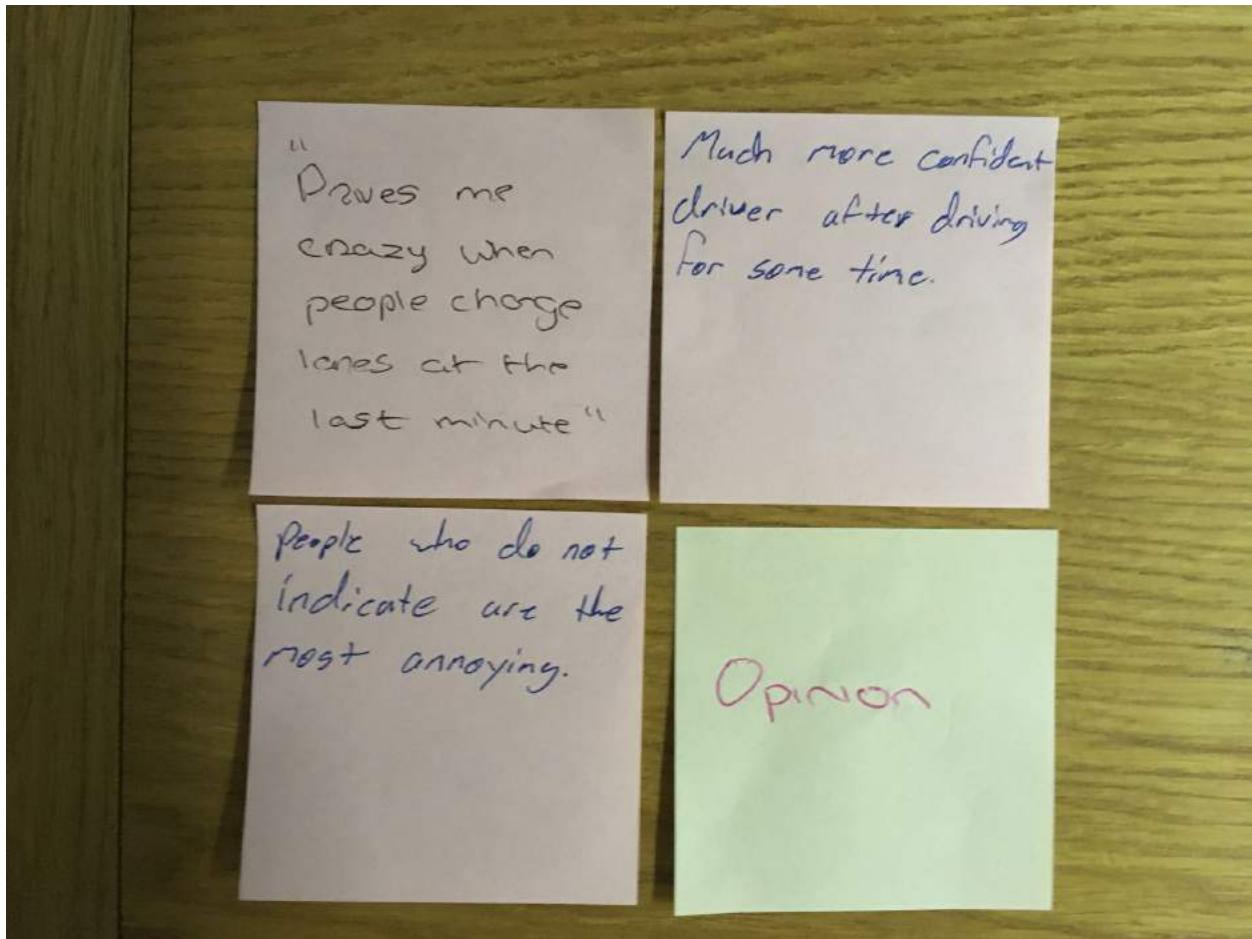
(Points about Distractions from subject 4's interview)

Appendix 12.4.12



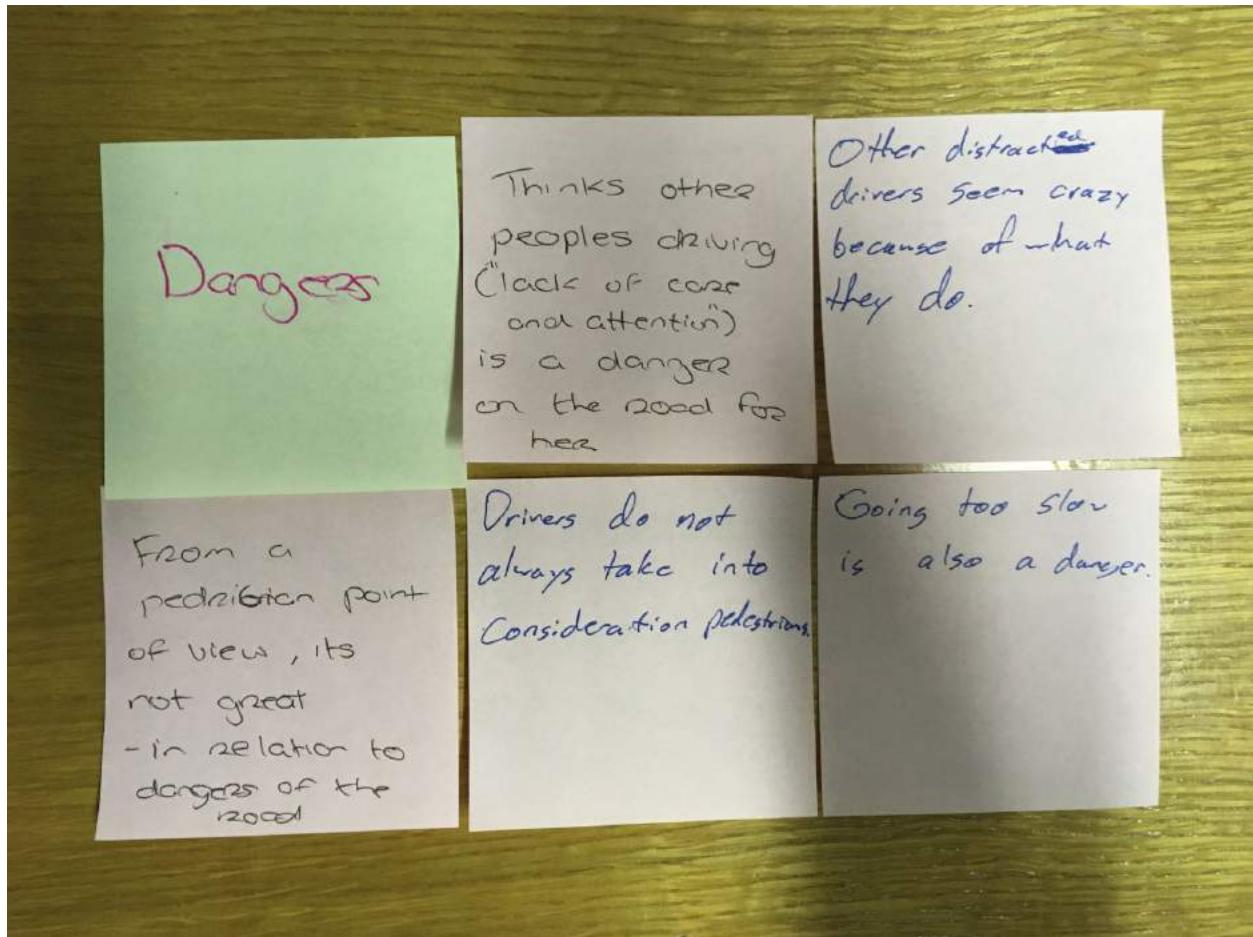
(Points about Authority from subject 4's interview)

Appendix 12.4.13



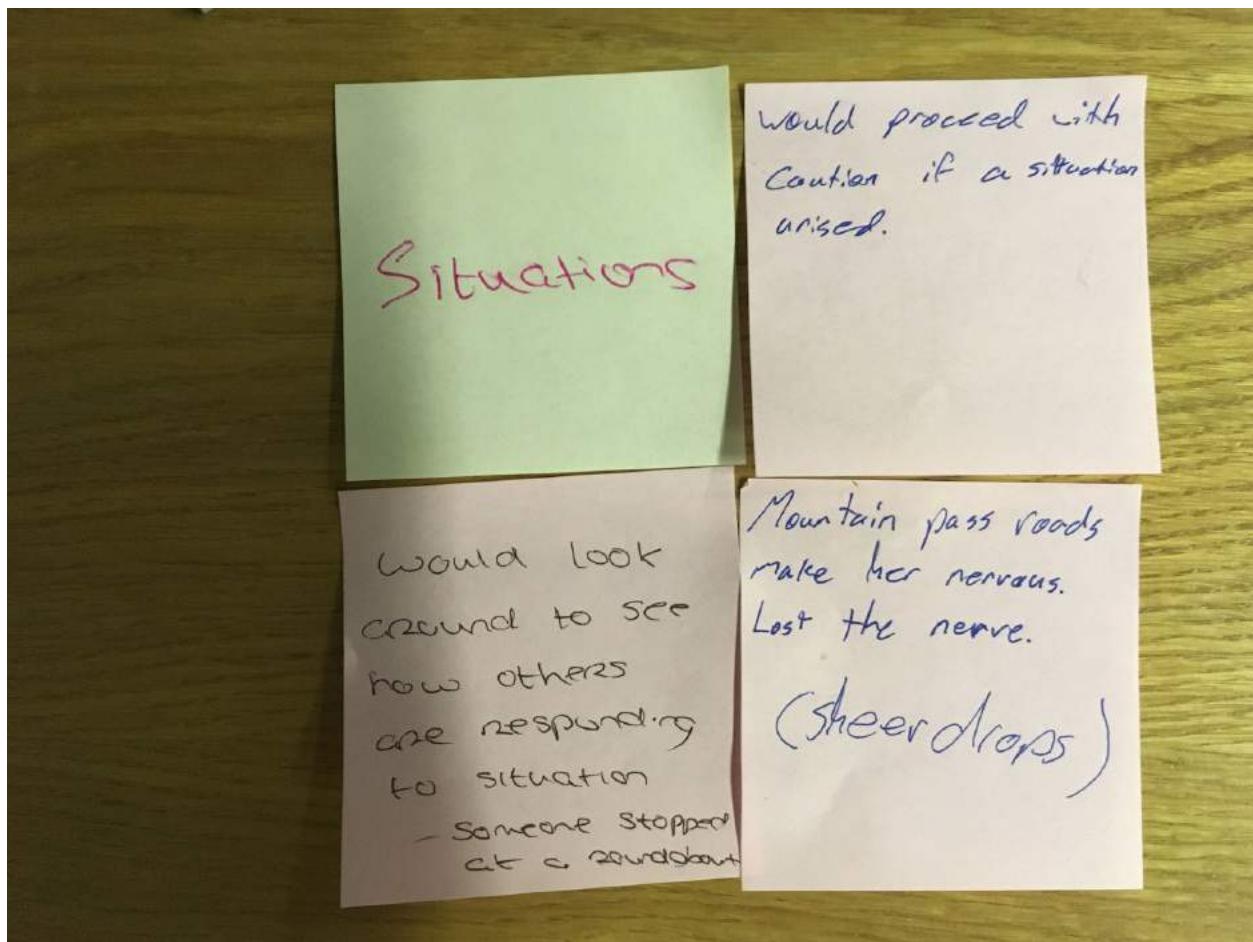
(Points about Opinions from subject 4's interview)

Appendix 12.4.14



(Points about Dangers from subject 4's interview)

Appendix 12.4.15



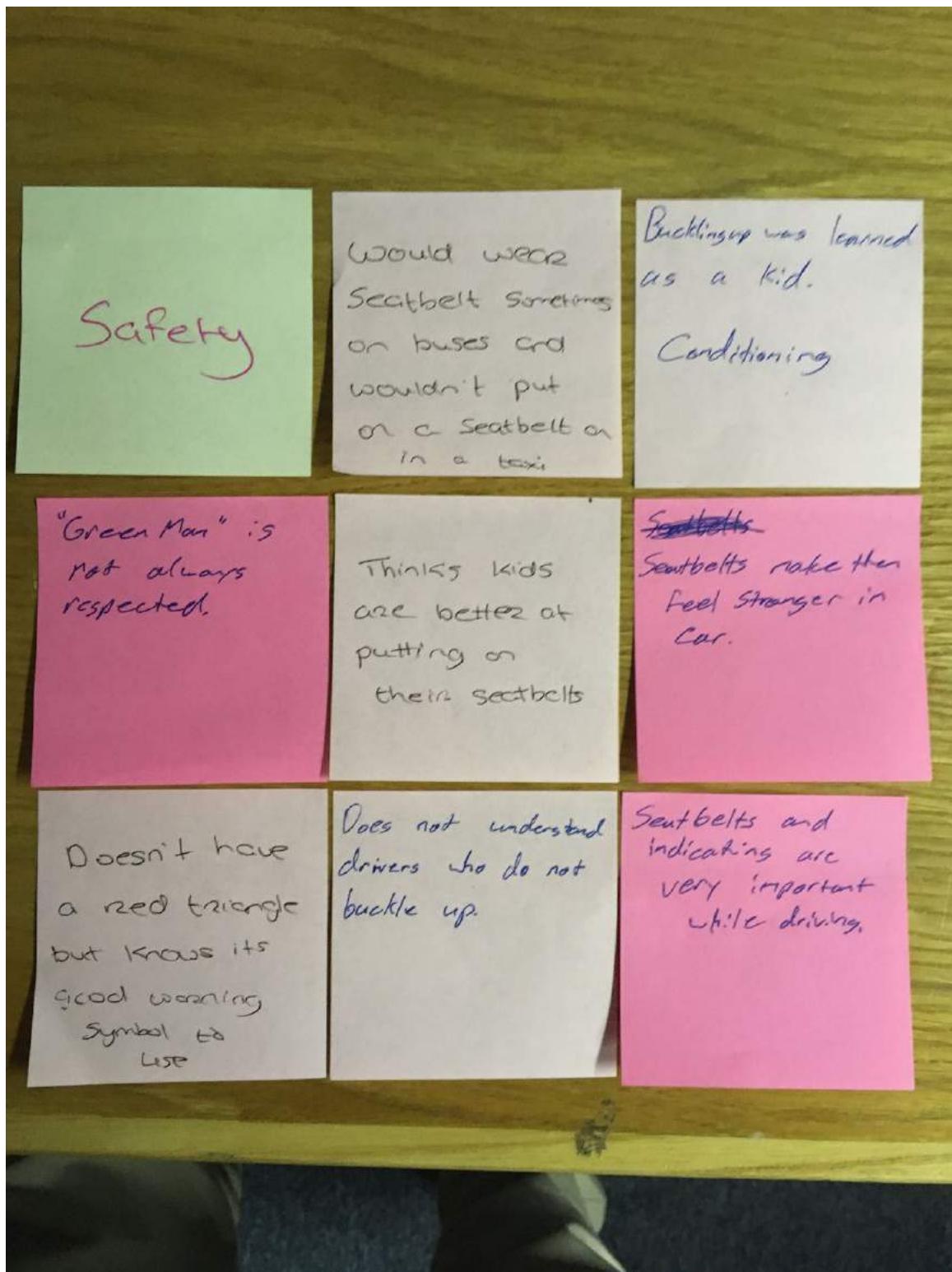
(Points about Situations from subject 4's interview)

Appendix 12.4.16



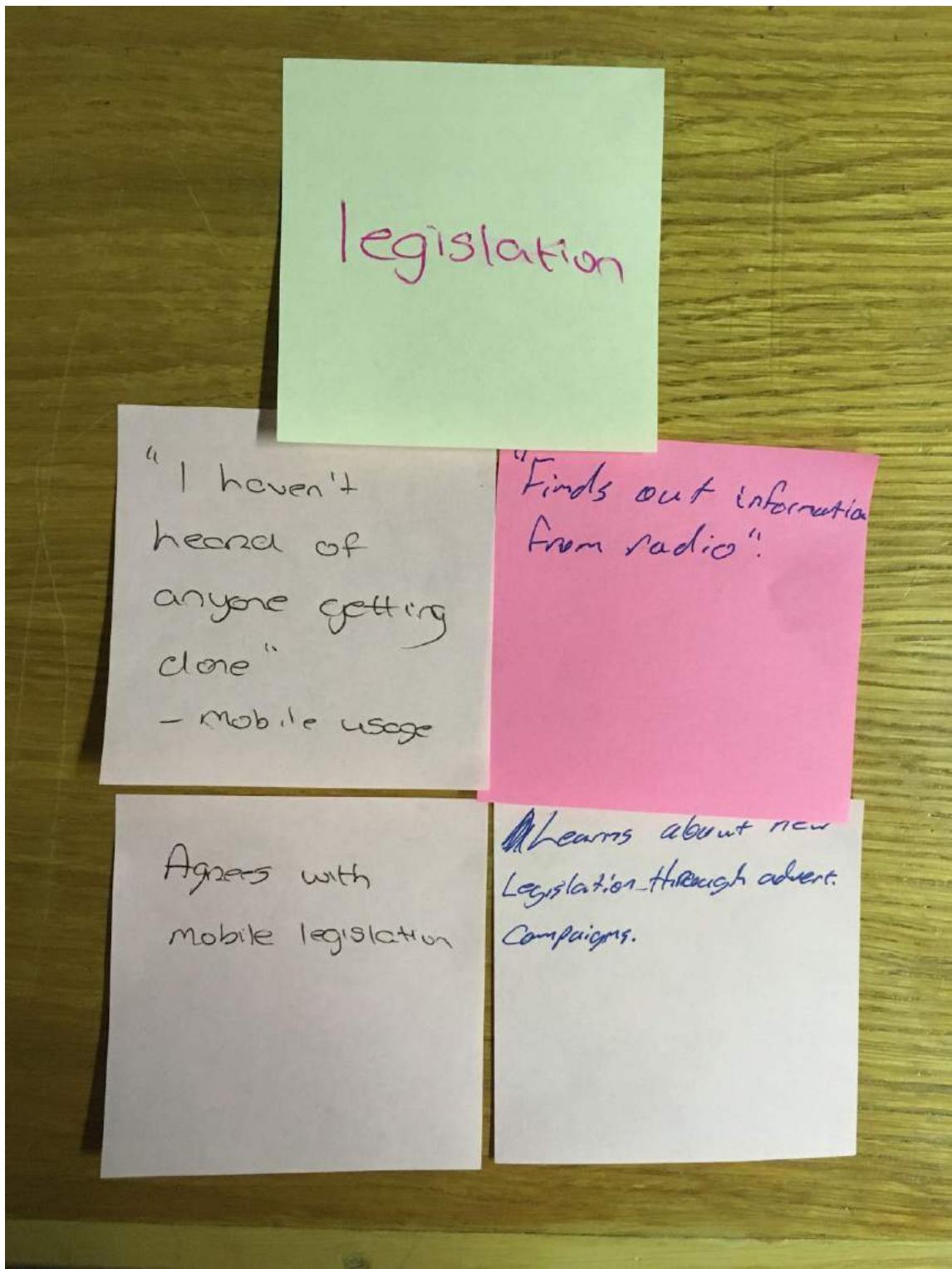
(Points about Technique from subject 4's interview)

Appendix 12.4.17

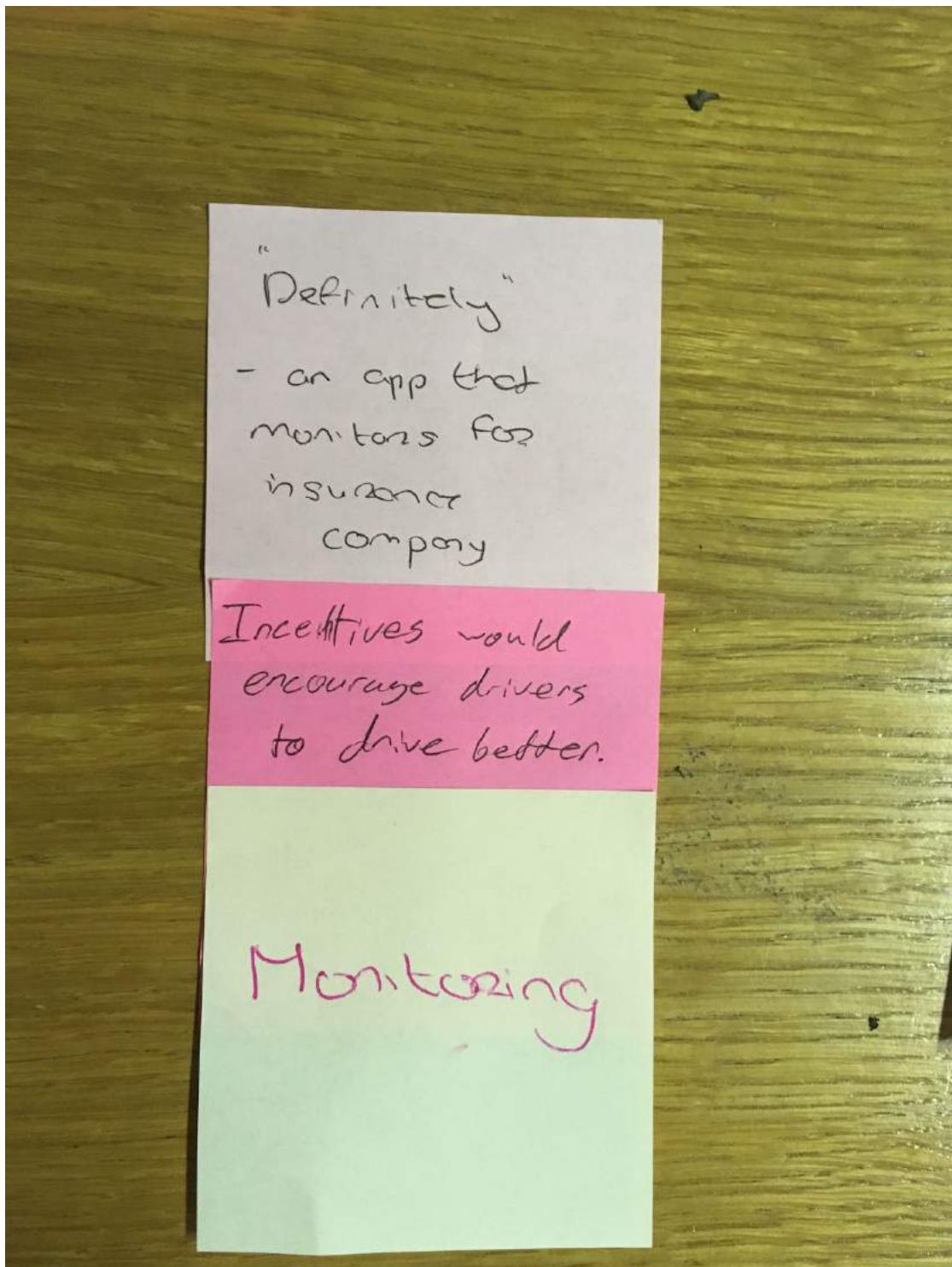


(Points about Safety from subject 4's interview)

Appendix 12.4.18

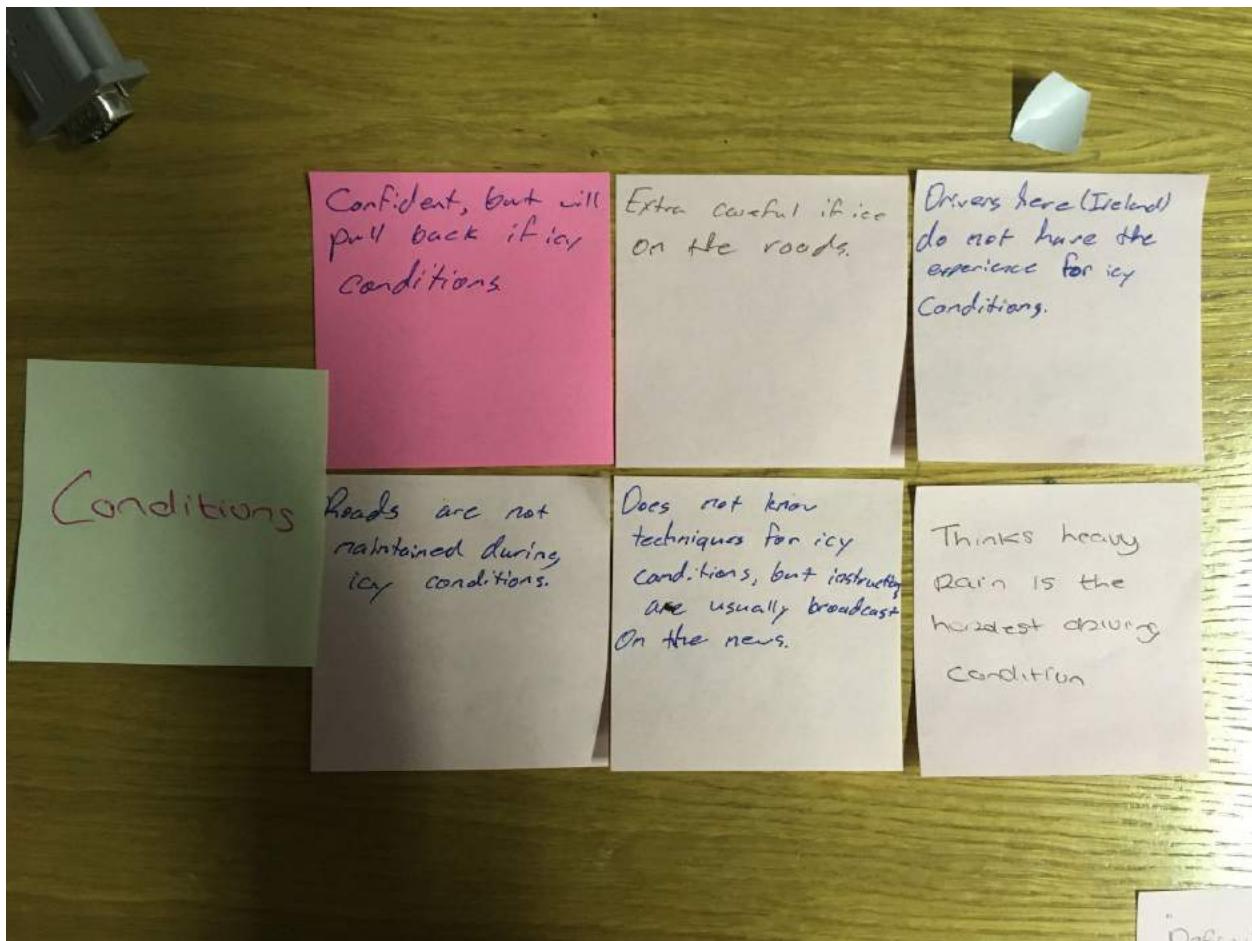


(Points about Legislation from subject 4's interview)



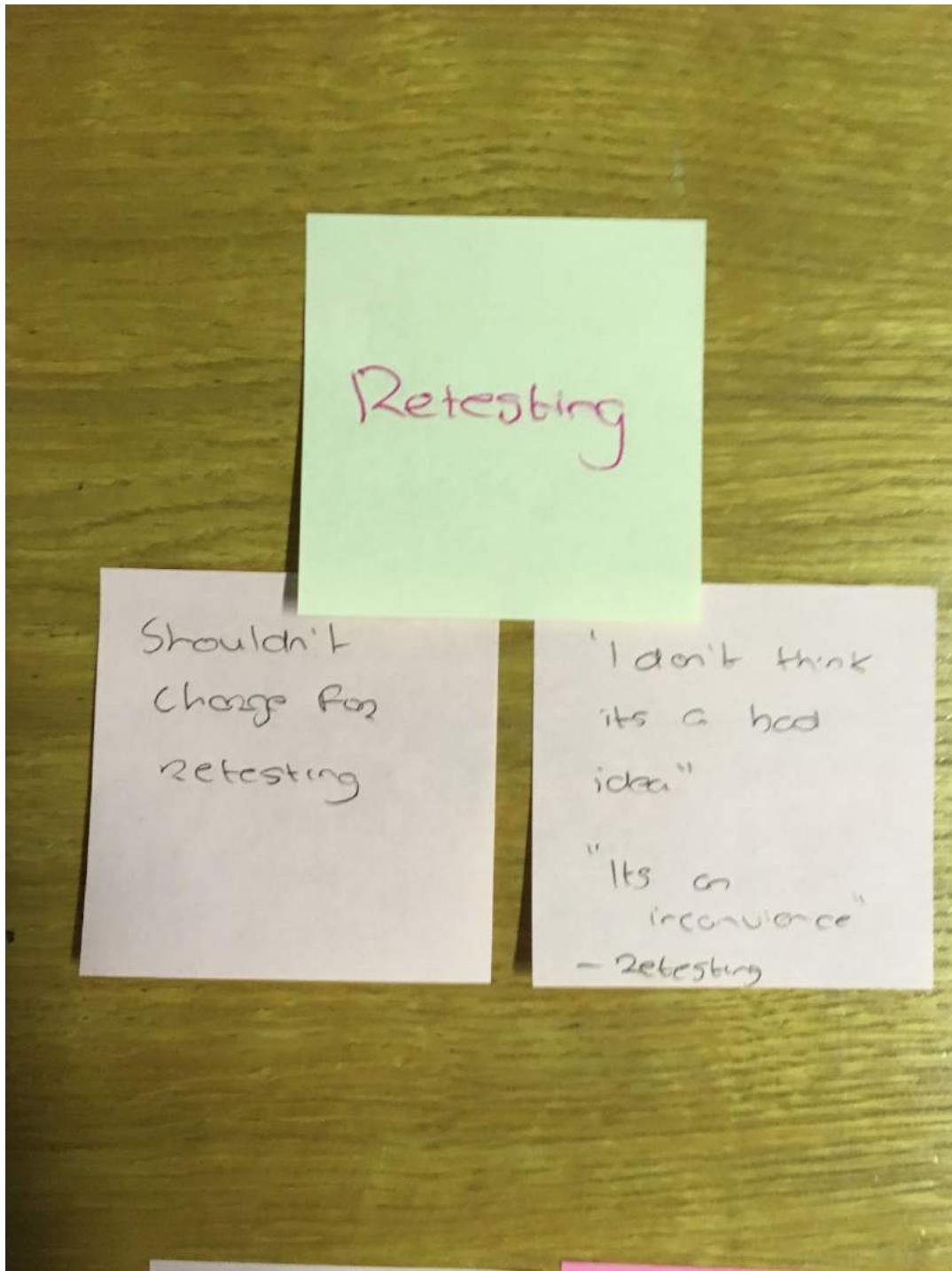
(Points about Monitoring from subject 4's interview)

Appendix 12.4.20



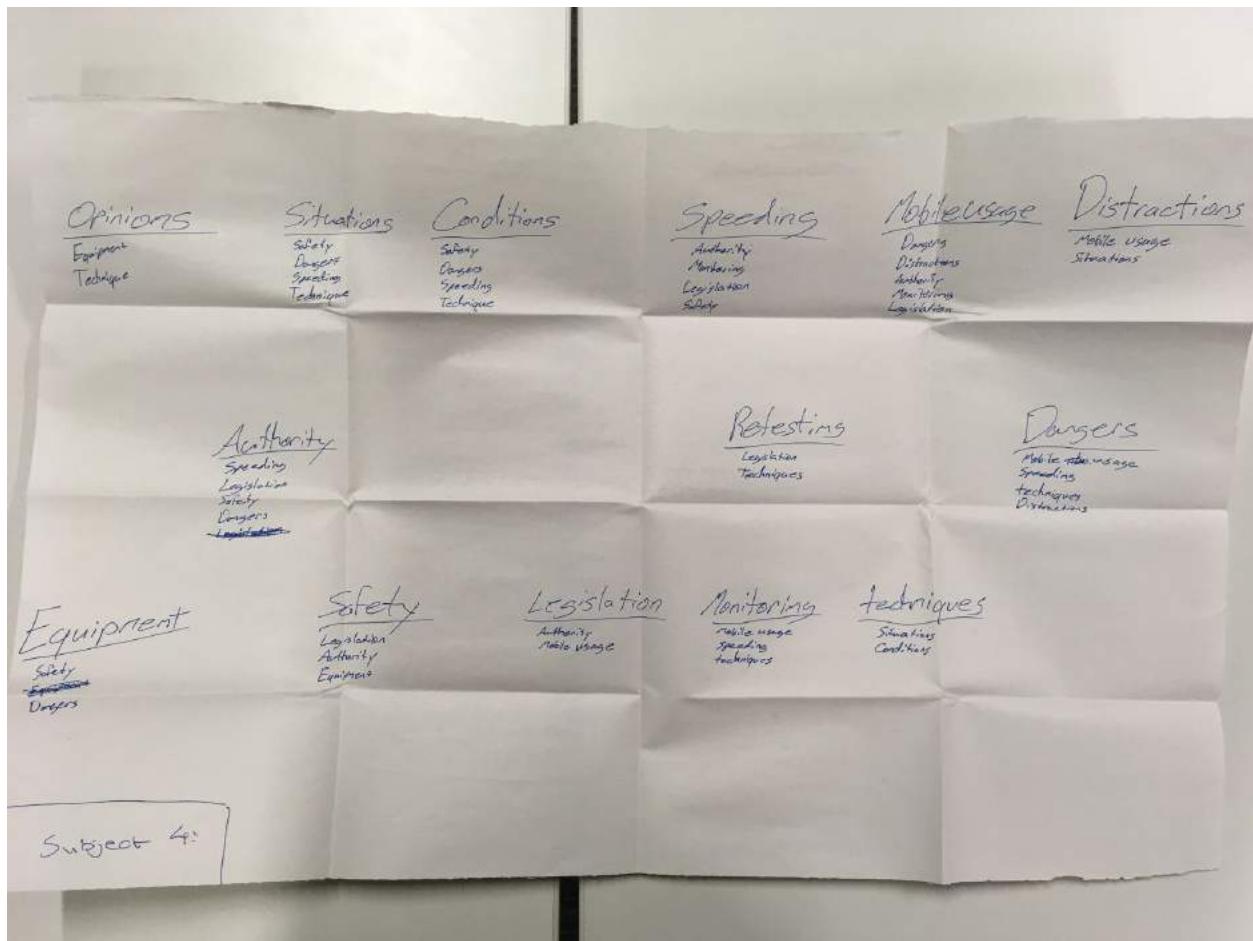
(Points about Conditions from subject 4's interview)

Appendix 12.4.21



(Points about Retesting from subject 4's interview)

Appendix 12.4.22



(Themed Cluster Relations from subject 4's interview)

Appendix 12.4.23

(Subject 4)

Interview Guide 4.0

1. How long have you been driving
 - a. How would you describe your skill level with the amount of time you have driven?
2. Do you have any driving rituals?
3. Can you tell us about a typical drive?
 - a. Ask Why
 - b. How do you start off your trip, in detail.
 - c. How do you normally know when to leave - do you plan ?
4. What is the one item you always have with you when you go driving?
 - a. Do you have those items in your car currently?
 - b. In your opinion, what are the items every driver should have in their car at all times?
5. How often in a week would you practice driving?
 - a. This week, how many times did you drive?
 - b. Week days ?
 - c. Weekends ?
6. What is the most annoying thing about driving
 - a. Why?
7. How do you feel about your skill level ?
 - a. Has it improved since you started driving ?
 - b. Have you relaxed a bit over time ?

8. Do you ever find yourself forgetting certain aspects of driving, as you are learning to drive?

9. In terms of comfort level, how do you feel about(Uphill Starts, Parallel Parking, Uncontrolled Junctions, Reverse Around A Corner).... ?
 - a. Can you tell us about a time where you did said techniques
 - i. What was it like ?
 - ii. Positive, negative ?

10. What would be your strongest driving technique ?
 - a. Why is this your strongest driving technique?
 - b. Do you practice this technique a lot?

11. What would be your weakest driving technique ?
 - a. Why is this your weakest driving technique?
 - b. What are your thoughts when you have to do it?
 - c. Why do you feel this is your weakest?

12. What is the type of driving you do the most?
 - a. Nighttime driving in urban areas
 - b. Nighttime driving in rural areas
 - c. Daytime driving in urban areas
 - d. Daytime driving in rural areas

13. What are your thoughts on speeding
 - a. Do you think in certain conditions that speeding is acceptable/non-acceptable
 - b. Do you yourself speed?
 - c. Do you think Garda should be more strict on speeding?

14. Do you ever find yourself getting distracted ?
 - a. How ?
 - b. What are your thoughts on other distracted drivers?

15. What is your perspective on the dangers of the road - thoughts ?

Agreements/Disagreements with the legislation ?

- a. Why might you agree/disagree with legislation?
- b. What do you think is the biggest danger to the road?

16. In your opinion, do you think drivers in general have enough knowledge and experience with icy conditions / wet conditions, etc.

17. In your opinion, which do you think are the hardest conditions for driving in:

- a. Heavy rain
- b. Wind
- c. Snow
- d. Very sunny

18. If you got into a situation where you (broke down, were overtaking, emergency services were passing, car parked on roundabout), how would you handle it ?

- a. Why ?

19. There are so many different regulations in driving, Do you keep up with the rules and regulations of the road

- a. How do you keep yourself updated? (What medium)
- b. Do you think there could be a better/easier way to keep up with the rules and regulations of the road?

20. What do you think about the laws in relation to mobile phone usage while driving

- a. Agree/Disagree with them ?
- b. Would you change them in any way ?

21. Do you think drivers should get retested every 10 years when they renew their licence?
- a. Why?
 - b. From your own perspective would you mind getting retested on your driving ?
 - i. Reasoning?
22. If your insurance company offered an app that monitored your actions while driving, that in turn would help to lower your monthly/annual rate, would this be an option that you would consider ?

Insight statements and How Might We

Distractions

- Mobile phones seem to be a major distraction for many drivers.
 - How might we discourage the use of mobile phones?
- Certain situations may cause distraction for drivers.
 - How might we assist drivers with concentrating on the road?

Mobile Usage

- Mobile usage while driving is a danger for other drivers.
 - How might we show drivers that mobile usage is a danger to others?
- Usage of a mobile device is a distraction for many drivers.
 - How might we prevent drivers from accessing their phone?
- Mobile phone legislation is not taken seriously by many drivers.
 - How might we enforce mobile phone legislation more?
- Mobile phones would enable monitoring of drivers.
 - How might we encourage drivers to allow monitoring via their mobile device?

Dangers

- The newest danger to the road is mobile phone usage.
 - How might we enforce the idea that mobile phones are dangerous while driving?
- Speeding attributes to many accidents while driving.
 - How might we discourage drivers from speeding?
- Poor driving techniques can be a danger to other drivers.
 - How might we assist drivers in learning and using proper driving techniques?
- Distractions while driving are a major danger on the road.
 - How might we prevent drivers from being distracted while driving?

Retesting

- Retesting legislation would ensure drivers remain up to date.
 - How might we encourage drivers to remain up-to-date about legislation?
- Retesting drivers could prevent poor/dangerous driving techniques.
 - How might we assist drivers in learning and using proper driving techniques?

Techniques

- Proper driving techniques may assist a driver in certain driving situations.

- How might we assure drivers that proper techniques may assist them in situations?

Monitoring

- Many drivers would not mind being monitored through their mobile phone.
 - How might we encourage more drivers to allow monitoring via their mobile devices?
- Technology can monitor a driver's speed while driving.
 - How might we monitor a driver's speed using modern technology?
- New or advanced monitoring technology may be able to monitor a driver's techniques.
 - How might we utilize technology to monitor a driver's technique?

Legislation

- Authorities do not seem to be implementing mobile phone legislation as much.
 - How might we encourage drivers not to use their phone while driving?

Safety

- Legislation is in place to reduce the risk of accidents while driving.
 - How might we encourage drivers to abide by driving legislation?
- Authorities enforce legislation to keep roads safe.
 - How might we help drivers understand the different aspects involved in keeping roads safe?
- Proper safety equipment should be kept in the car at all time.
 - How might we suggest to drivers to keep important safety equipment in their vehicles?

Equipment

- Drivers should ensure safety equipment is present in their car at all times.
 - How might we encourage drivers to purchase and keep safety equipment with them at all times?
- Safety equipment can reduce the risk of an accident.
 - How might we display to drivers the importance of safety equipment?

Authority

- Speed vans are not effectiveness enough
 - How might we help drivers in monitoring their speeding?
- Legislation outlined doesn't deter drivers from speeding or using mobile phones
 - How might we make drivers take legislation more seriously?
- Having an authority body helps reduce some of the dangers on the road
 - How might we help reducing speed outside of an authority body?
- With legislation being enforced it outlines some of the safety precautions drivers face

- How might we make drivers more aware of the safety protocols in legislation?

Opinions

- Equipment such as seat belts, jacks, spare tyre and red hazard triangle are utilized by drivers to ensure safety and handle different situations.
 - How might we get drivers to use more safety equipment in different situations?
- Drivers feel that their technique improves over time.
 - How might we help drivers to improve on their driving technique?

Situations

- It is important to be cautious in certain driving situations.
 - How might we help drivers be more aware of certain driving situations?
- Many drivers feel that it is acceptable to speed in certain situations.
 - How might we make drivers more aware about the dangers of speeding in certain conditions?
- Proper technique can assist a driver in certain situations.
 - How might we assist drivers in knowing proper driving techniques?

Conditions

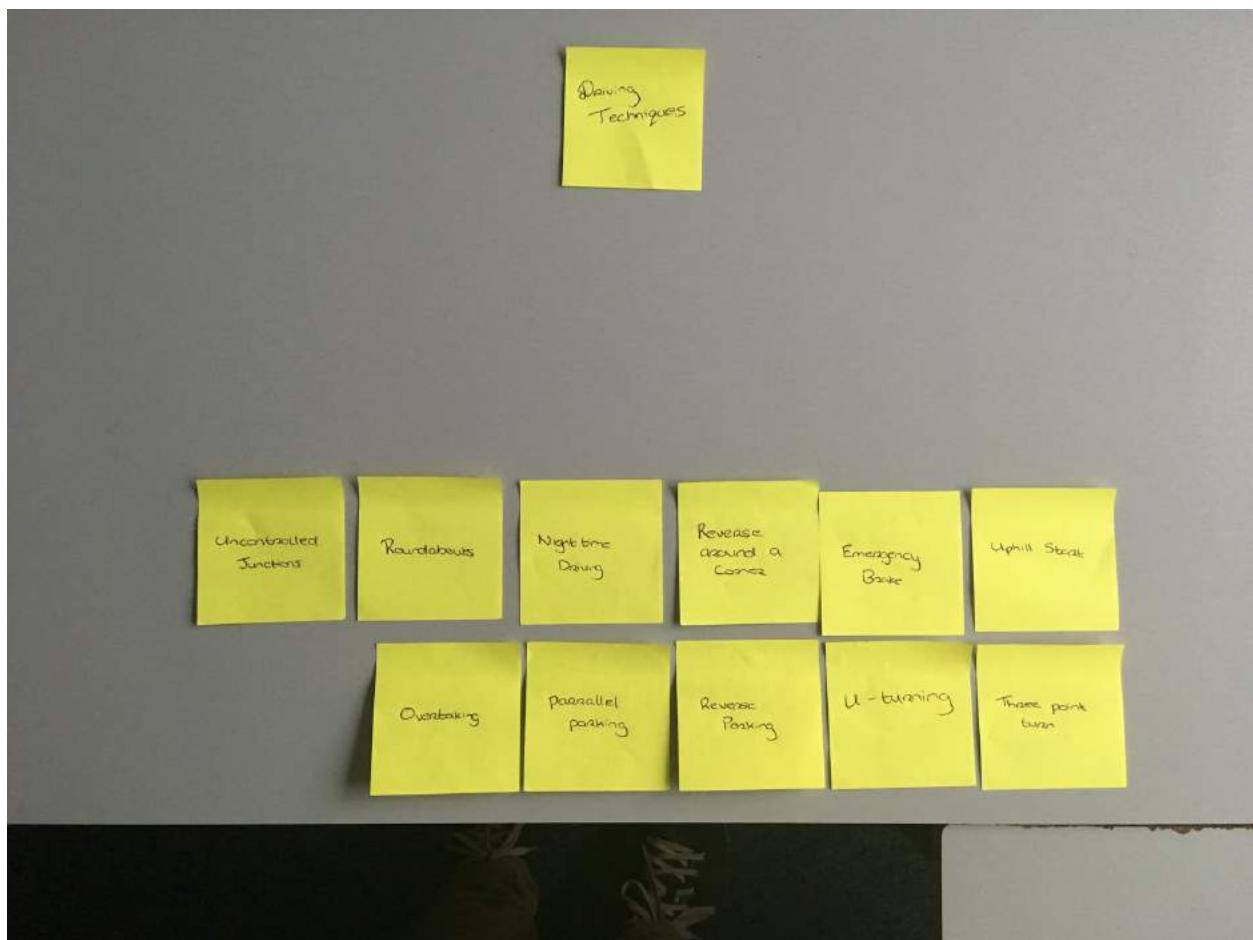
- Proper driving conditions may improve the safety of the road.
 - How might we help drivers improve on safety on roads in poor driving conditions?
- Poor driving conditions may be a danger to drivers.
 - How might we instruct drivers on how to drive in poor driving conditions?
- Speeding in bad weather conditions may be dangerous.
 - How might we make drivers aware of the dangers with speed in bad weather conditions?
- Proper driving techniques may improve driving in certain weather conditions.
 - How might we aid drivers with knowing the correct techniques for different weather conditions?

Speeding

- Overspeeding penalties are enforced by authorities
 - How might we reduce the amount of overspeeding occurring?
- Speeding is a safety concern
 - How might we combat speeding?
- Speeding limits are in place by legislation
 - How might we help enforce speeding legislation?
- Speed is an aspect which could potentially be monitored
 - How might we monitor speeding effectively?

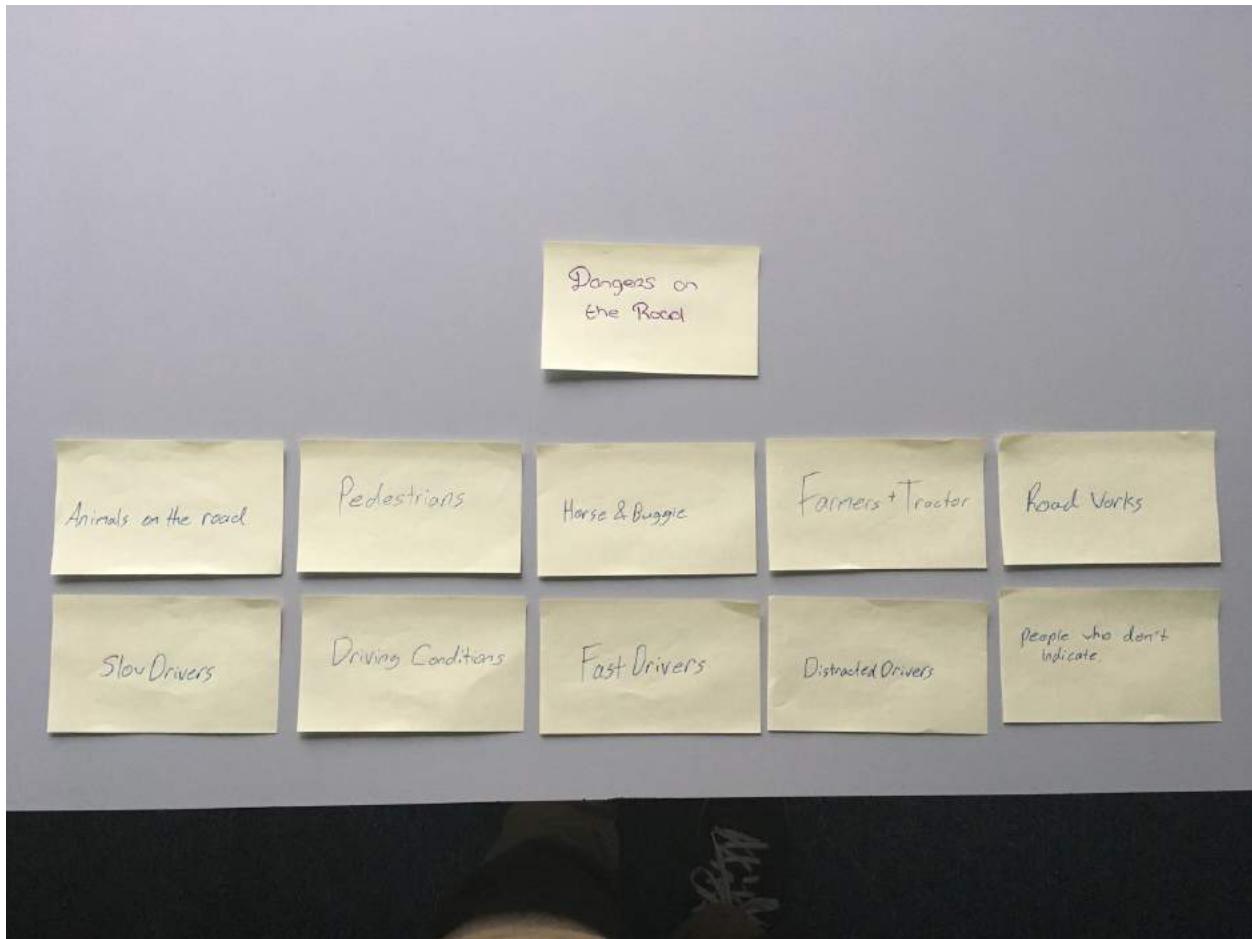
12.5 Subject #5

Appendix 12.5.1



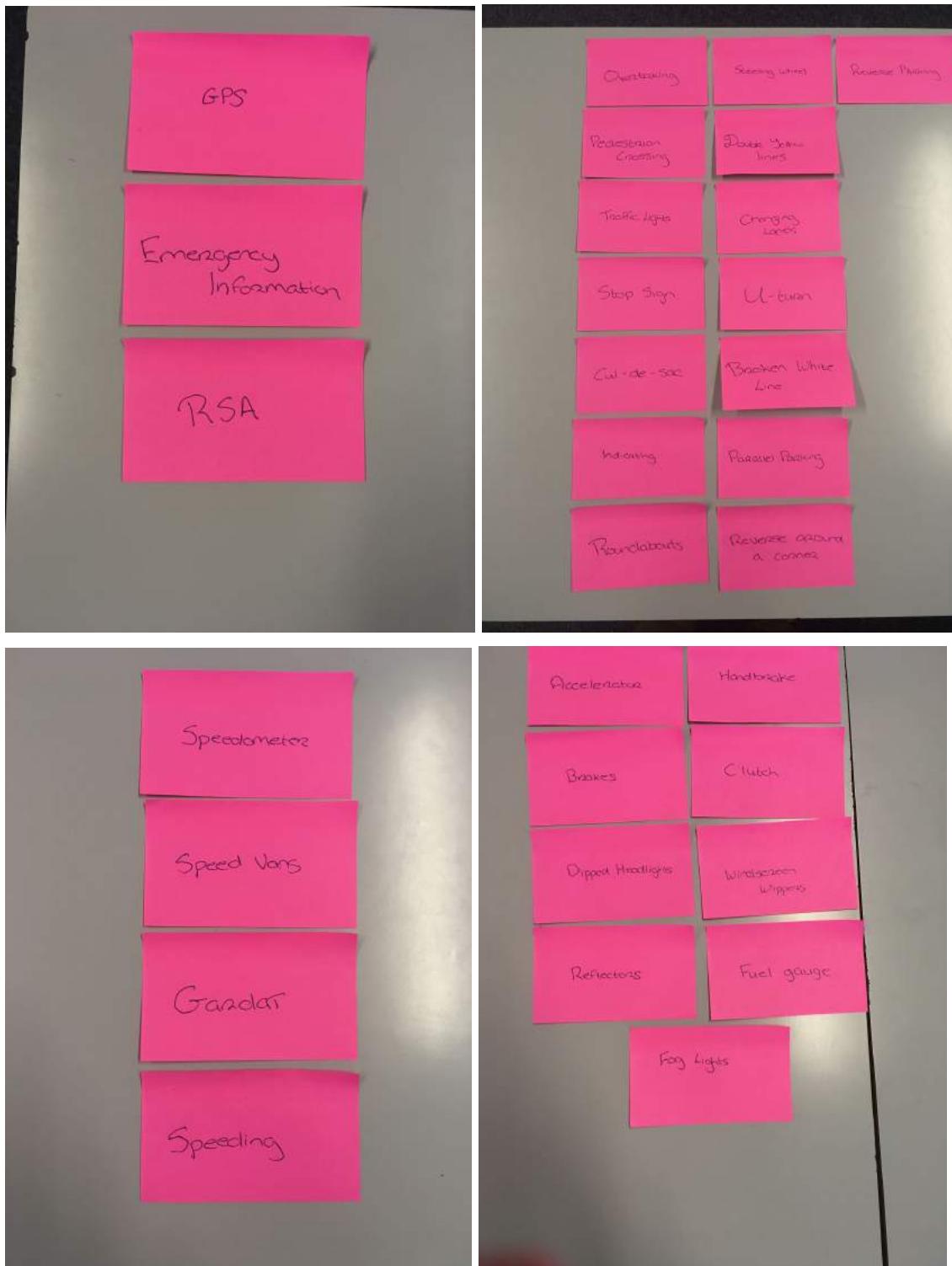
(Driving techniques card sorting for subject 5 depicting their best to worst driving techniques)

Appendix 12.5.2



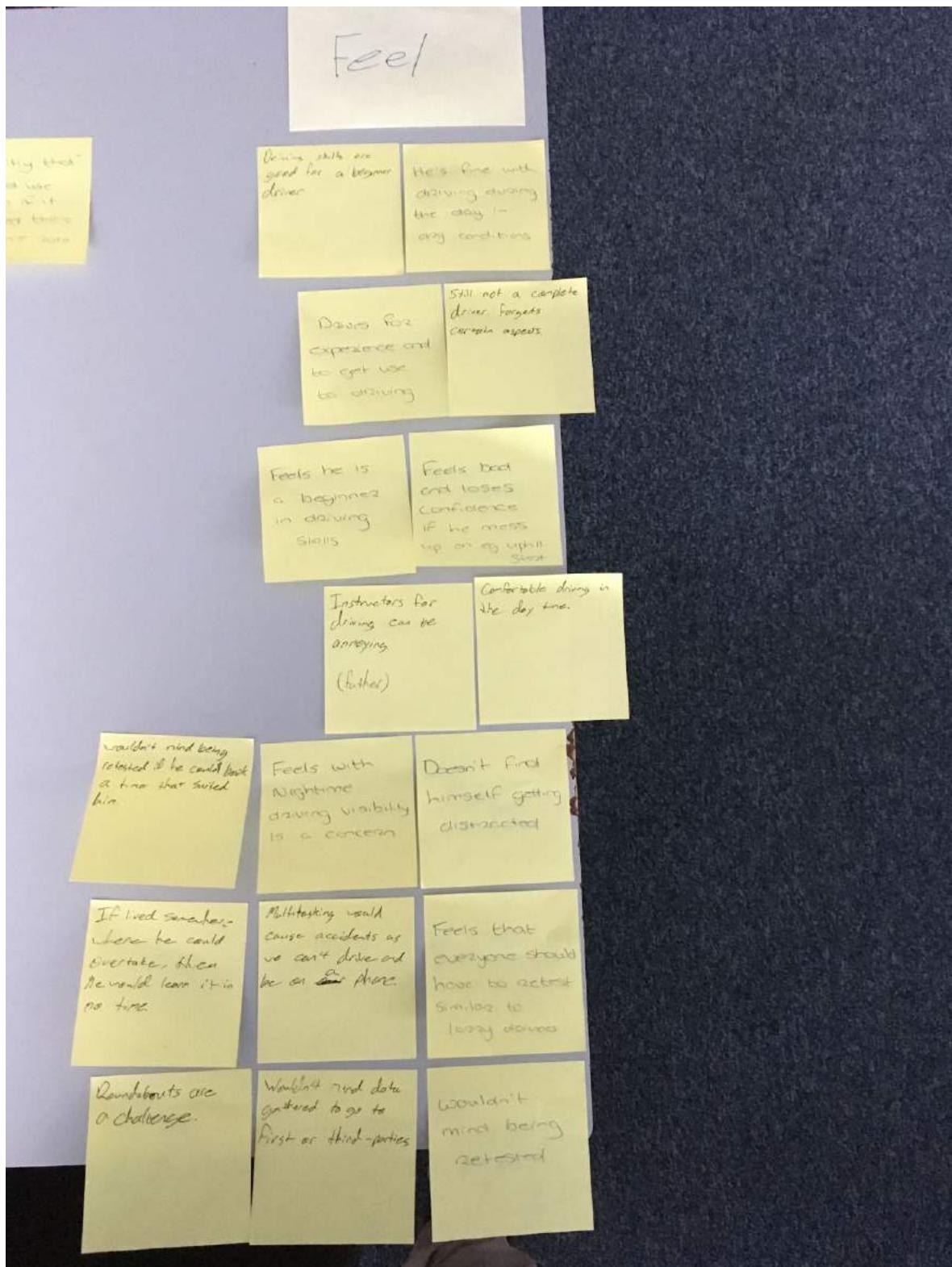
(Dangers of the Road card sorting for subject 5 depicting the least to most dangerous)

Appendix 12.5.3



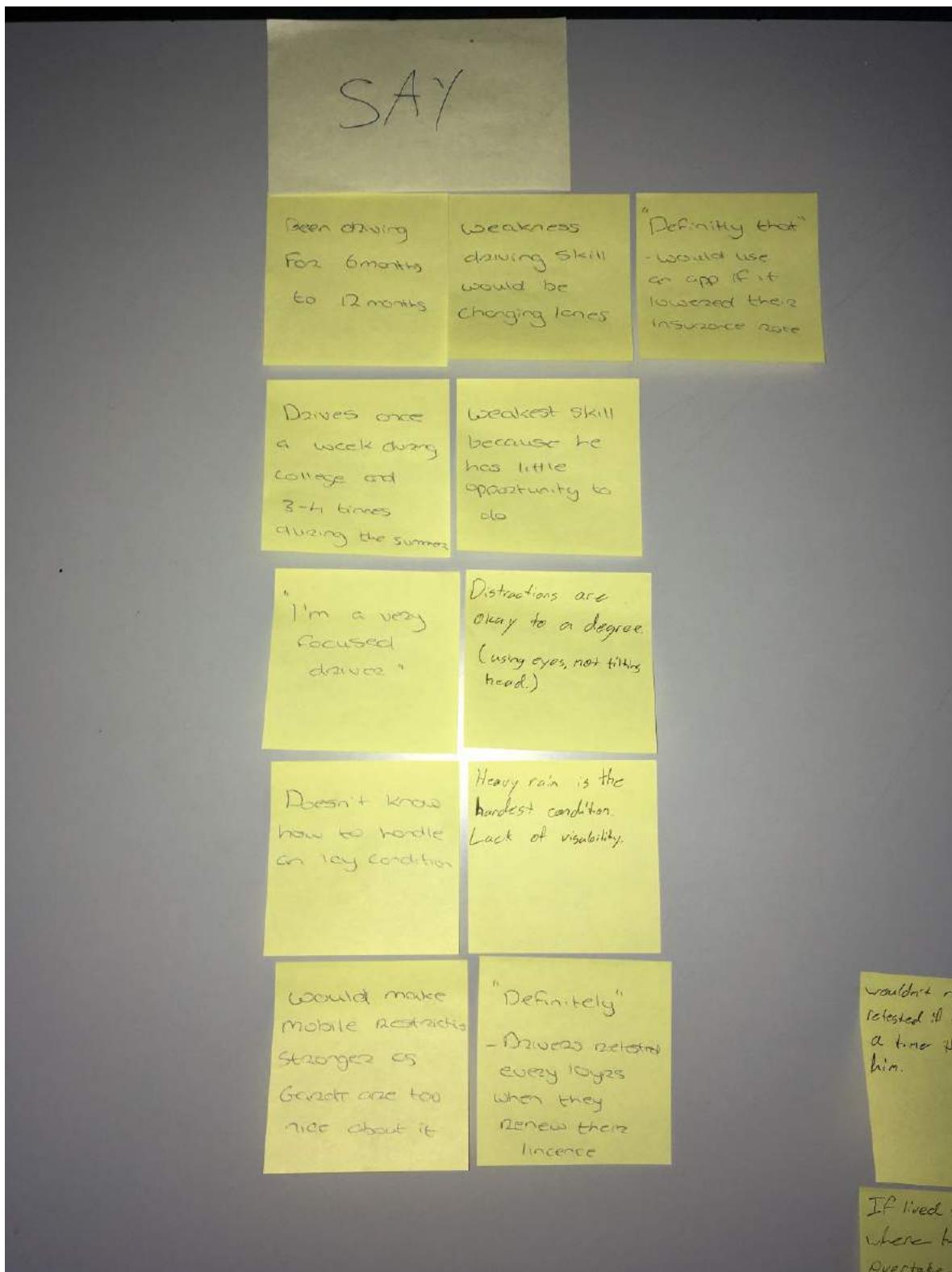
(Clustering of different aspects related to design challenge. Sorted by subject 5)

Appendix 12.5.4



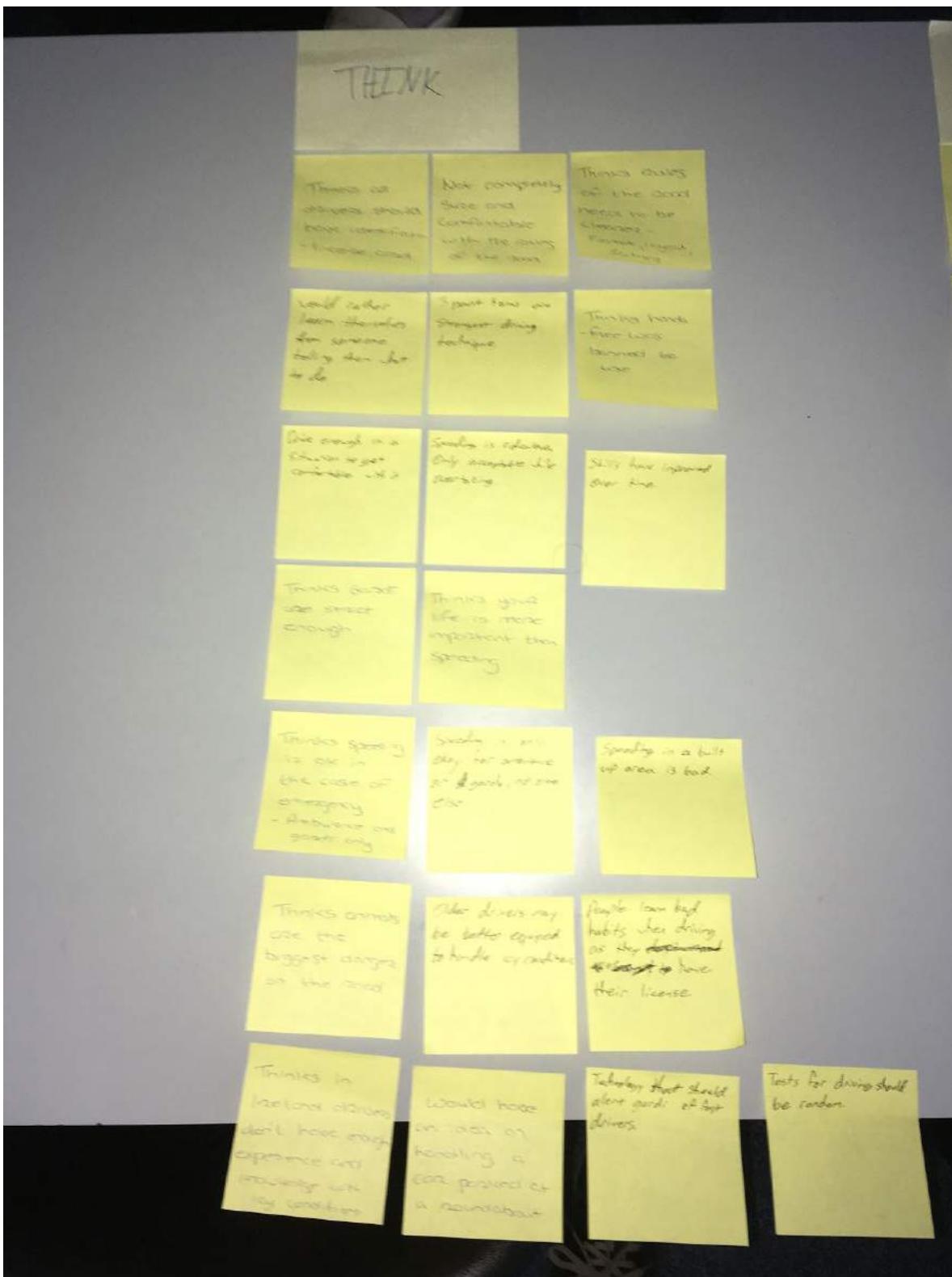
(Empathy Map FEEL laid out after listening to subject 5's recorded interview)

Appendix 12.5.5



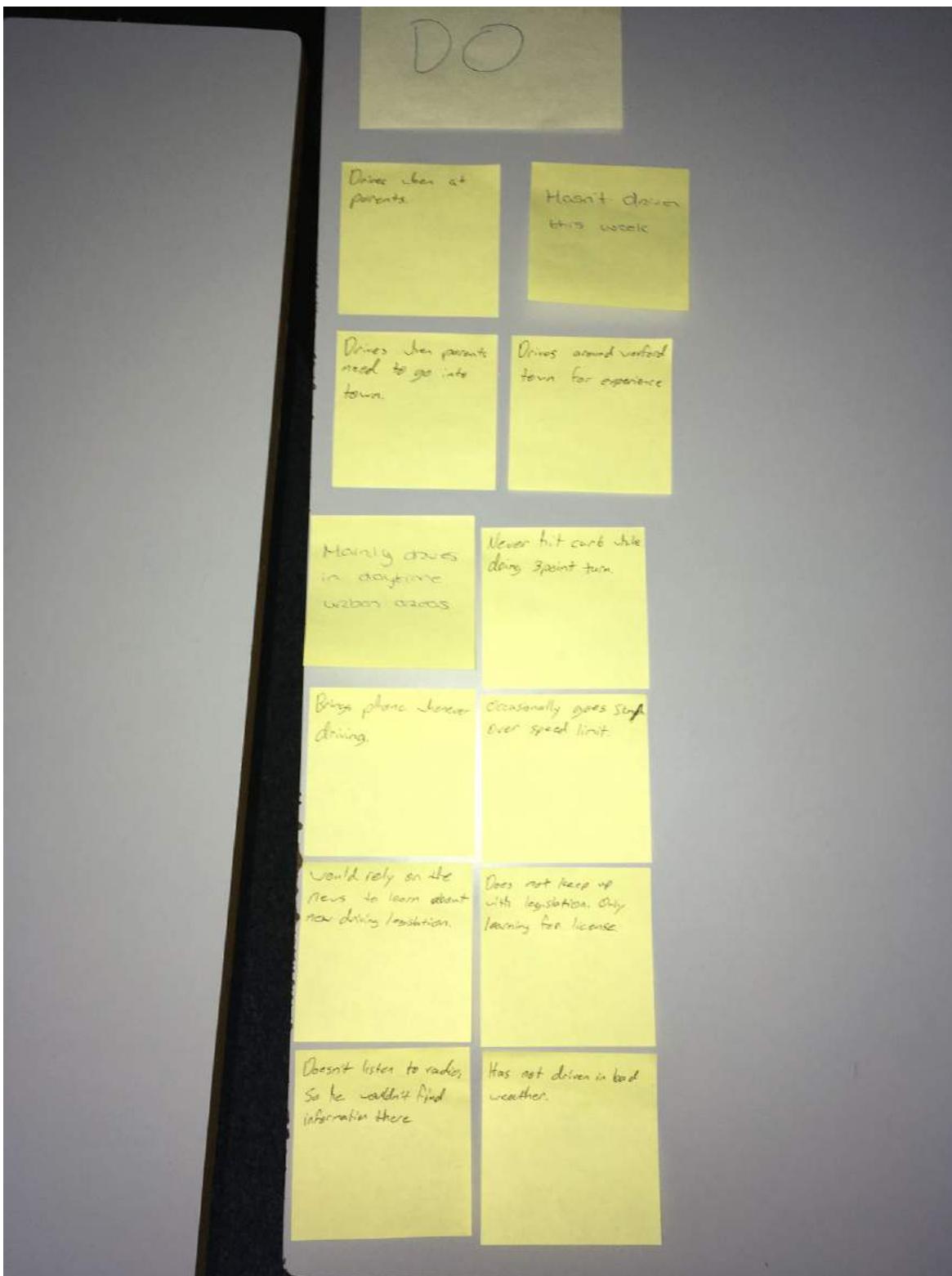
(Empathy Map SAY laid out after listening to subject 5's recorded interview)

Appendix 12.5.6



(Empathy Map THINK laid out after listening to subject 5's recorded interview)

Appendix 12.5.7



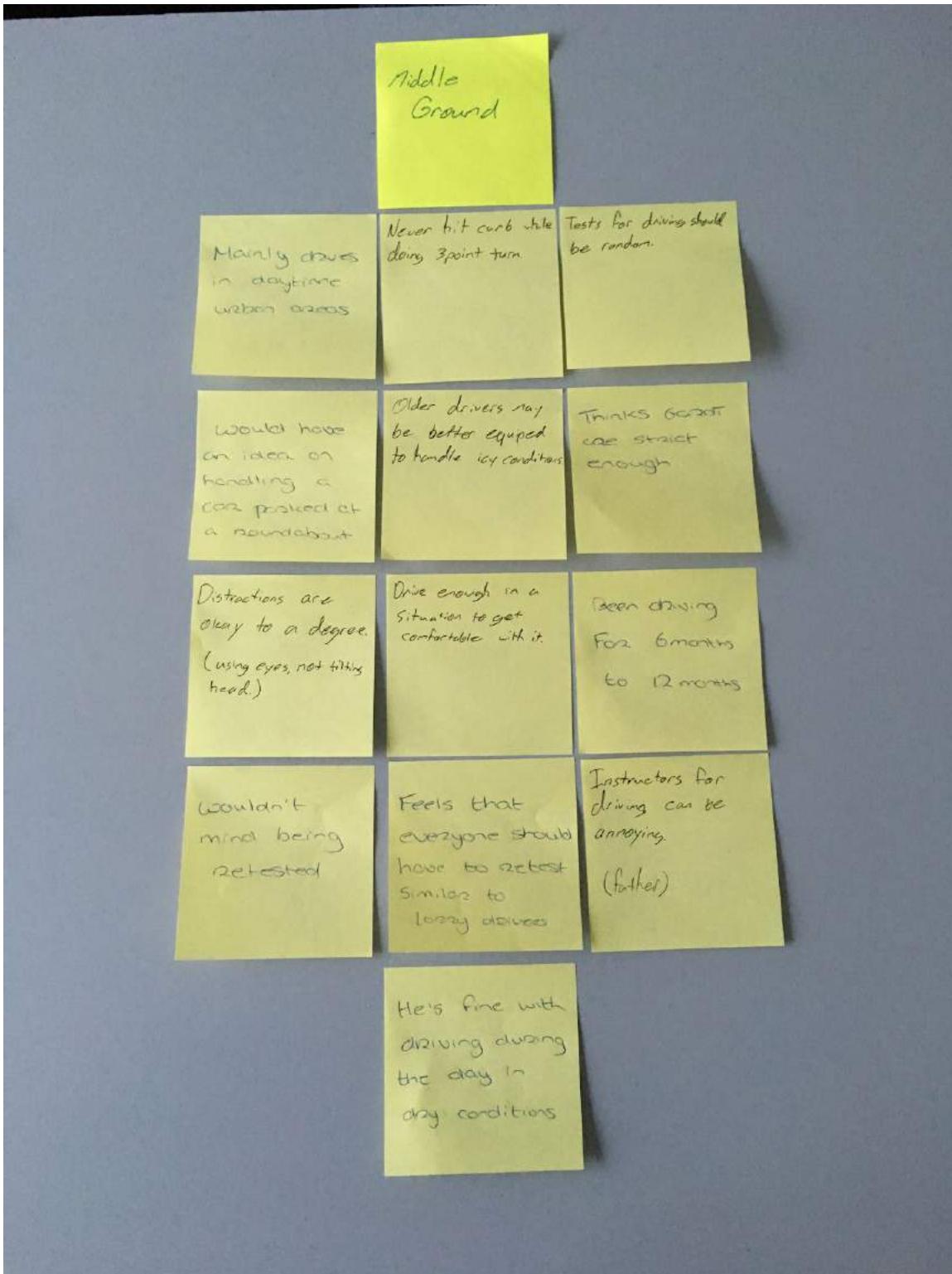
(Empathy Map DO laid out after listening to subject 5's recorded interview)

Appendix 12.5.8

Most Important				
Does not have up with legislation day learning for license	Thinks cameras are the biggest changes on the road	Doesn't know how to handle an emergency	Wouldn't feel safe gathered to go to first or third parties	
Would rely on the news to learn about new driving legislation	People learn bad habits when driving as they haven't haven't to have their license	"Definitely" - Drives nervous every time when they know there's someone	If lived somewhere where he could practice then he would learn it in no time	Drives for experience and to get use to driving
Occasionally goes slightly over speed limit	Speeding in a built up area is bad	Thinks rules of the road need to be clearer - Forest, signs, sections	Roundabouts are a challenge	Still not a complete driver, forgets certain aspects
Bring phone when driving	Speeding is only okay for ambulance or garda, no one else	Not completely sure and comfortable with the rules of the road	"Definitely that" - Would use an app if it honored their insurance name	Feels bad and loses confidence if he messes up on an uphill start
Has not driven in bad weather	Thought speeding is ok in case of emergency - Ambulance can break only	would rather learn themselves than someone telling them what to do	Weakness driving skill would be changing lanes	Feels he is a beginner in driving skills
Doesn't listen to radio so he wouldn't find information there	Thinks your life is more important than speeding	3 point turns are strongest driving technique	Weakest skill because he has little opportunity to do	Feels with nighttime driving visibility is a concern
Thinks in Ireland drivers don't have enough experience and knowledge with bad conditions	Skills have improved over time	Speeding is ridiculous. Only acceptable like overtaking	Heavy rain is the hardest condition. Lack of visibility.	Multitasking would cause accidents as we can't drive and be on the phone.

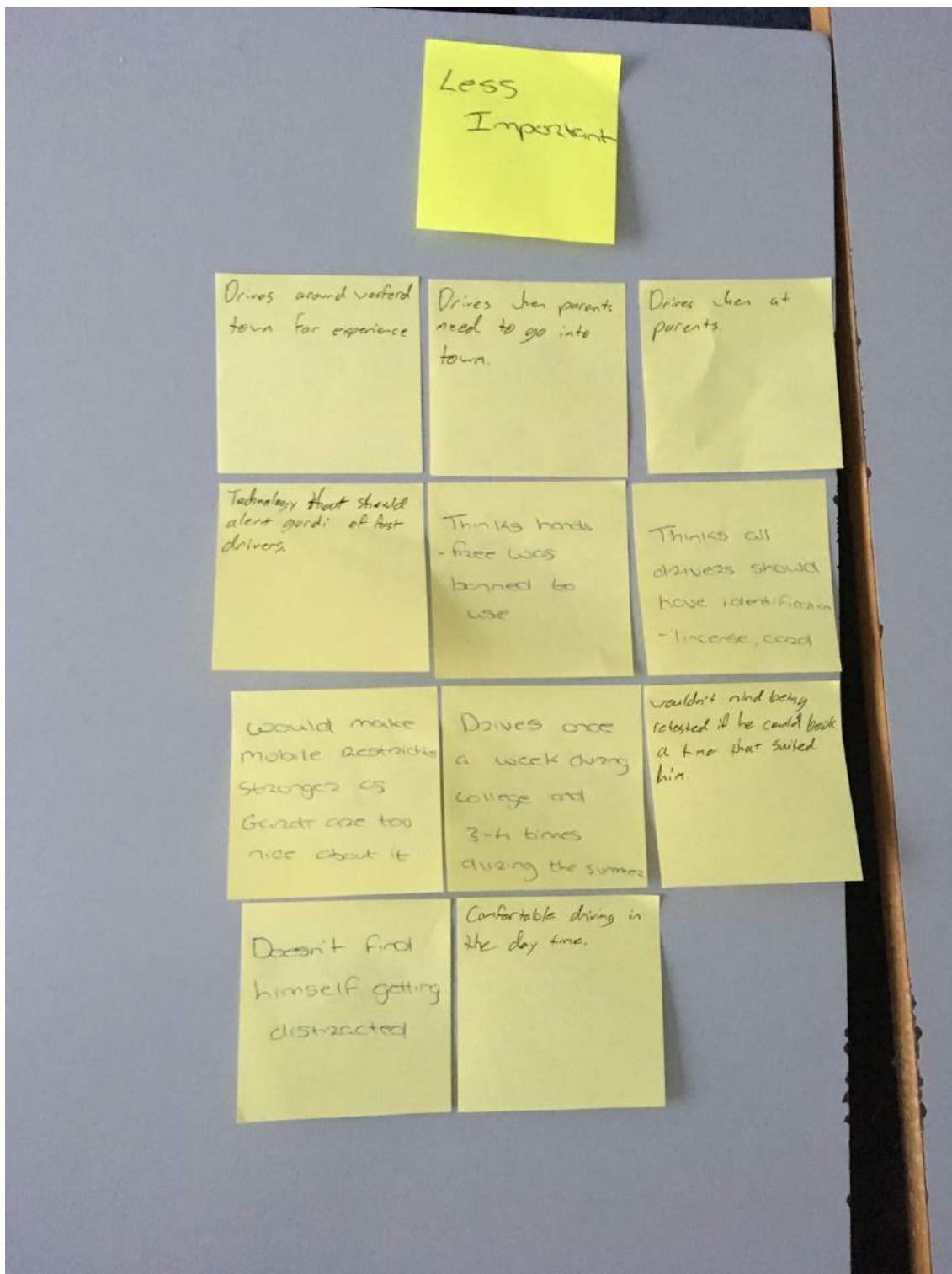
(Most Important points from subject 5's interview with regards to the design challenge)

Appendix 12.5.9



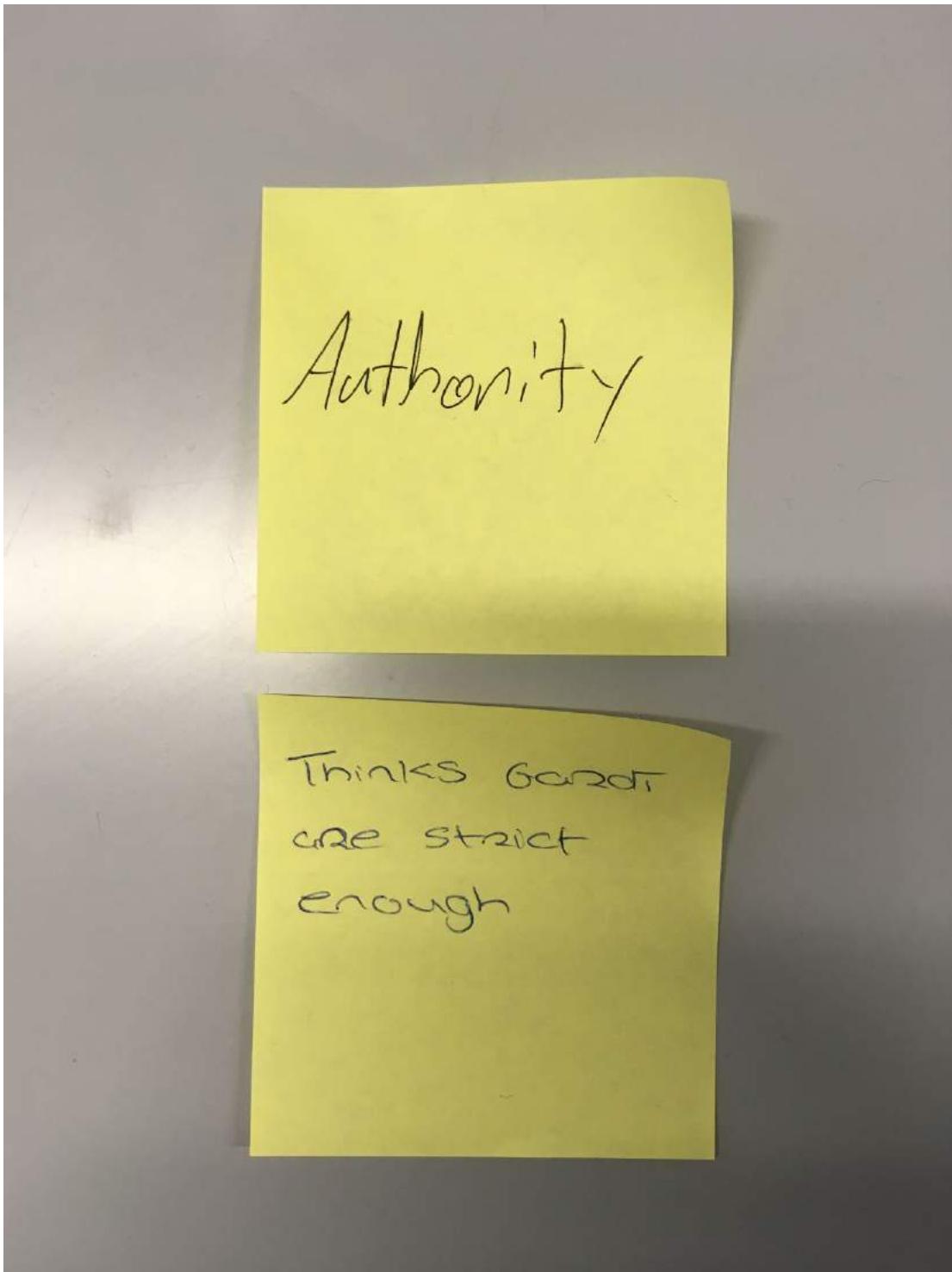
(Middle Ground points from subject 5's interview with regards to the design challenge)

Appendix 12.5.10



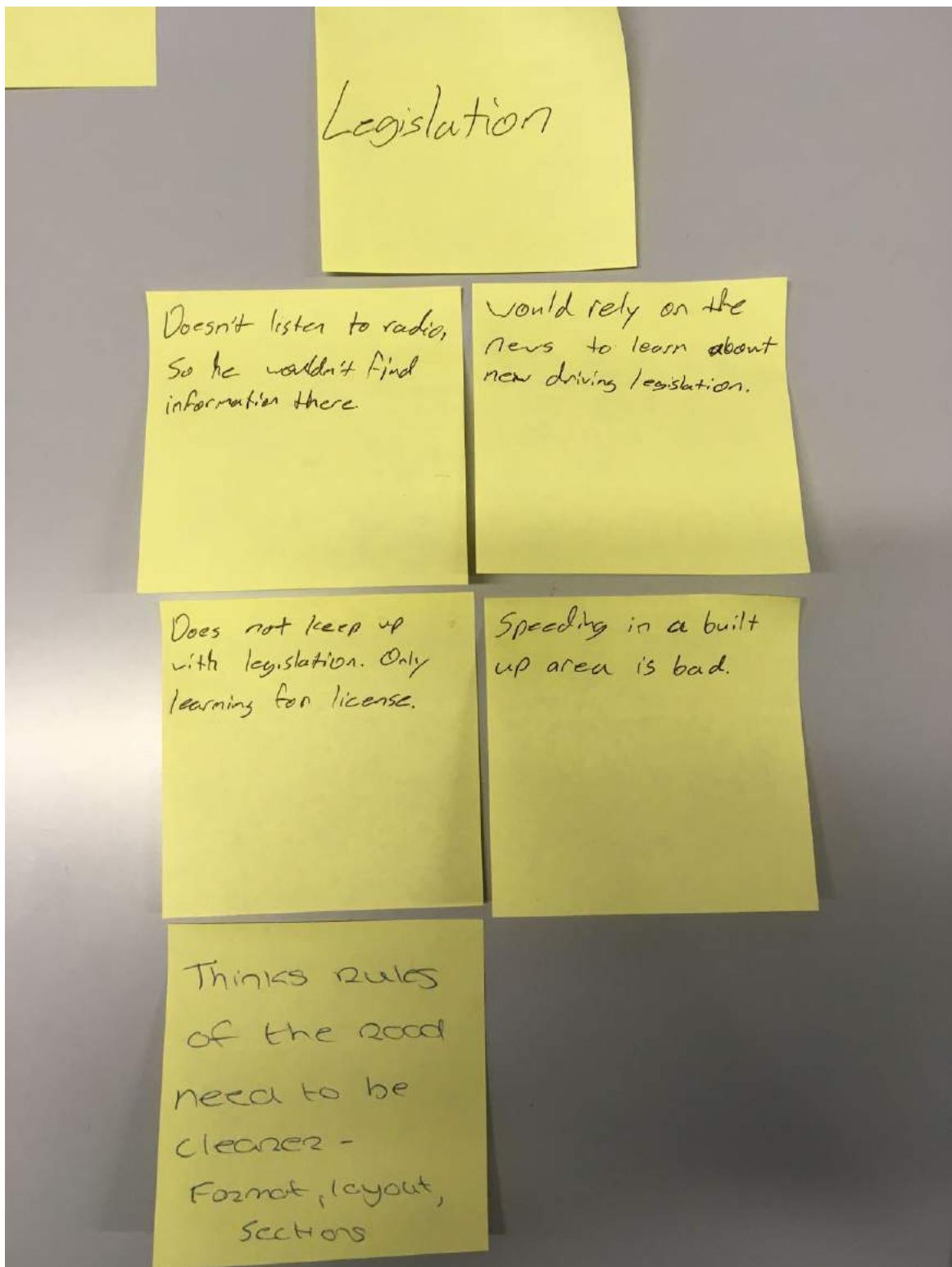
(Less Important points from subject 5's interview with regards to the design challenge)

Appendix 12.5.11



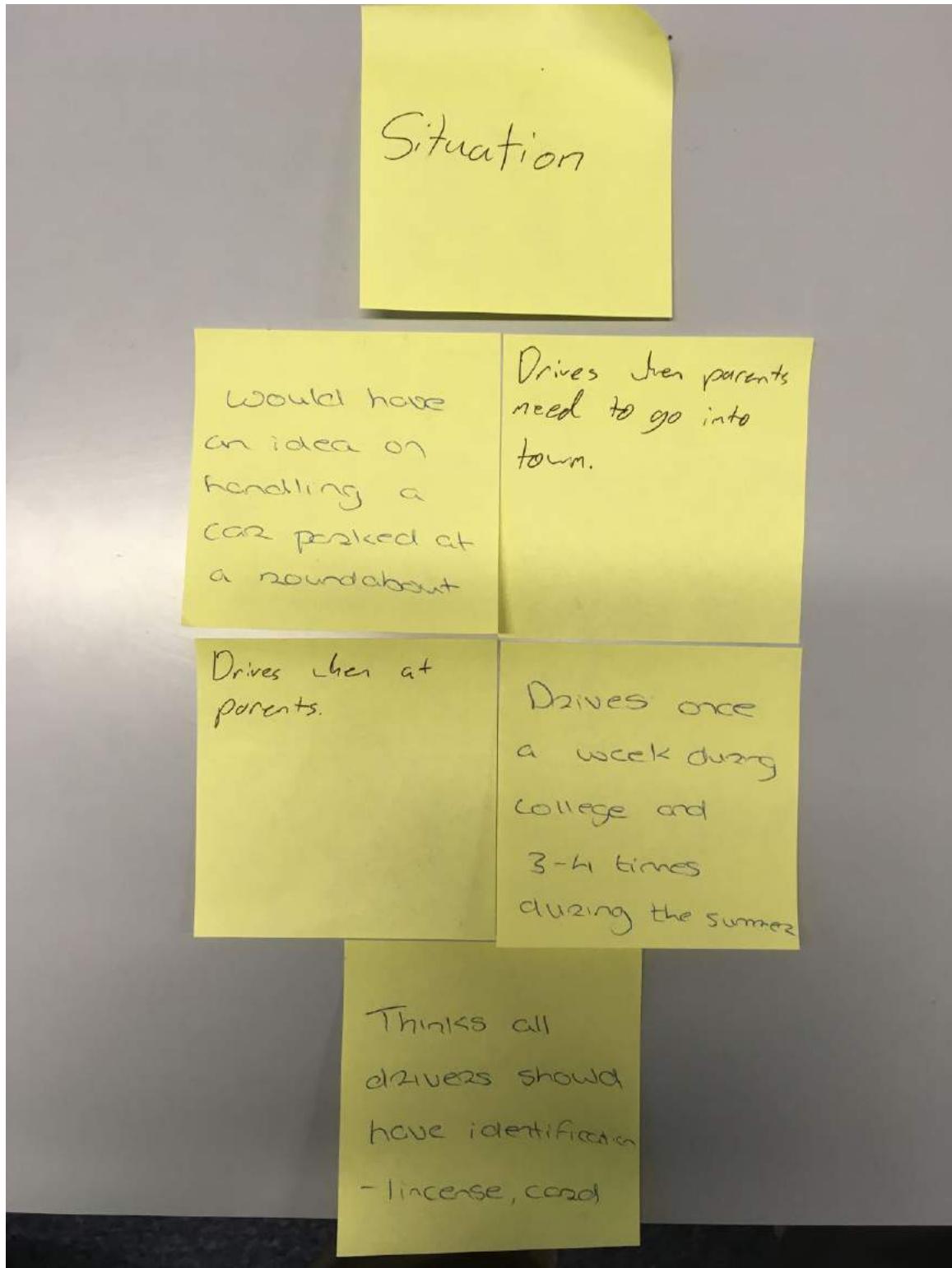
(Points about Authority from subject 5's interview)

Appendix 12.5.12



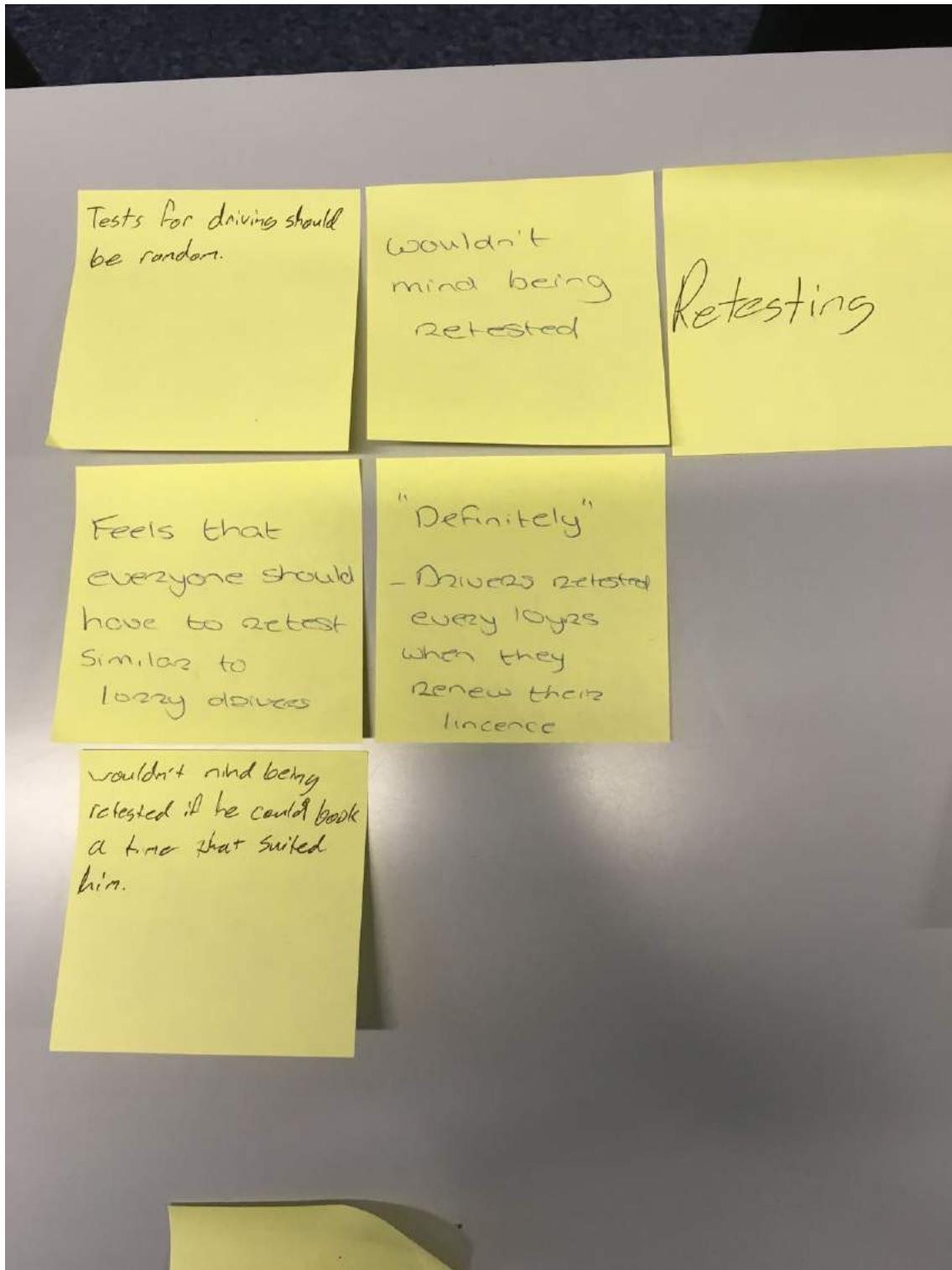
(Points about Legislation from subject 5's interview)

Appendix 12.5.13



(Points about Situation's from subject 5's interview)

Appendix 12.5.14



(Points about Distractions from subject 5's interview)

Appendix 12.5.15

If lived somewhere where he could overtake, then he would learn it in no time.	3 point turns are strongest driving technique.	Never hit curb while doing 3 point turn.	Weakness driving skill would be changing lanes.	Technique
Roundabouts are a challenge.	Weakest skill because he has little opportunity to do.	Feels he is a beginner in driving skills.	Drive enough in a situation to get comfortable with it.	
Skills have improved over time.	Drives around verford town for experience.	Drives for experience and to get use to driving.		

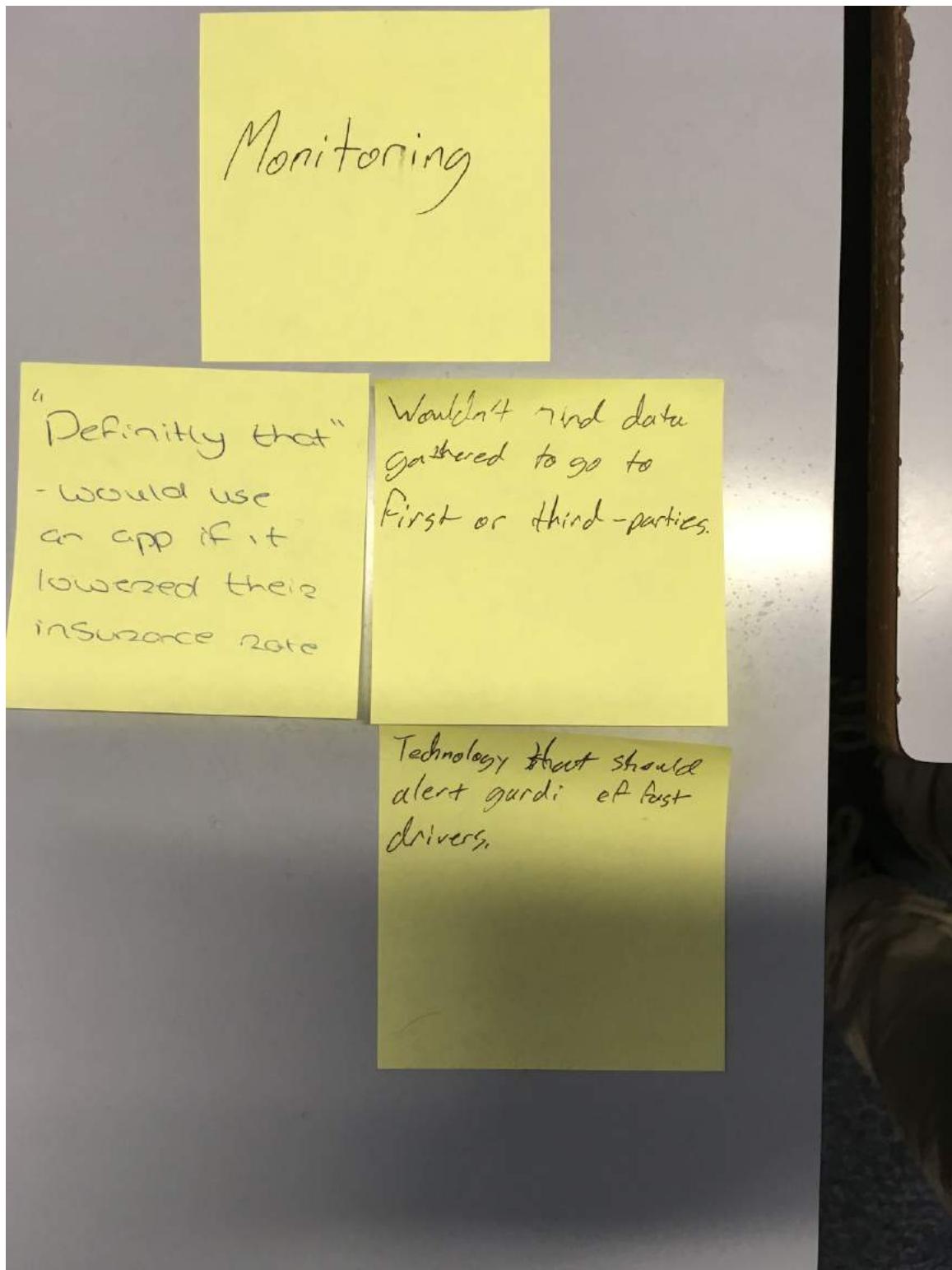
(Points about Technique from subject 5's interview)

Appendix 12.5.16

Condition	Heavy rain is the hardest condition. Lack of visibility.	Mainly drives in daytime urban areas	Older drivers may be better equipped to handle icy conditions
Thinks in Ireland drivers don't have enough experience and knowledge with icy conditions	Has not driven in bad weather.	Feels with Nighttime driving visibility is a concern	He's fine with driving during the day in dry conditions
	Comfortable driving in the day time.		Doesn't know how to handle an icy condition

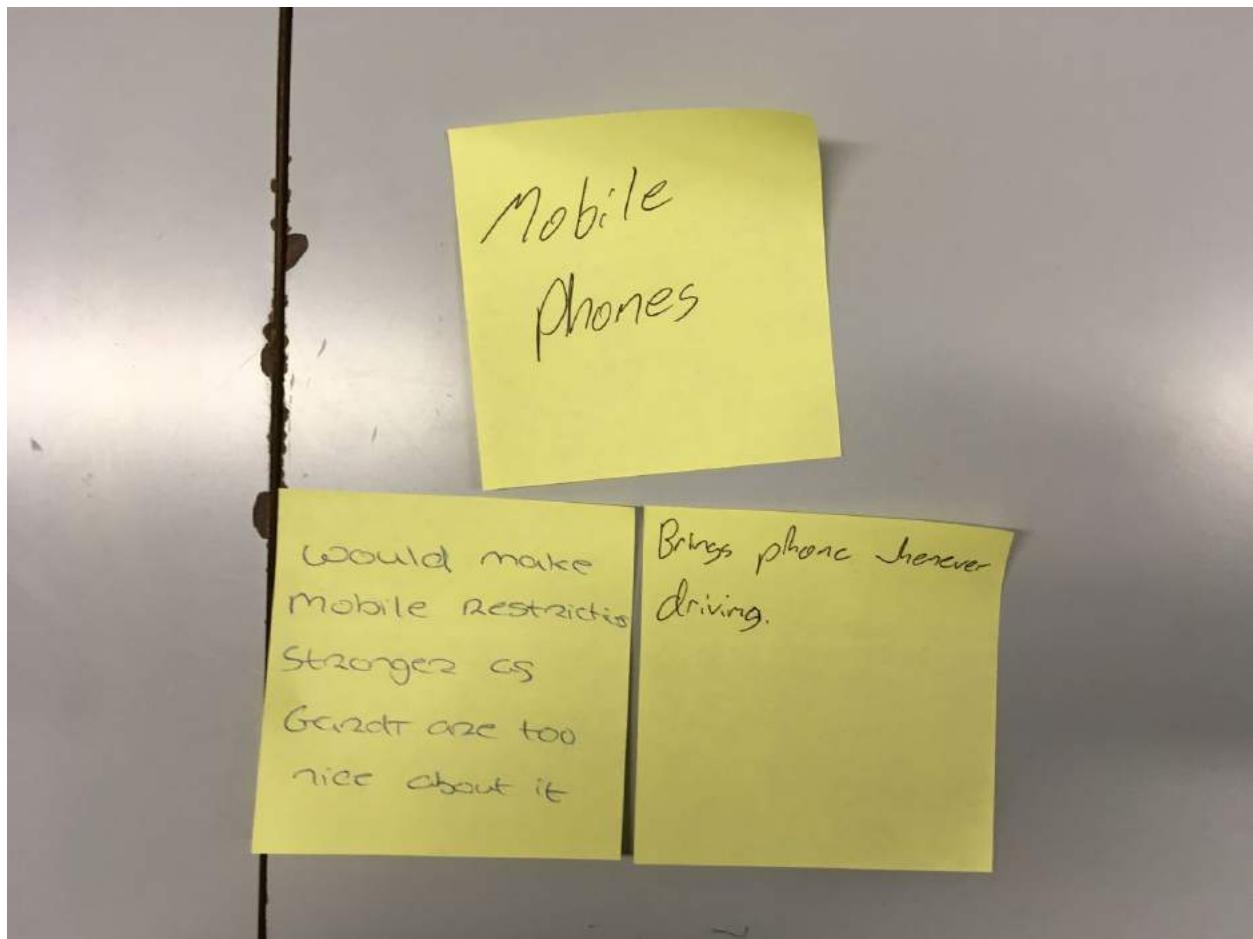
(Points about Condition from subject 5's interview)

Appendix 12.5.17



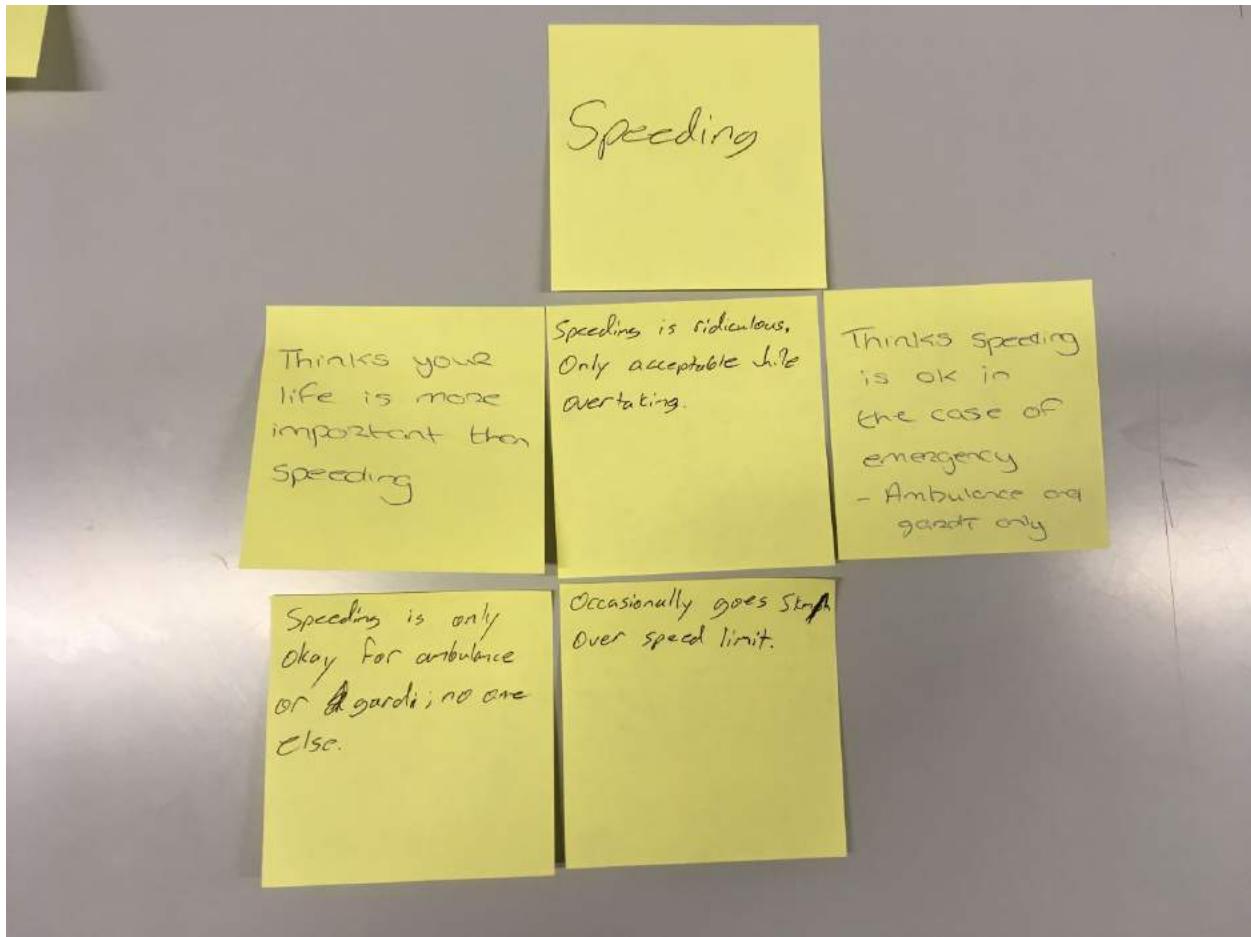
(Points about Monitoring from subject 5's interview)

Appendix 12.5.18



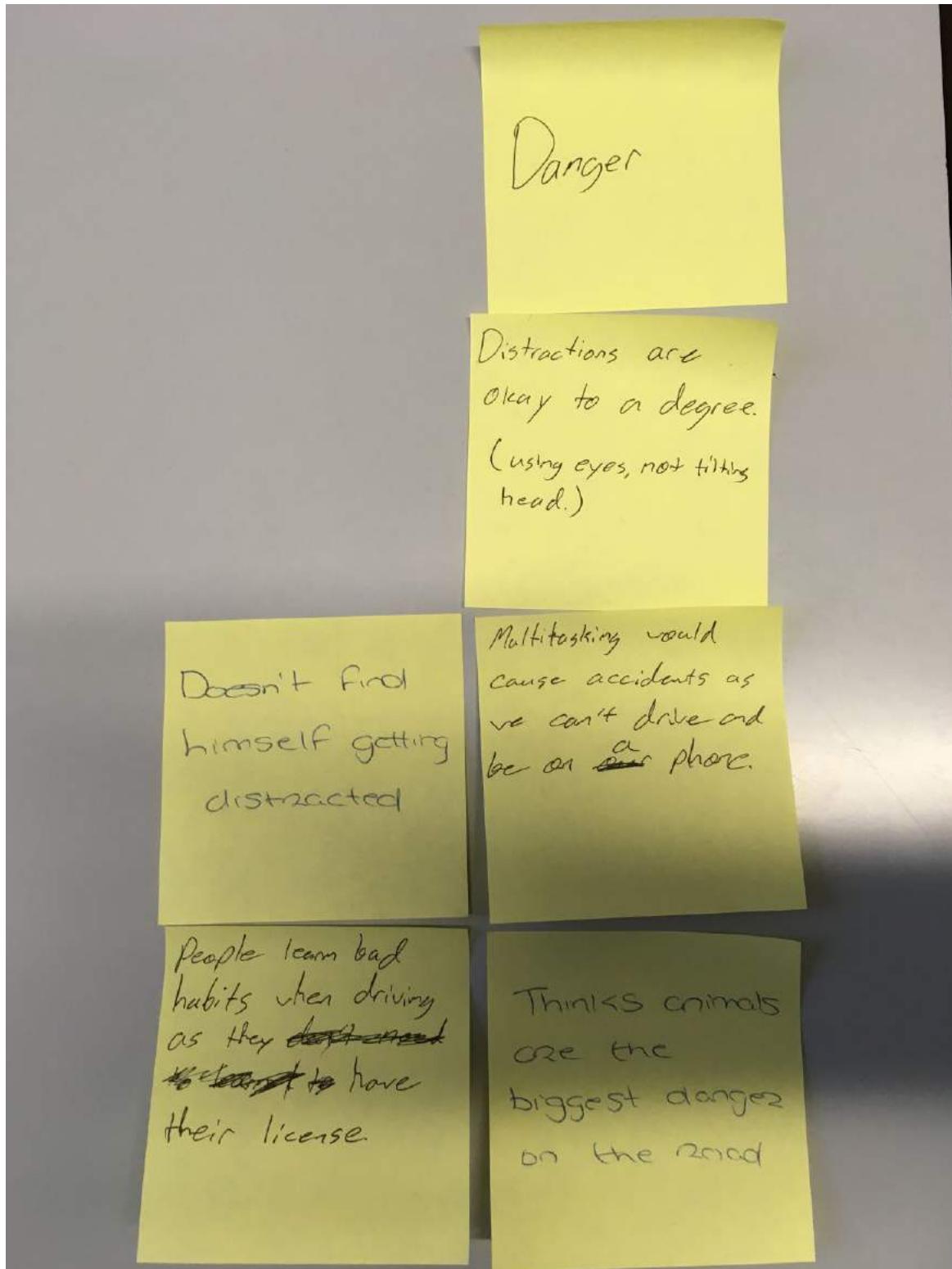
(Points about Mobile Phones from subject 5's interview)

Appendix 12.5.19



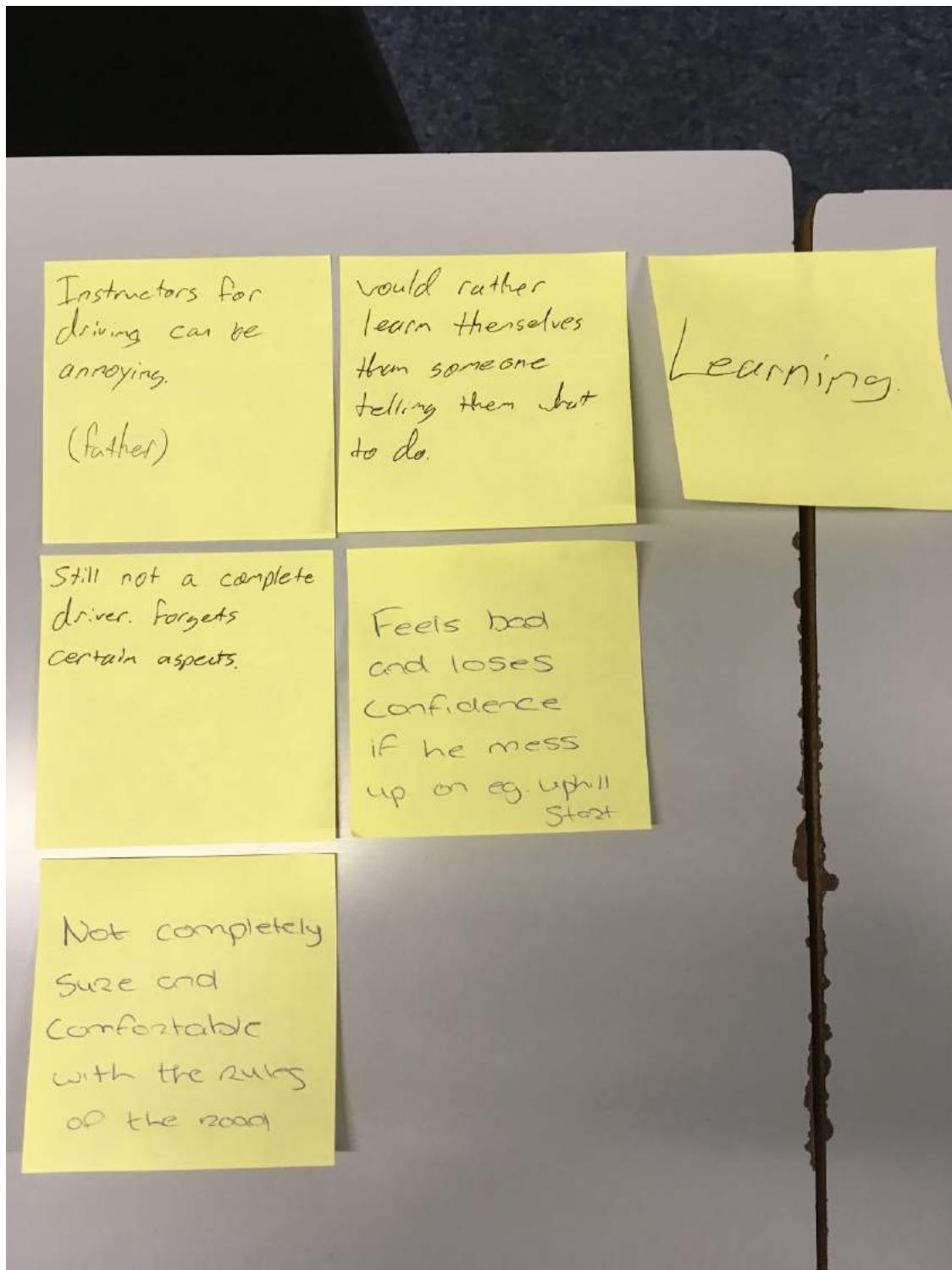
(Points about Speeding from subject 5's interview)

Appendix 12.5.20



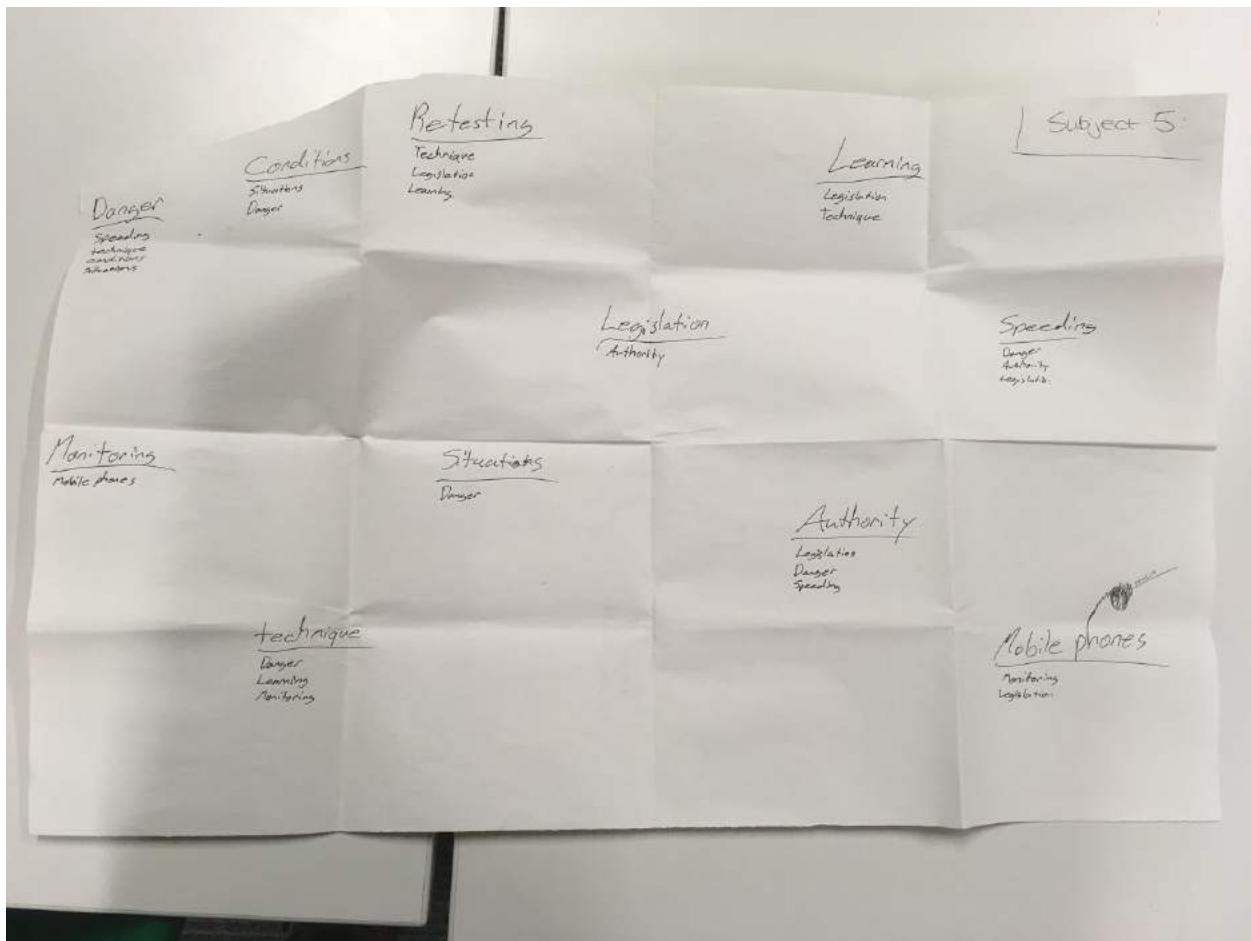
(Points about Danger from subject 5's interview)

Appendix 12.5.21



(Points about Learning from subject 5's interview)

Appendix 12.5.22



(Themed Cluster Relations from subject 5's interview)

Appendix 12.5.23

(Subject 5)

Interview Guide 5.0

1. How long have you been driving
 - a. How would you describe your experience level with driving over time
2. Do you have any driving rituals?
3. Can you tell us about a typical driving trip to the shop, college, etc?
 - a. Ask Why
 - b. How do you start off your trip, in detail.
 - c. How do you normally know when to leave - do you plan ?
 - d. Do you ever face traffic jams during your trips ?
4. What is the one item you always have with you when you go driving?
 - a. Do you have those items with you or in your car currently?
 - b. In your opinion, what items should every driver have in their car at all times?
5. How often in a week would you drive?
 - a. This week, how many times did you drive ?
 - b. Week days ?
 - c. Weekends ?
6. What is the most annoying thing about driving
 - a. Why ?
7. How do you feel about your skill level ?
 - a. Has it improved with the length of time you have been driving ?
 - b. Have you relaxed a bit over time ?

8. Do you ever find yourself being forgetting certain aspects of driving or rules of the road?
9. In terms of comfort level, how do you feel about(Uphill Starts, Parallel Parking, Uncontrolled Junctions, Reverse Around A Corner).... ?
 - a. Can you tell us about a time where you did said techniques
 - i. What was it like ?
 - ii. Positive, negative ?
10. What would be your strongest driving technique ?
 - a. Why is this your strongest driving technique?
 - b. Do you practice this technique a lot?
11. What would be your weakest driving technique ?
 - a. Why is this your weakest driving technique?
 - b. What are your thoughts when you have to do it?
 - c. Why do you feel this is your weakest?
12. What is the type of driving you do the most?
 - a. Nighttime driving in urban areas
 - b. Nighttime driving in rural areas
 - c. Daytime driving in urban areas
 - d. Daytime driving in rural areas
13. What are your thoughts on speeding
 - a. Do you think in certain conditions that speeding is acceptable/non-acceptable
 - b. Do you yourself speed?
 - c. Do you think Garda should be more strict on speeding?
14. Do you ever find yourself getting distracted ?
 - a. How ?
 - b. What are your thoughts on other distracted drivers?

15. In your perspective, what is most dangerous on the road?Agreements/Disagreements with the legislation ?

- a. Why might you agree/disagree with legislation?

16. In your opinion, do you think drivers in general have enough knowledge and experience with icy conditions / wet conditions, etc.

17. In your opinion, which do you think are the hardest conditions for driving in:

- a. Heavy rain
- b. Wind
- c. Snow
- d. Very sunny

18. If you got into a situation where you (broke down, were overtaking, emergency services were passing, car parked on roundabout), how would you handle it ?

- a. Why ?

19. There are so many different regulations in driving, Do you keep up with the rules and regulations of the road

- a. How do you keep yourself updated? (What medium)
- b. Do you think there could be a better/easier way to keep up with the rules and regulations of the road?

20. What do you think about the laws in relation to mobile phone usage while driving

- a. Agree/Disagree with them ?
- b. Would you change them in any way ?

21. Do you think drivers should get retested every 10 years when they renew their licence?

- a. Why?
 - b. From your own perspective would you mind getting retested on your driving ?
 - i. Reasoning?
22. If your insurance company offered an app that monitored your actions while driving, that in turn would help to lower your monthly/annual rate, would this be an option that you would consider ?

Insight statements and How Might We

Danger

- Speeding is seen as a major driving concern.
 - How might we discourage speeding?
- Poor driving techniques can be hazardous to other drivers.
 - How might we encourage drivers to improve upon their current techniques?
- Poor driving conditions can result in dangerous driving.
 - How might we inform drivers of proper driving techniques to combat these situations?
- Certain situations in driving may be dangerous to drivers if inexperienced.
 - How might we familiarize drivers with situations they may experience?

Conditions

- Driving conditions may impede upon situations on the road.
 - How might we encourage drivers to drive cautiously in certain conditions?
- Certain driving conditions may be seen as dangerous to some drivers.
 - How might we improve a driver's technique in certain driving conditions?

Monitoring

- Drivers would not mind being monitored with the use of their mobile phone.
 - How might we use mobile phones to other aspects of driving?

Technique

- Poor technique can be a hazard on the road.
 - How might we improve upon a driver's technique?
- Overtime, a driver's techniques may decay.
 - How might we prevent decay of a driver's technique?
- Techniques which are monitored may improve upon a driver's skills.
 - How might we gather statistics to suit a driver's specific needs?

Situations

- It is important for drivers to have proper identification in the car while driving.*
 - How might we ensure drivers have proper identification on them at all times?
- Drivers feel they are not as prepared in certain situations as they are in others.
 - How might we prepare drivers for certain situations which may arise?

Retesting

- Retesting a driver's technique could ensure techniques are up to standard.
 - How might we ensure a driver's technique is up to standard?
- Retesting could encourage drivers to remain up-to-date with driving legislation.
 - How might we make legislation readily available, and easy for drivers read and understand?
- Drivers would not mind be retested.
 - How might we help drivers with legislation and driving techniques?
- Retesting could be a means to evaluate a driver's understanding of the road.
 - How might we assist a driver with understanding the rules of the road?

Legislation

- Gardi are sometimes lenient on mobile phone usage.
 - How might we enforce mobile phone legislation more?
- Drivers tend to hear about new legislation through the news.
 - How might we make legislation more accessible?
- Drivers typically do not seek out new legislation.
 - How might we encourage driver's to seek our legislation?

Learning

- Many drivers learn legislation only when applying for their license.
 - How might we encourage drivers to keep updated with legislation after they acquire their license?
- Driving techniques are best learned when put to practice.
 - How might we assist drivers in putting driving techniques to practice?
- Some drivers have different methods of learning.
 - How might we ensure all methods of learning are met with the topic of driving?

Authority

- Some drivers feel that Gardi are not strict on certain legislation.
 - How might we aid Gardi in strengthening the enforcement of legislation?
- Speeding is an area which authorities are most concerned about.
 - How might we discourage drivers from speeding?
- Authorities enforce legislation to reduce the amount of danger on the road.
 - How might we encourage drivers to abide to driving legislation?

Speeding

- Speeding can result in dangerous driving.
 - How might we reinforce the idea that fast driving is dangerous?
- Many drivers feel that speeding is only applicable for the authorities.
 - How might we assure drivers that speeding is only acceptable for the authorities?

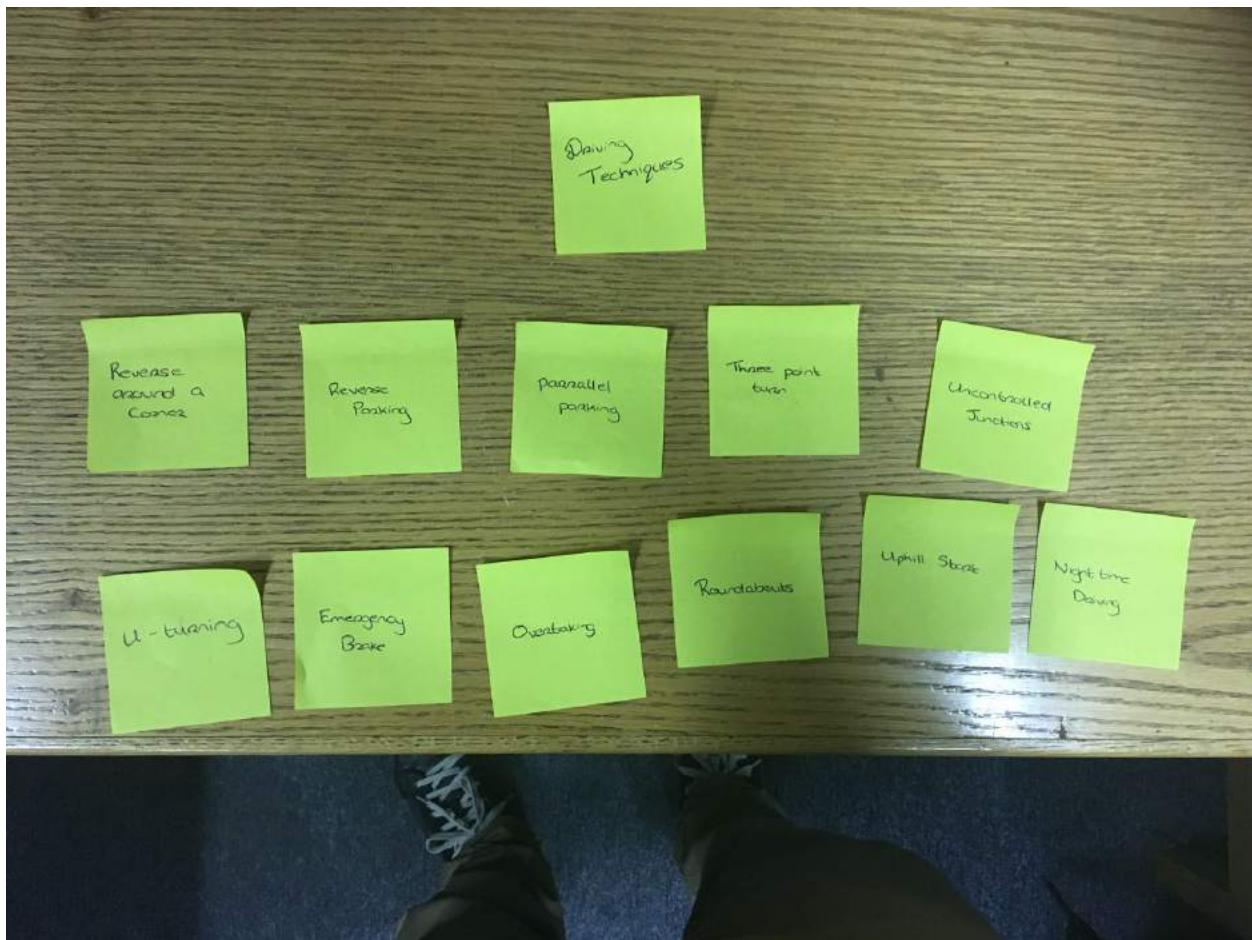
- Drivers believe that speeding is unacceptable, but it is socially acceptable to go 5-10km/h over the speed limit.
 - How might we discourage the social norm of speeding just above the limit?

Mobile Phones

- Mobile phones are capable of monitoring certain driving aspects.
 - How might we use mobile phone technology to monitor driving aspects?
- Mobile phone legislation is not taken seriously by all drivers.
 - How might we enforce the mobile phone legislation as serious?

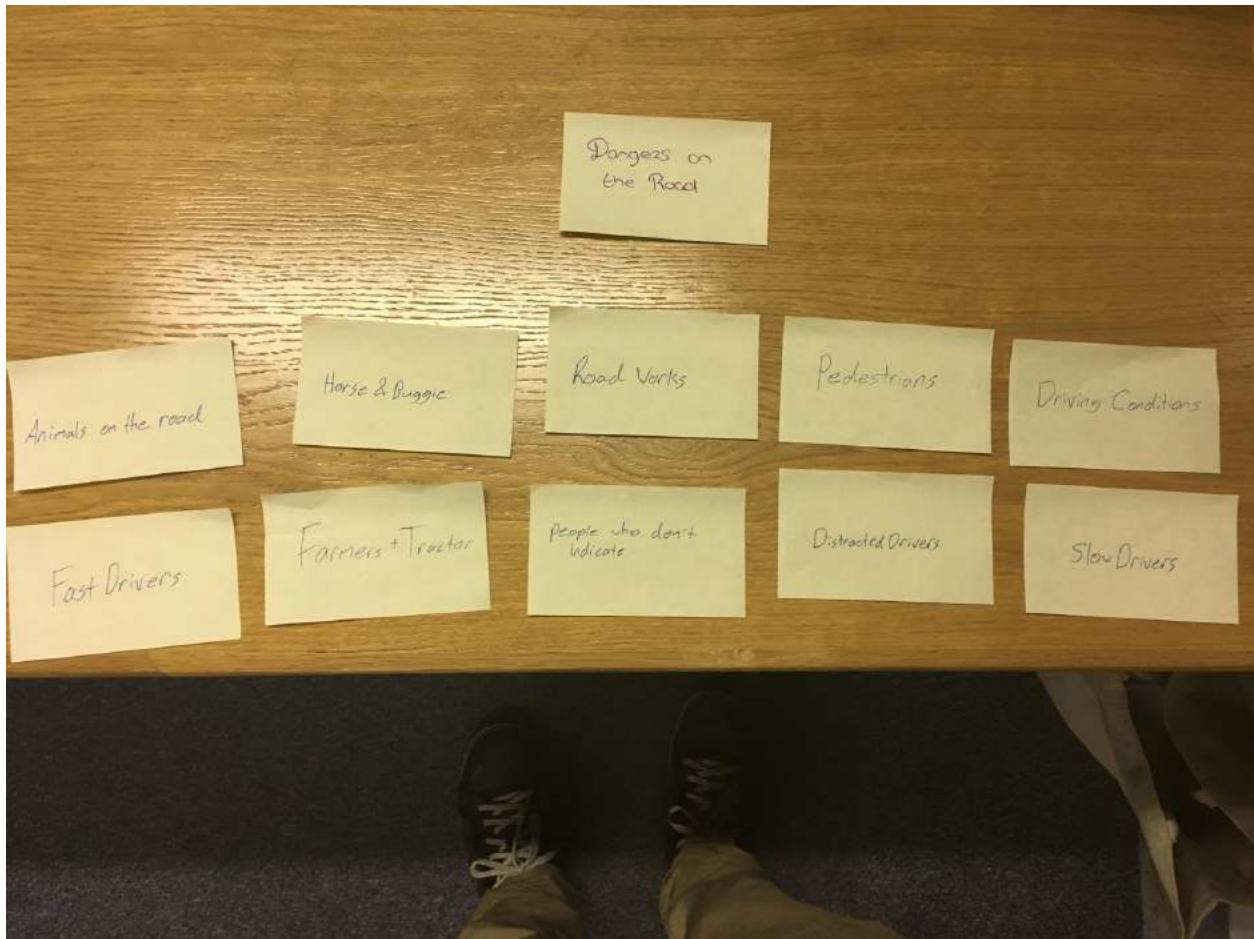
12.6 Subject #6

Appendix 12.6.1



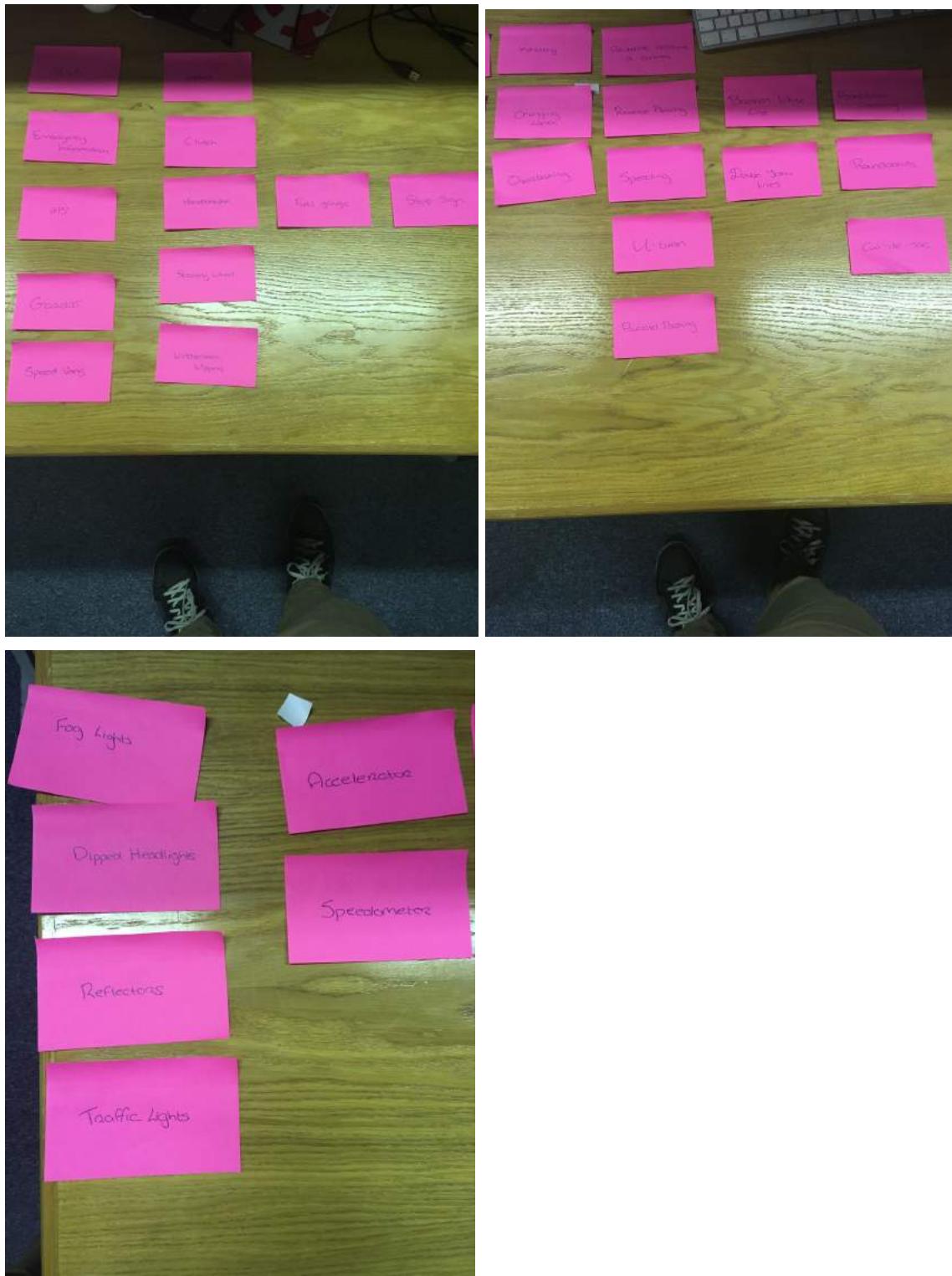
(Driving techniques card sorting for subject 6 depicting their best to worst driving techniques)

Appendix 12.6.2



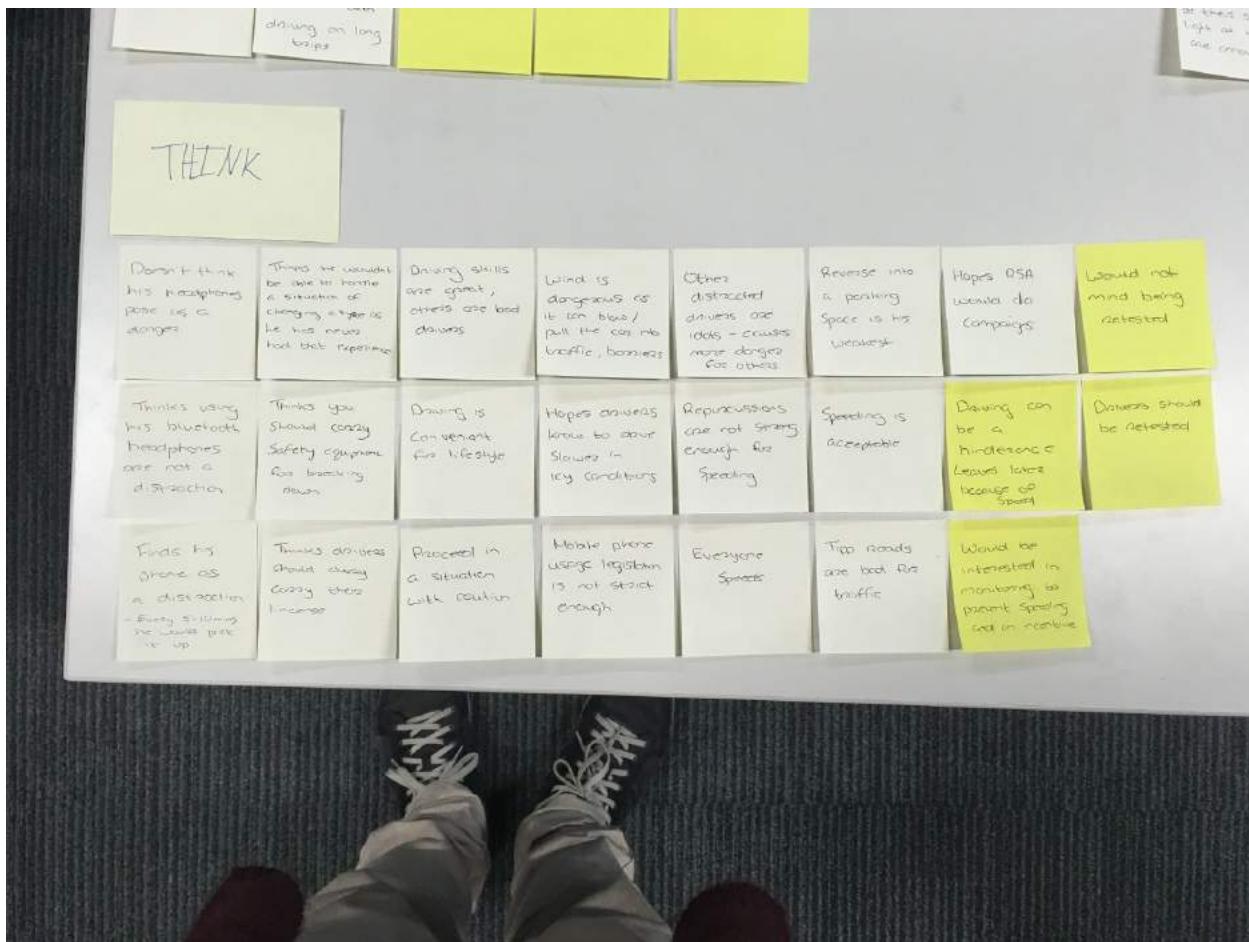
(Dangers of the Road card sorting for subject 6 depicting the least to most dangerous)

Appendix 12.6.3



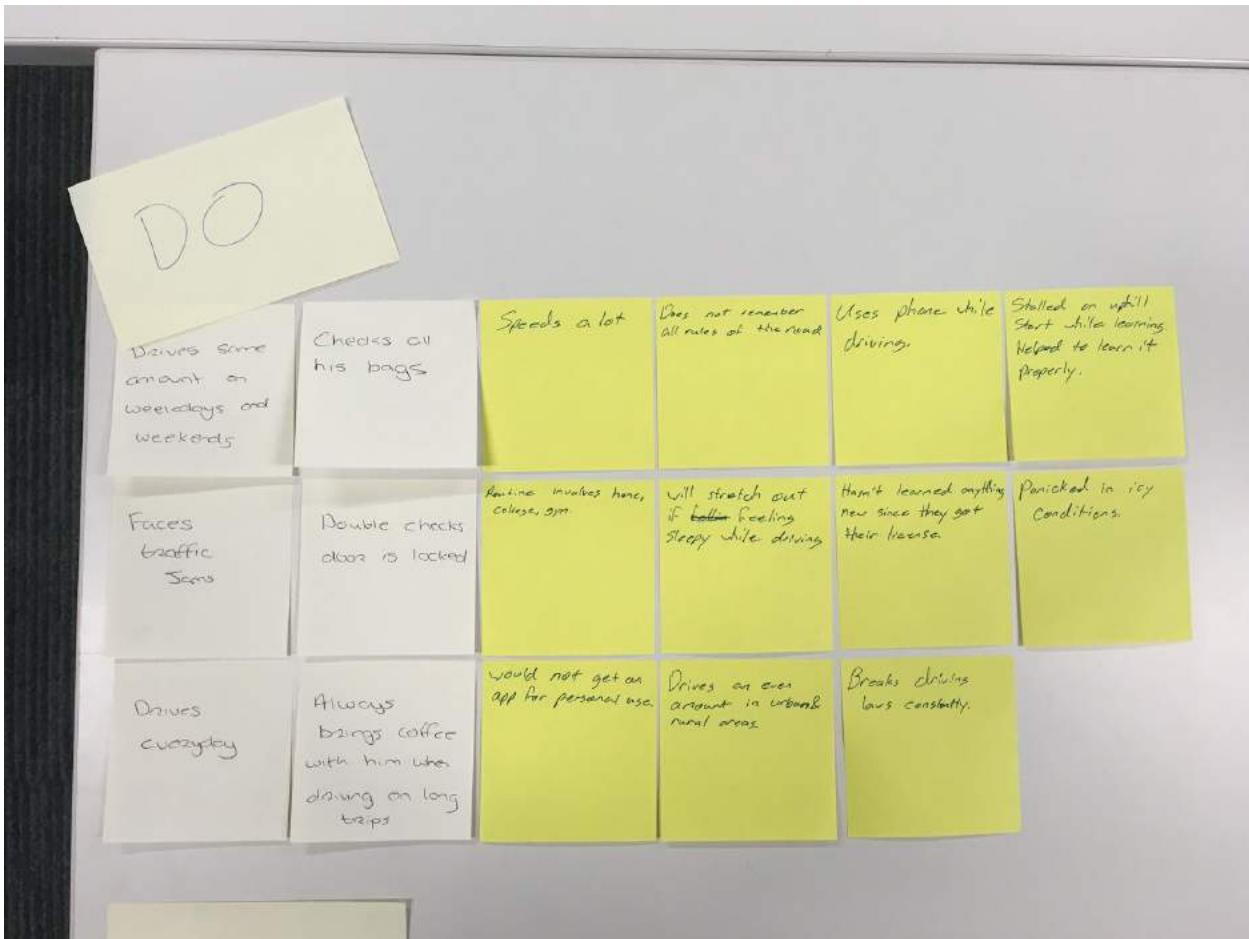
(Clustering of different aspects related to design challenge. Sorted by subject 6)

Appendix 12.6.4



(Empathy Map THINK laid out after listening to subject 6's recorded interview)

Appendix 12.6.5



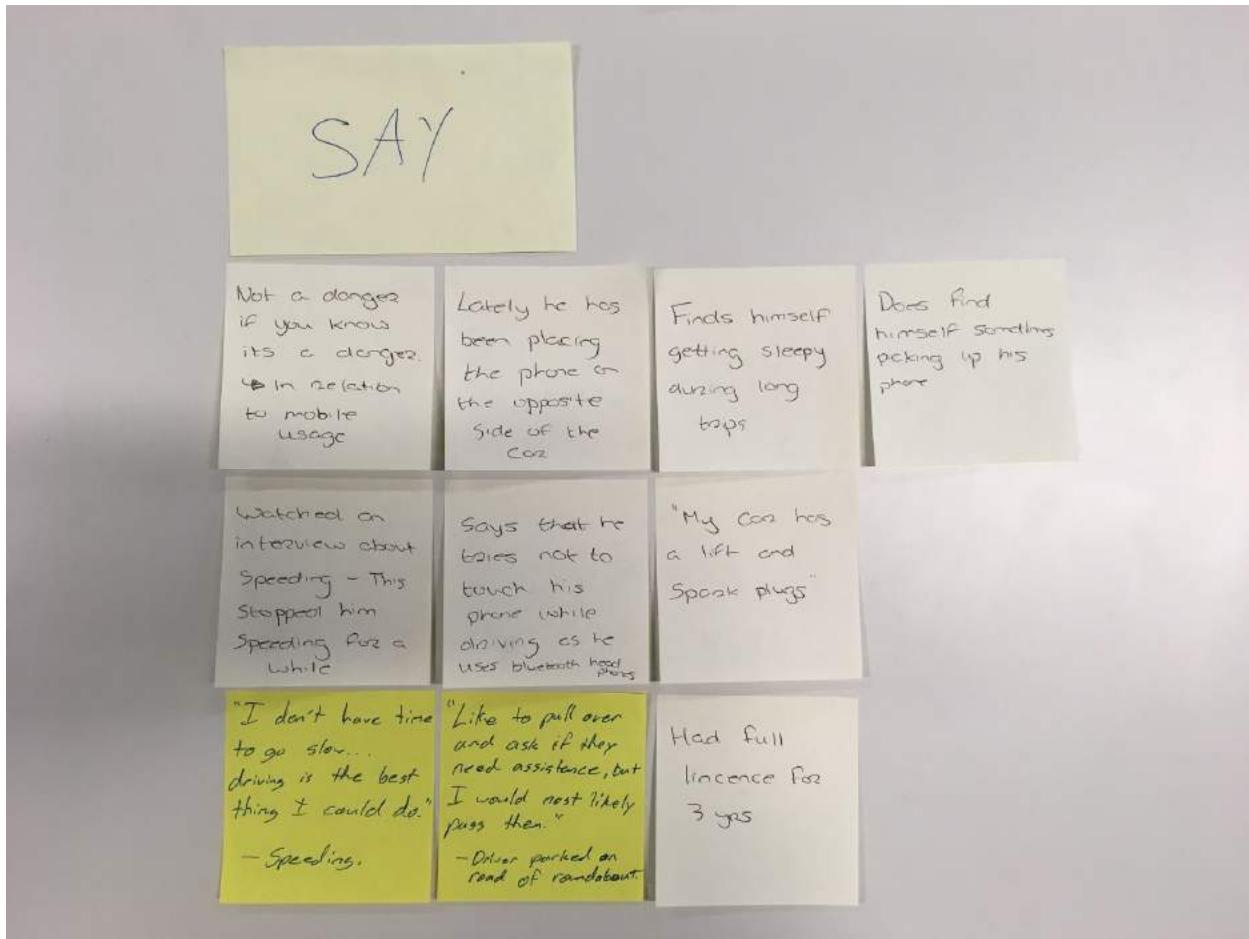
(Empathy Map DO laid out after listening to subject 6's recorded interview)

Appendix 12.6.6

Feel							
Feels he forgets the rules of the road all the time	Feels others drivers are ignorant to other drivers + people	Feels he doesn't have all the right safety equipment	Wants to use his phone while driving	Not comfortable with reverse parking as he hasn't practised it	Heavy rain is annoying	Thinks public campaigns would be the best method to teach people about new legislation	
Finds people who don't stay in the right lanes, to be annoying	Feels he wouldn't be able to handle a situation in relation to his bags	Drives because its convenient for carrying his bags	Parallel parking is easier in the night because of visibility but not in the cities	Lives night time driving more because these are less crowded	Lack of awareness and sleep deprivation are dangerous as well	His driving skills have been improving over time	
Feels people who don't turn off their spot light at night are annoying	Feels he could handle a situation where his battery is dead	Has had no accidents	Uphill starts he is comfortable with	Distracted drivers in built-up urban areas are the most dangerous	Feels drivers should abide by the laws	Feels that he is bad with gear shifting	Likes the way he drives

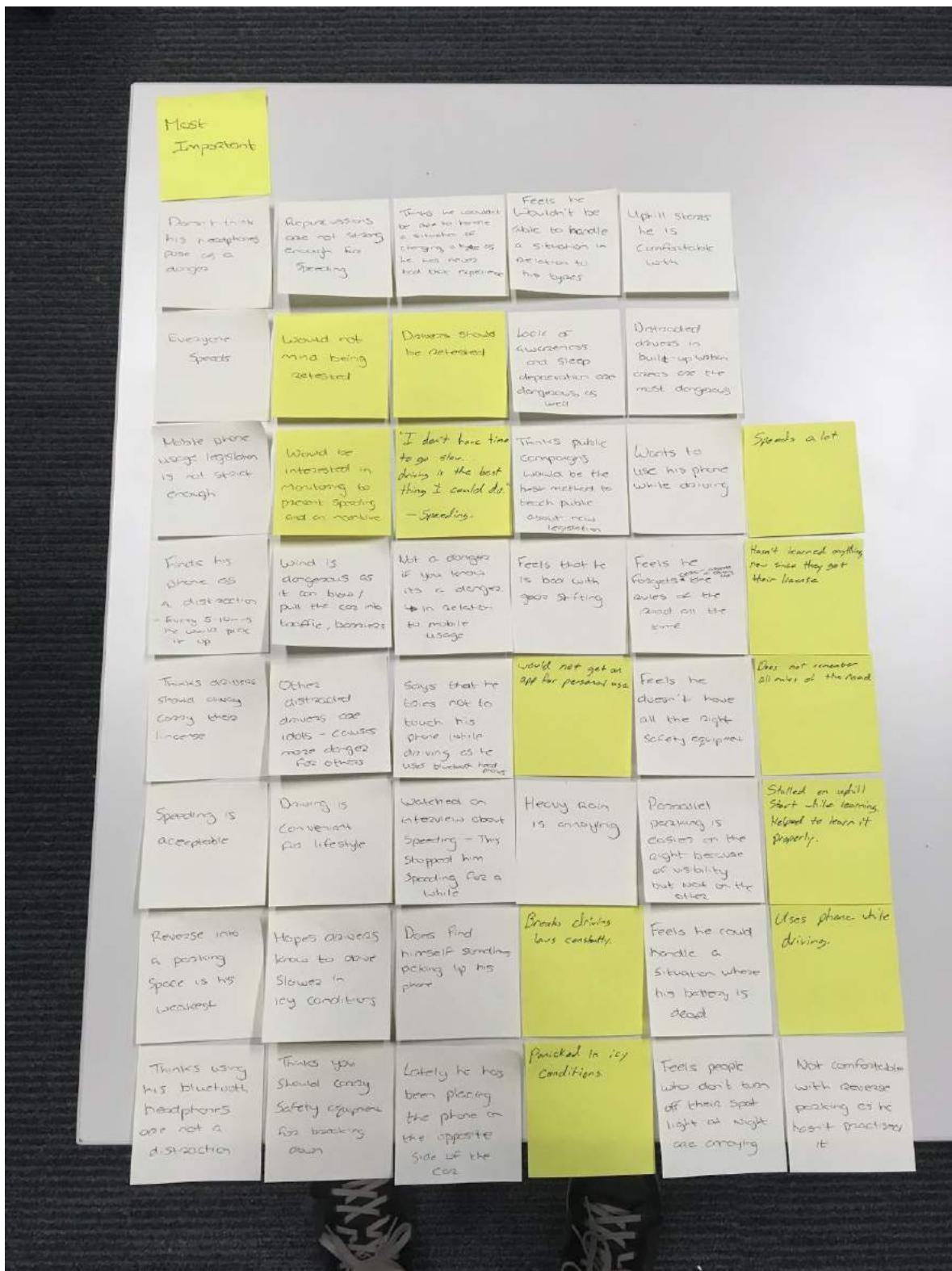
(Empathy Map FEEL laid out after listening to subject 6's recorded interview)

Appendix 12.6.7



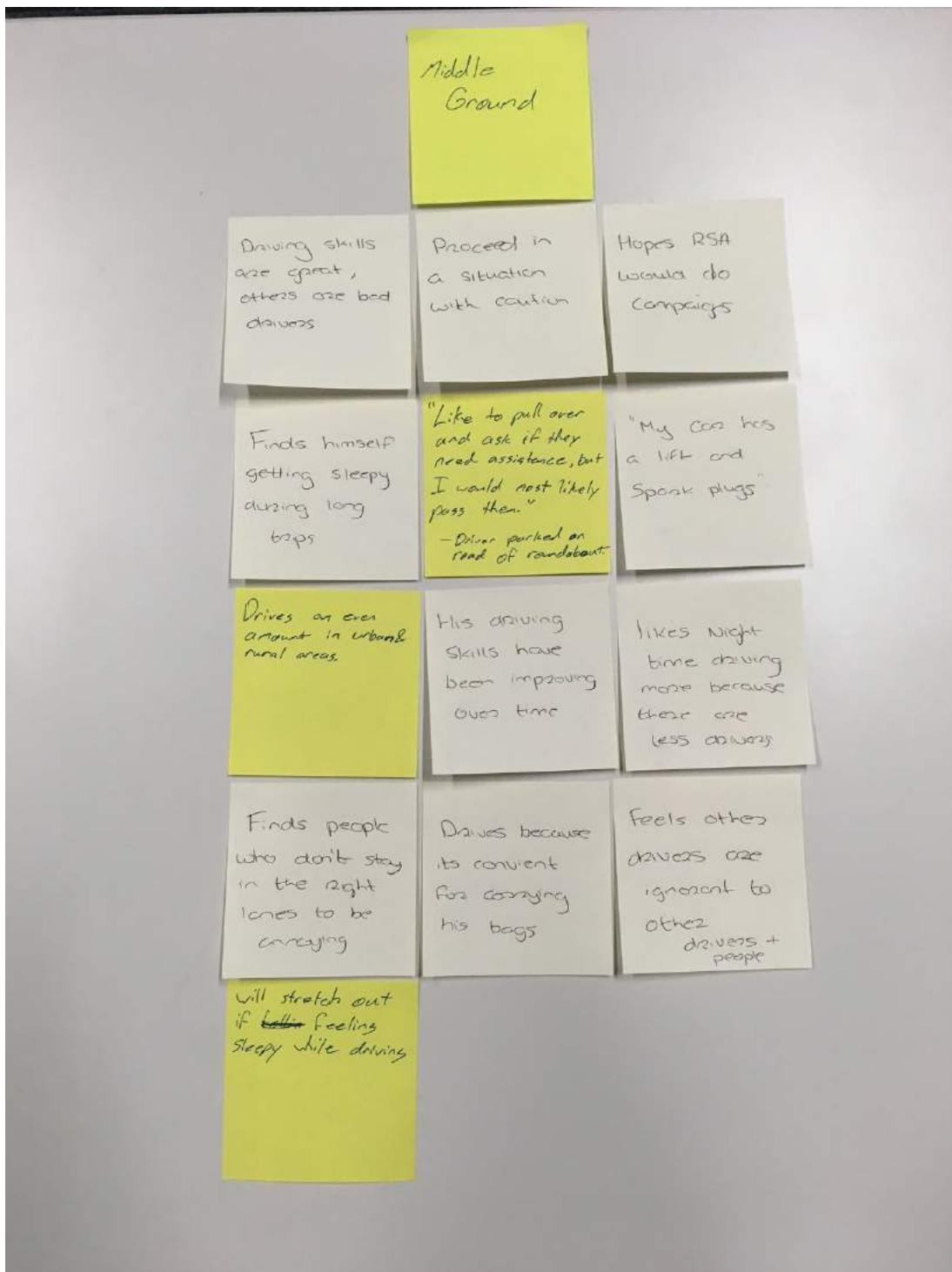
(Empathy Map SAY laid out after listening to subject 6's recorded interview)

Appendix 12.6.8



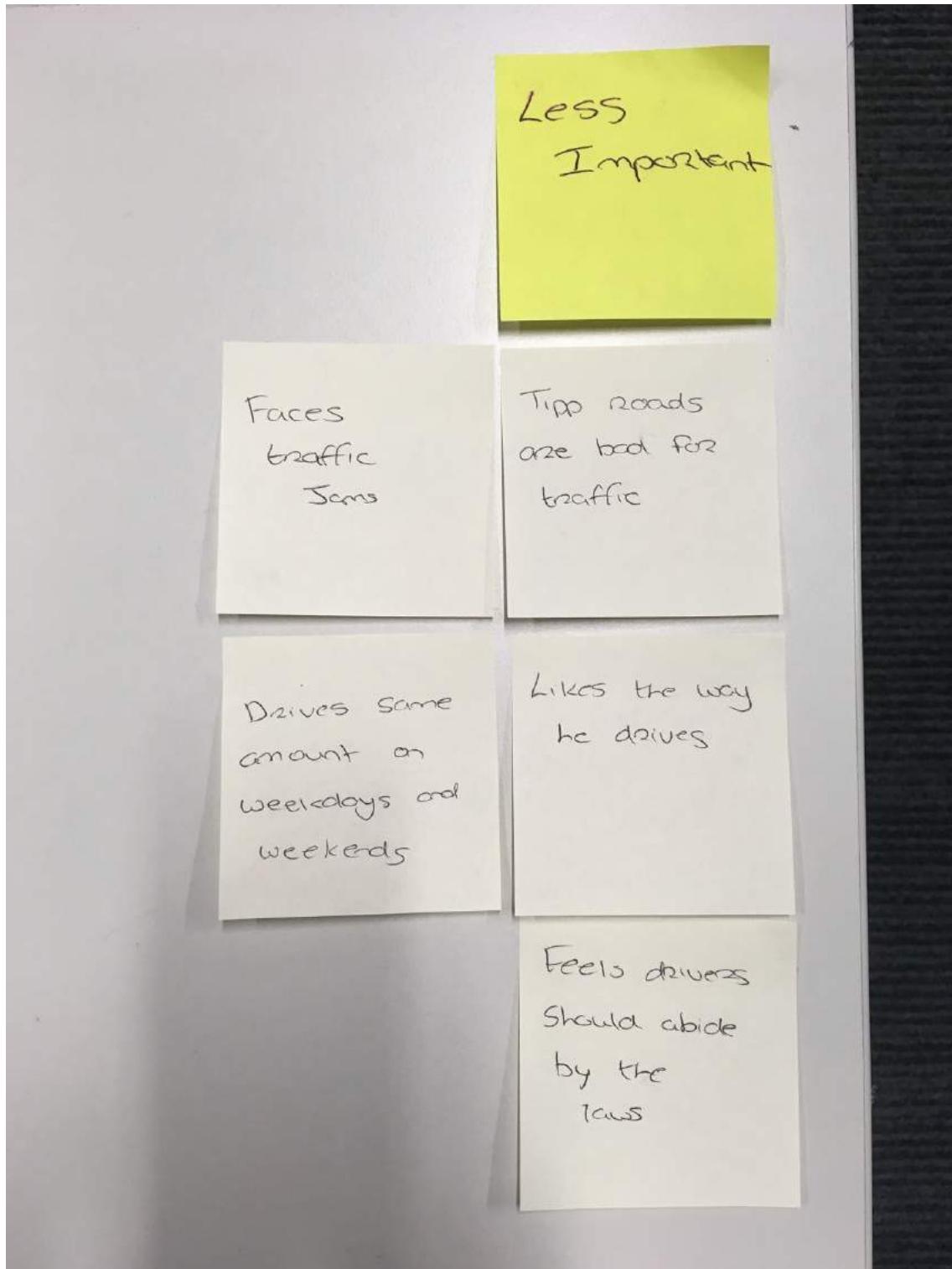
(Most Important points from subject 6's interview with regards to the design challenge)

Appendix 12.6.9



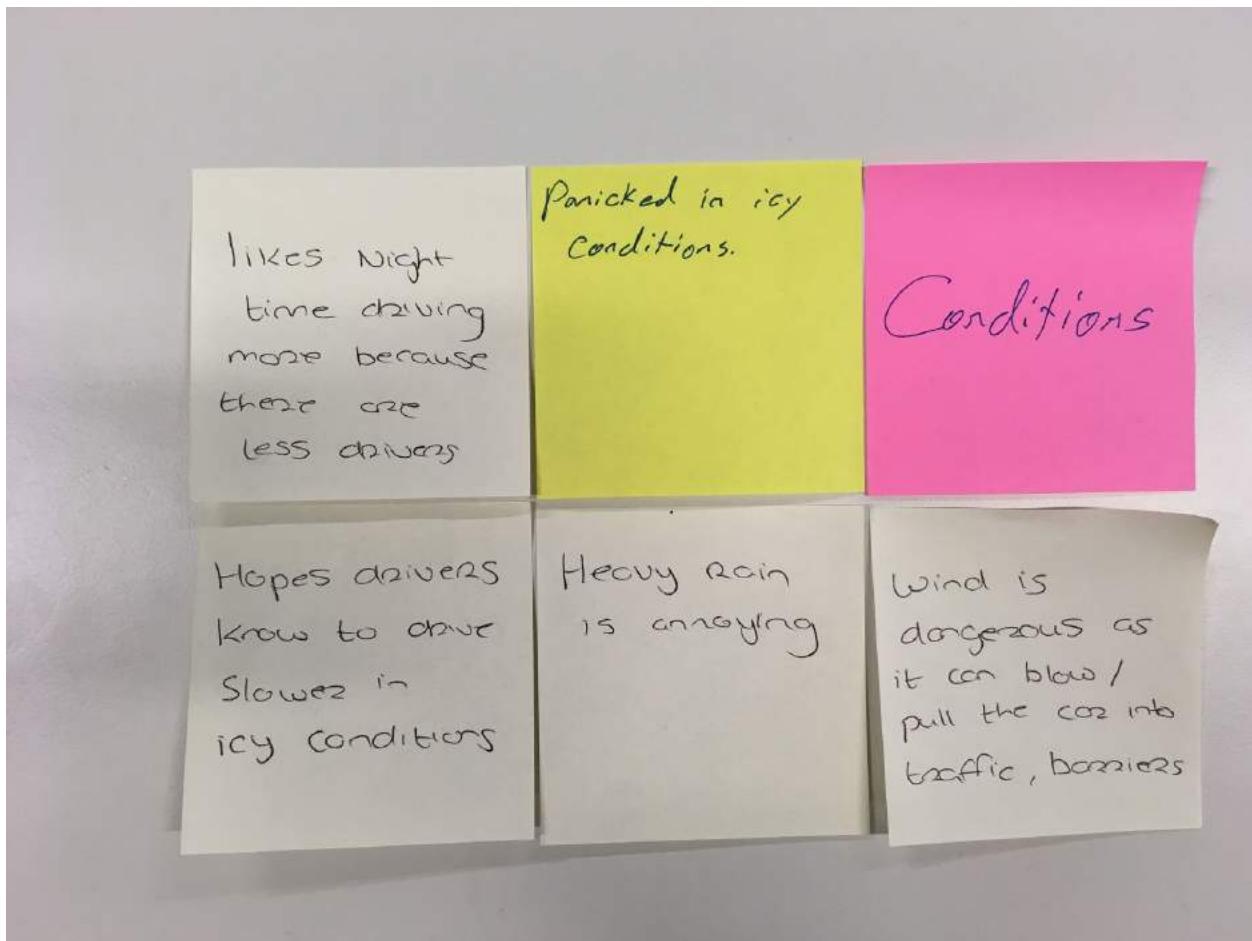
(Middle Ground points from subject 6's interview with regards to the design challenge)

Appendix 12.6.10



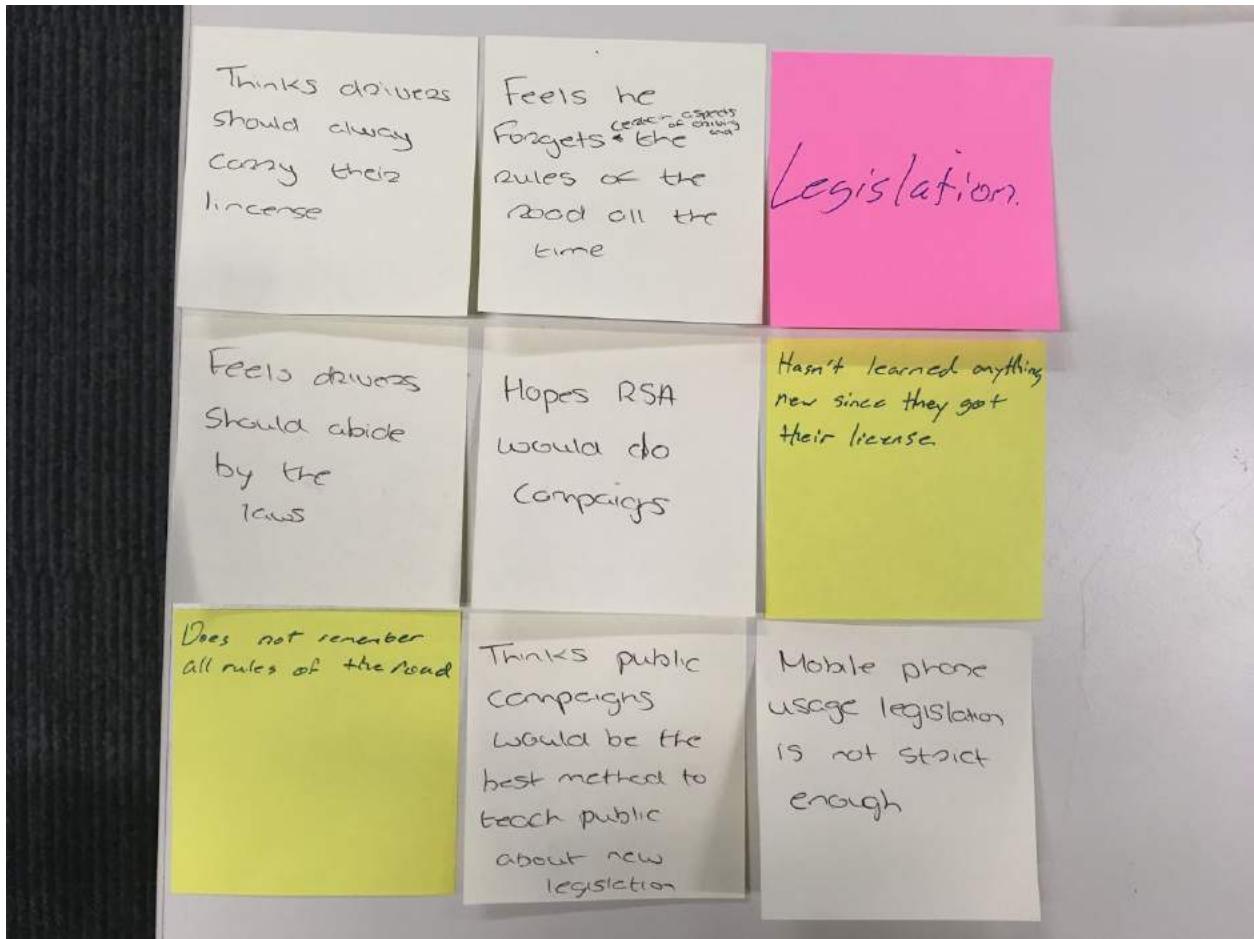
(Less Important points from subject 6's interview with regards to the design challenge)

Appendix 12.6.11



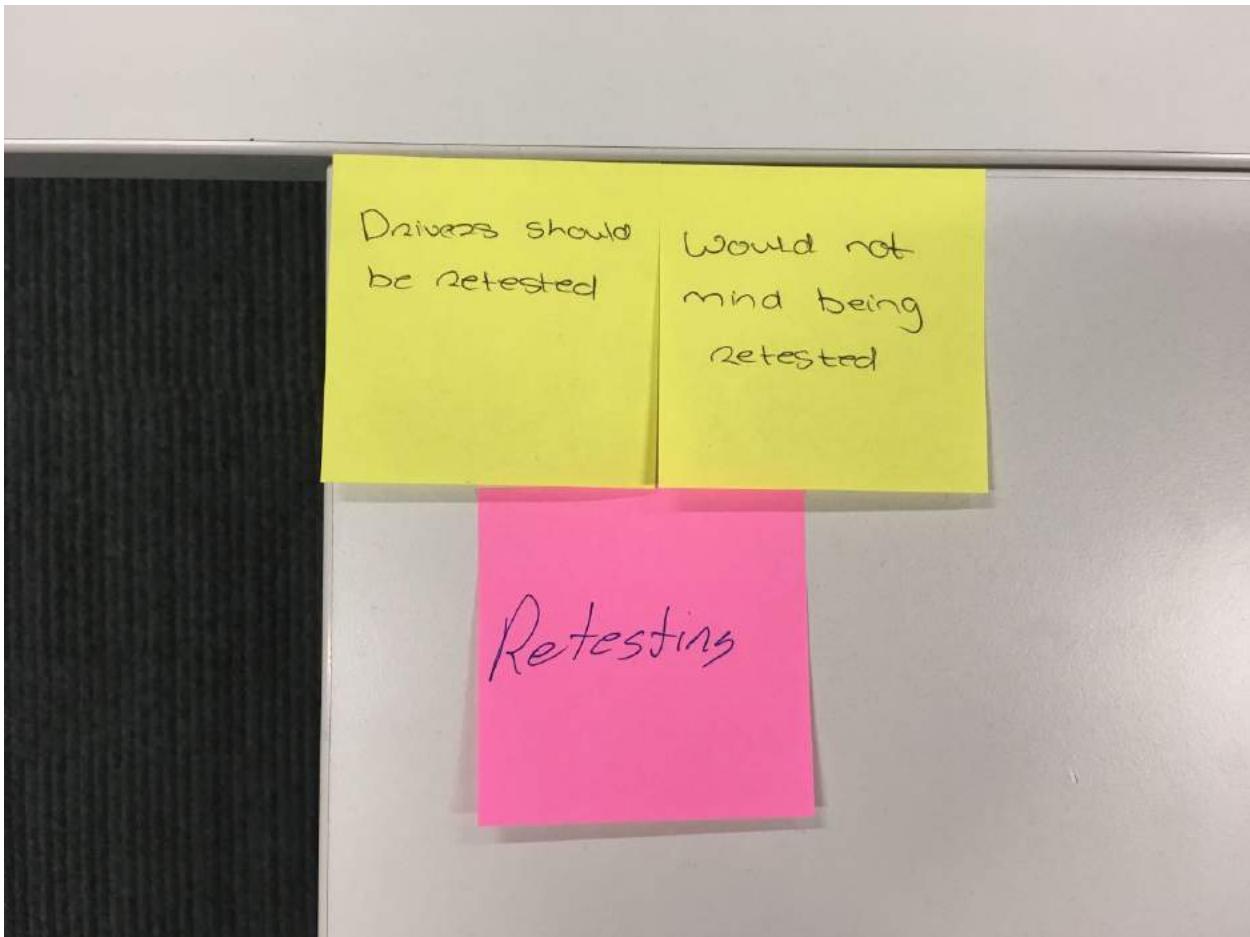
(Points about Conditions from subject 6's interview)

Appendix 12.6.12



(Points about Legislation from subject 6's interview)

Appendix 12.6.13



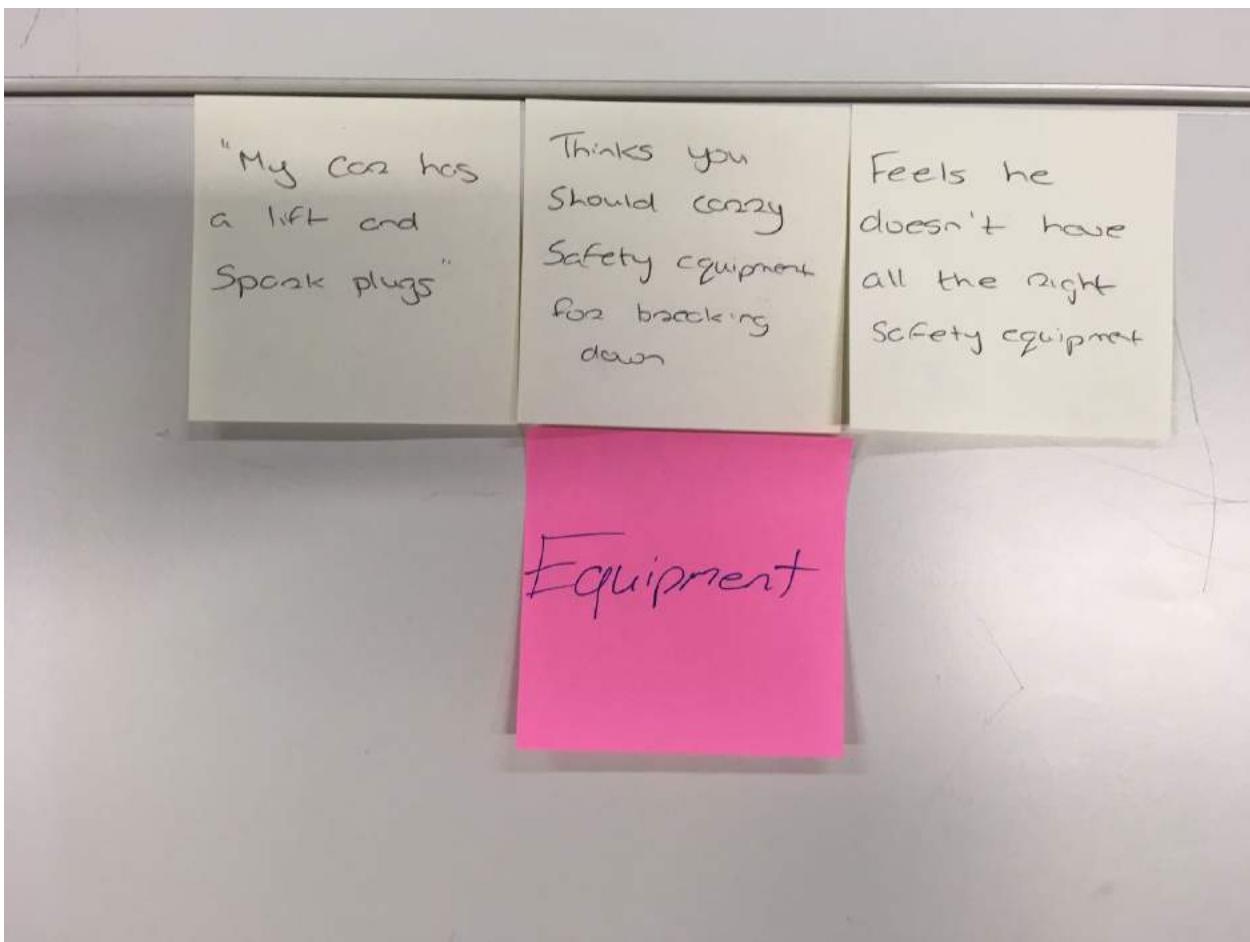
(Points about Retesting from subject 6's interview)

Appendix 12.6.14

Proceed in a situation with caution	Drives an even amount in urban/rural areas.	Feels he could handle a situation where his battery is dead	Situations
Finds himself getting sleepy during long trips	Will stretch out if feeling feeling sleepy while driving	"Like to pull over and ask if they need assistance, but I would not likely pass them." - Driver parked on road of roundabout.	
Thinks he wouldn't be able to handle a situation of changing a tire as he has never had that experience	Feels he wouldn't be able to handle a situation in relation to his tires	Finds people who don't stay in the right lanes to be annoying	

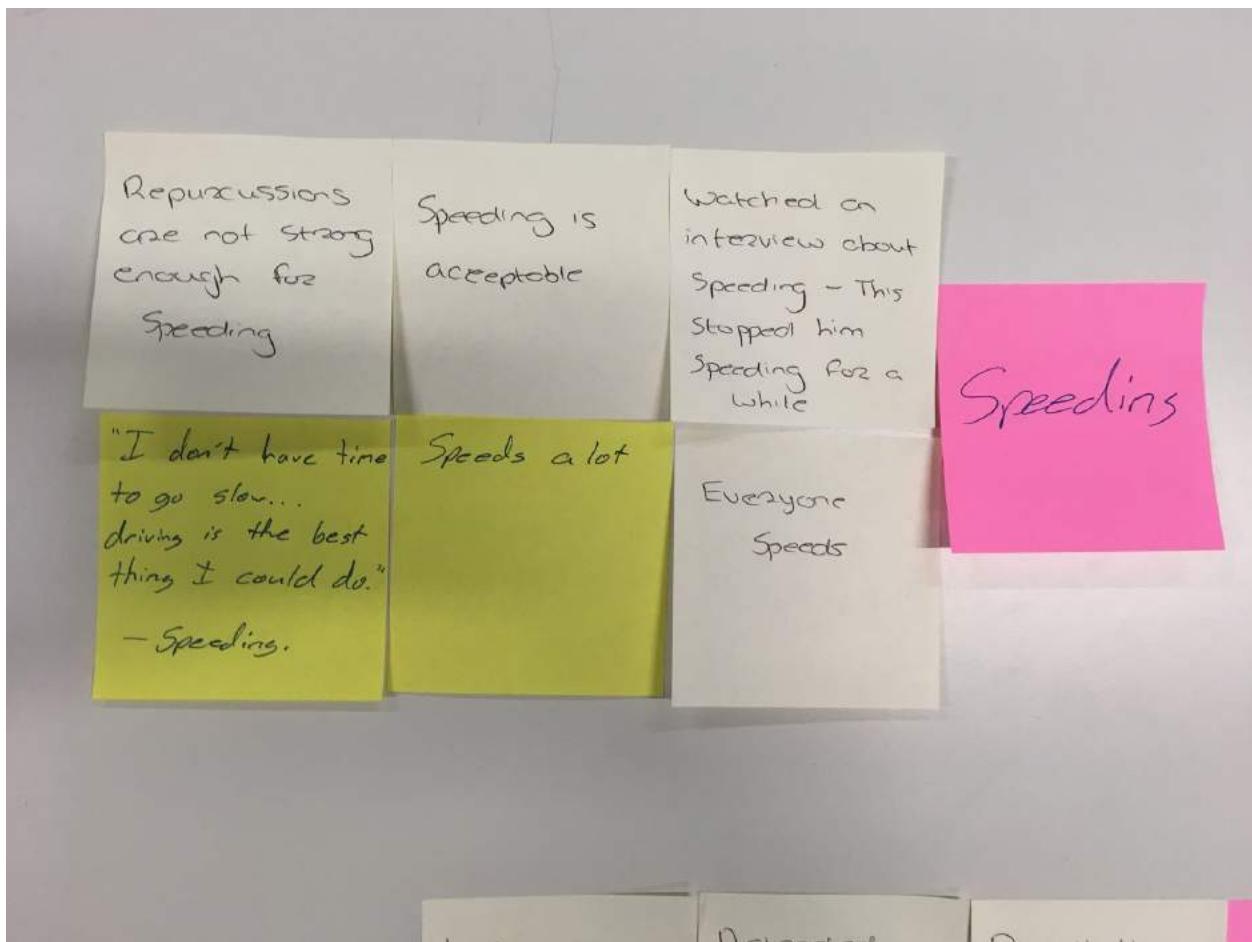
(Points about Situations from subject 6's interview)

Appendix 12.6.15



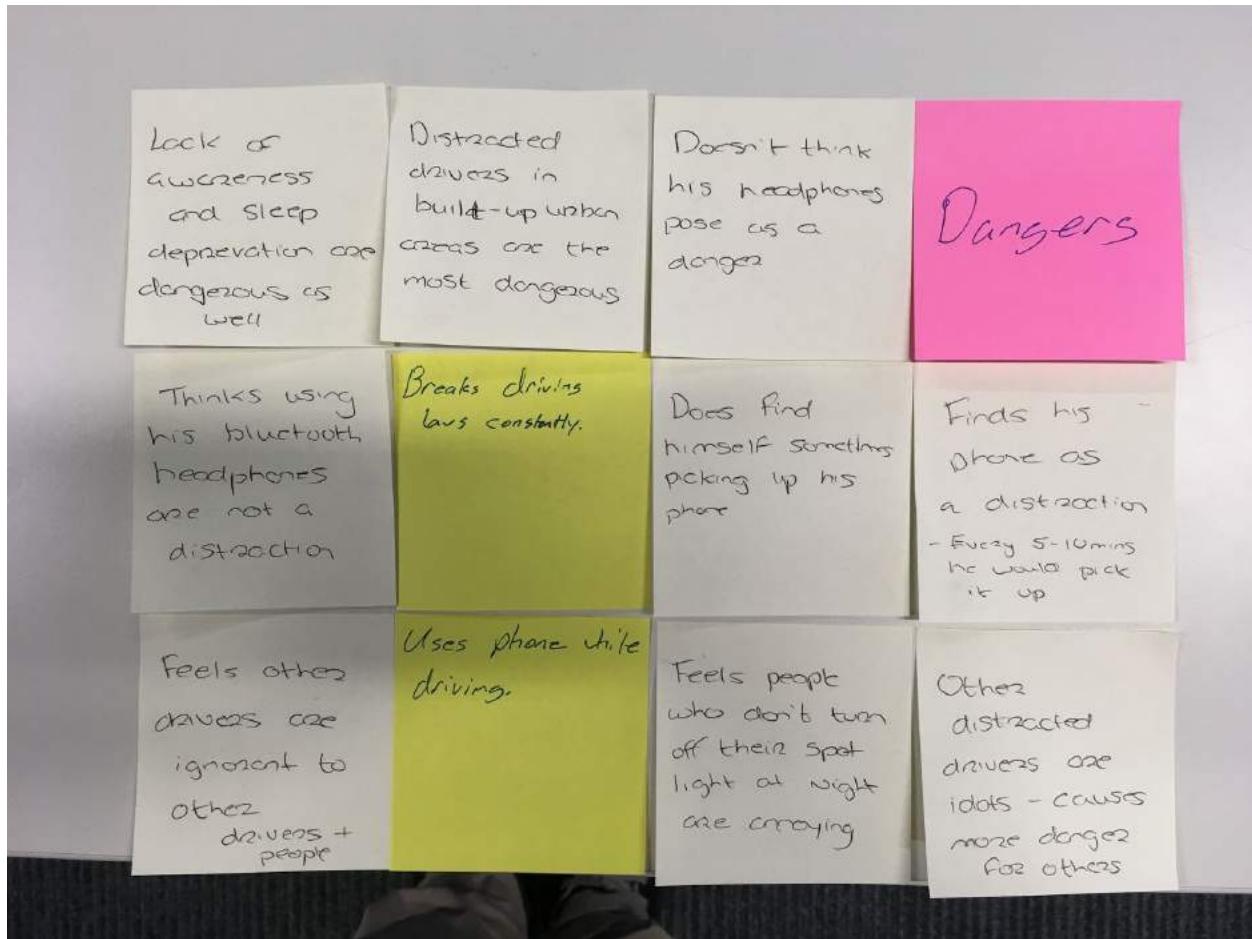
(Points about Equipment from subject 6's interview)

Appendix 12.6.16



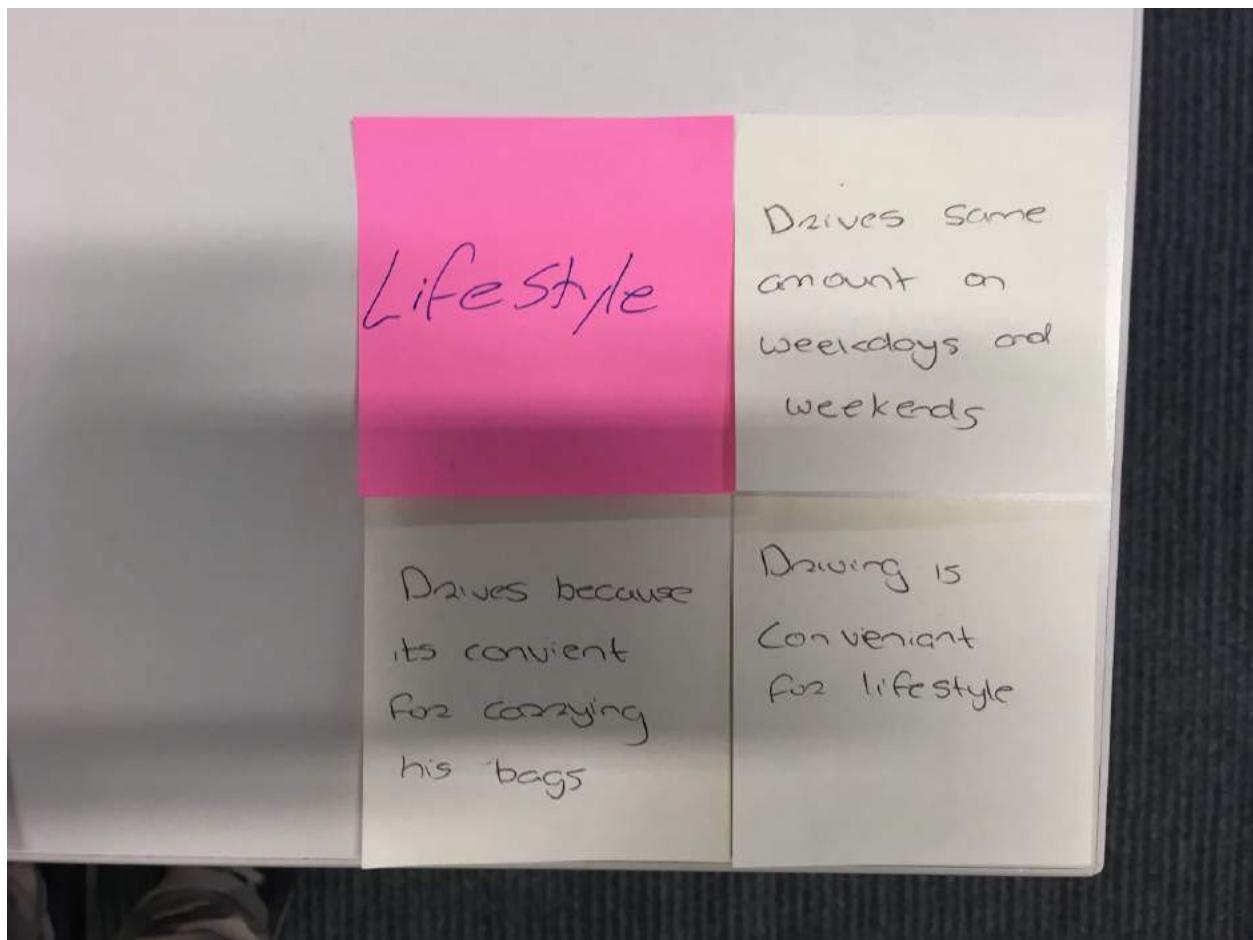
(Points about Speeding from subject 6's interview)

Appendix 12.6.17



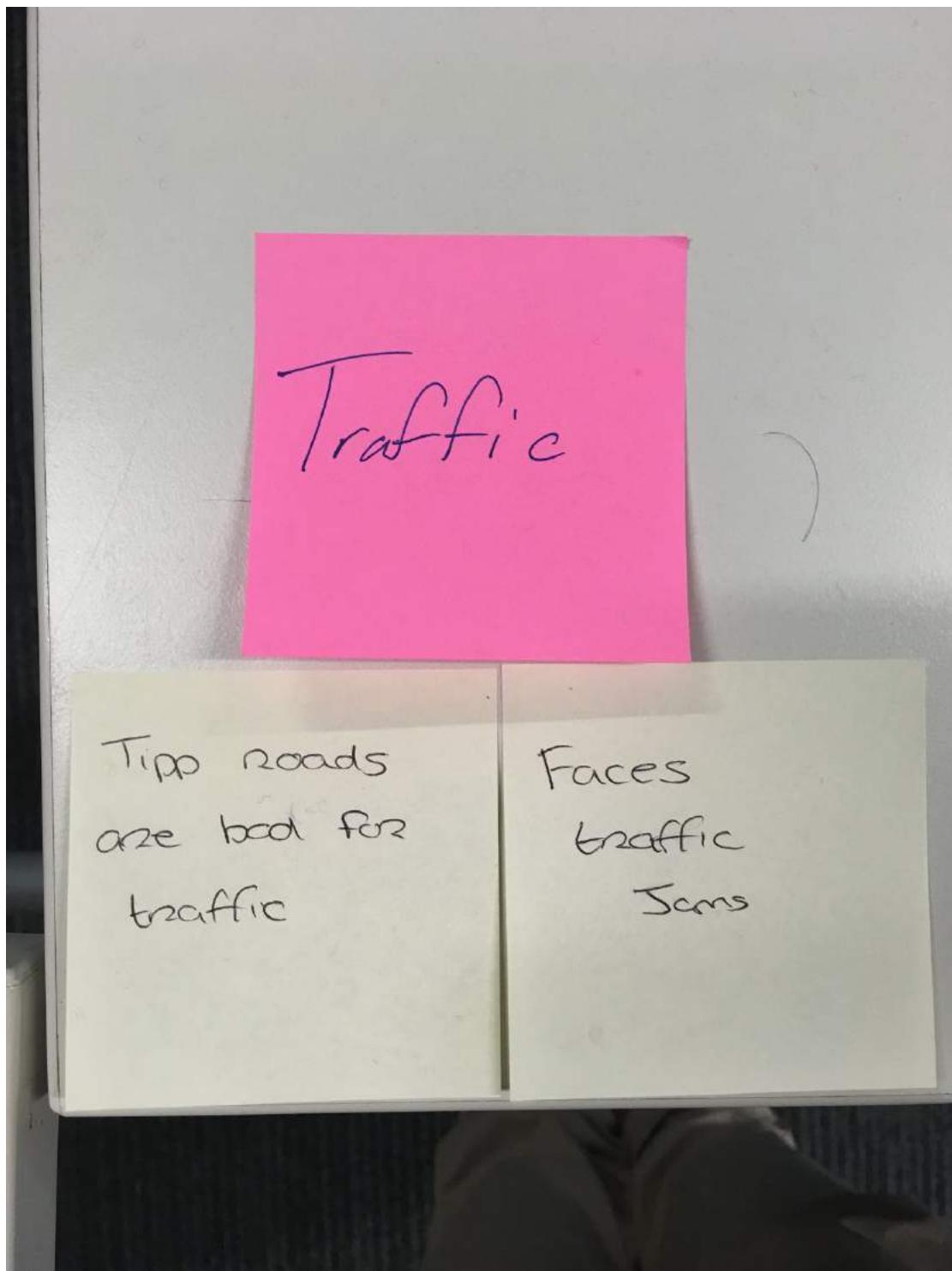
(Points about Dangers from subject 6's interview)

Appendix 12.6.18



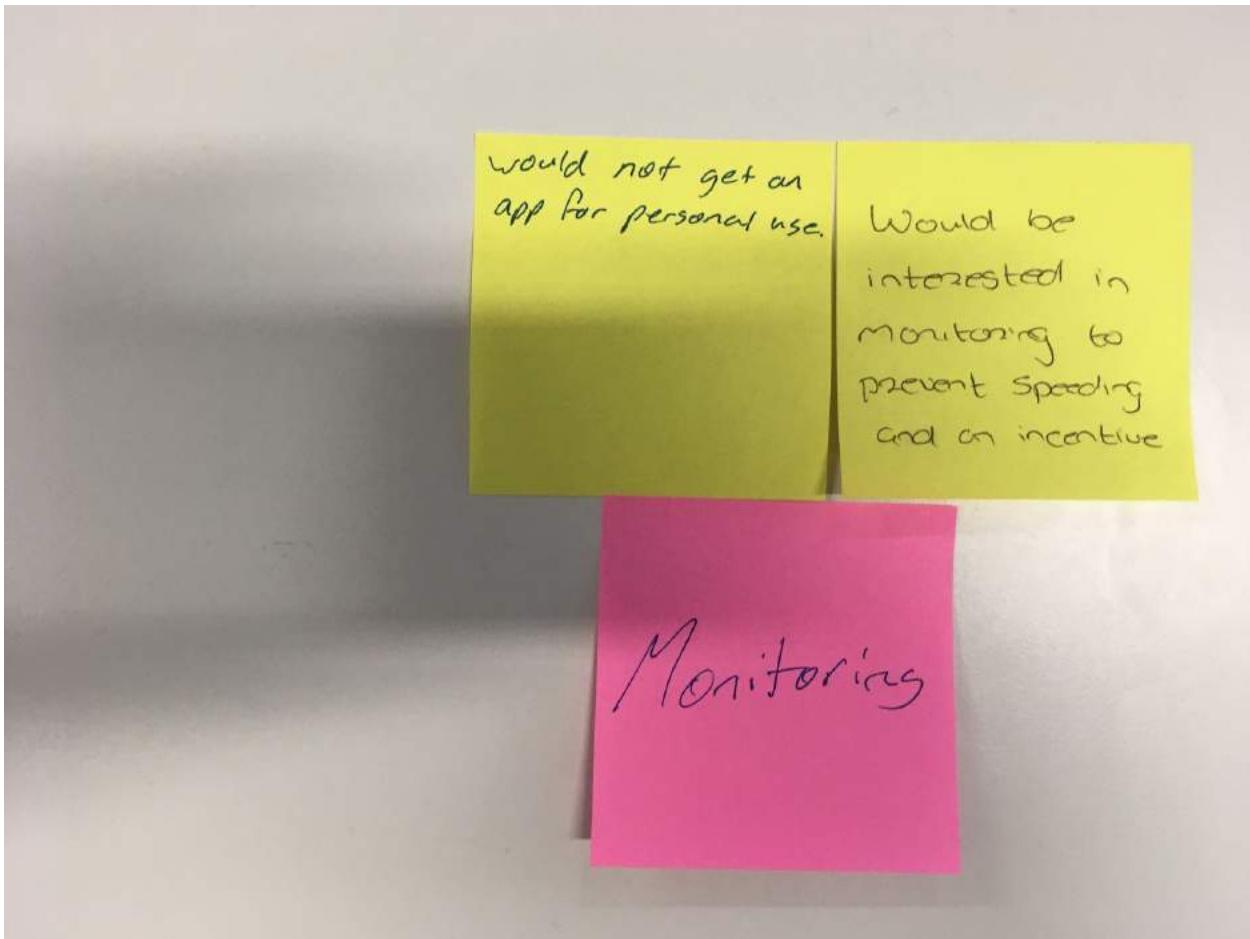
(Points about Lifestyle from subject 5's interview)

Appendix 12.6.19



(Points about Traffic from subject 6's interview)

Appendix 12.6.20



(Points about Monitoring from subject 6's interview)

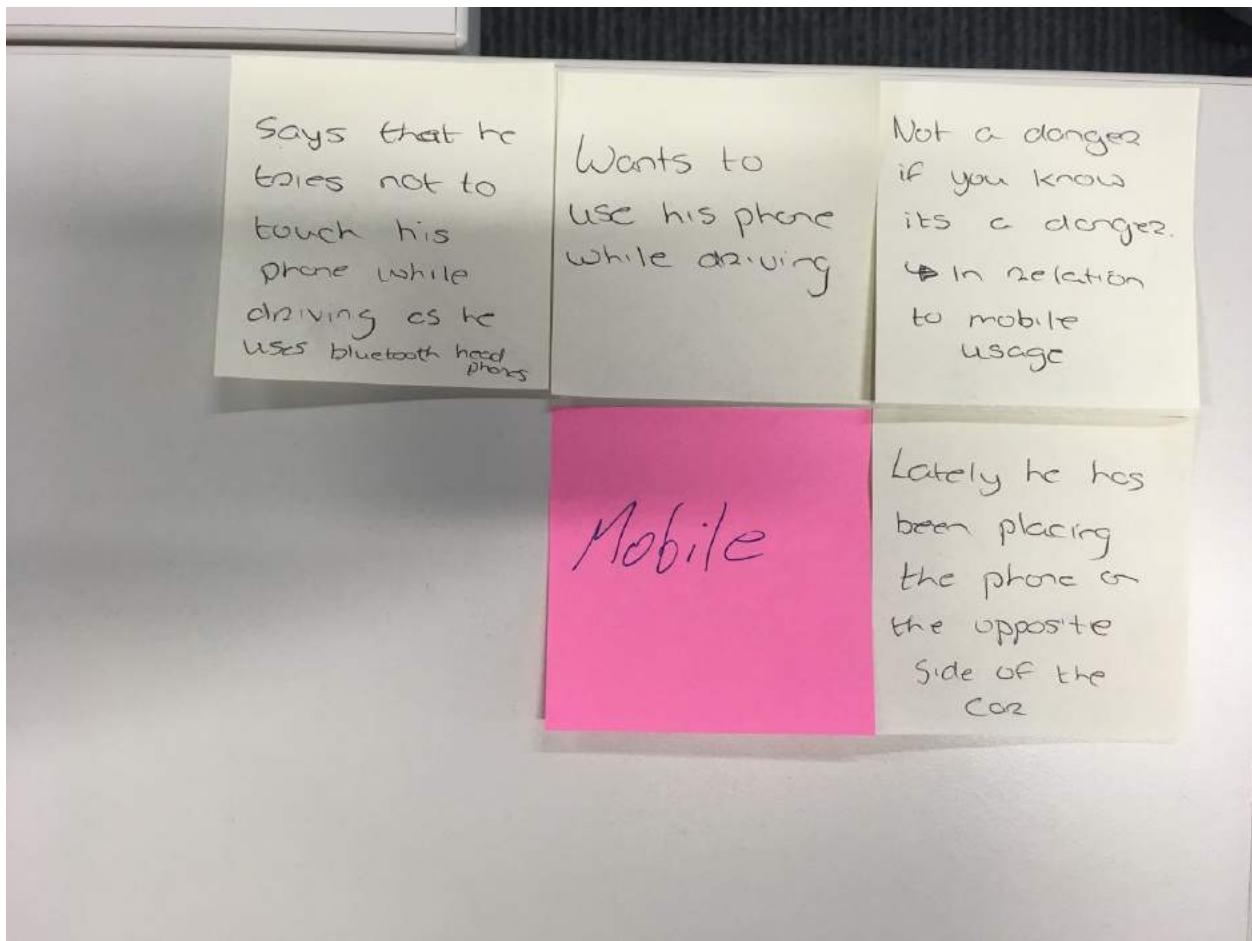
Appendix 12.6.21

Technique	Reverse into a parking Space is his weakest	Parallel parking is easier on the right because of visibility but not on the other	Uphill Starts he is comfortable with	Stalled on uphill Start while learning. Helped to learn it properly.
Feels that he is bad with gear shifting	His driving Skills have been improving over time	Driving skills are great, others are bad drivers	Likes the way he drives	Not comfortable with reverse parking as he hasn't practised it



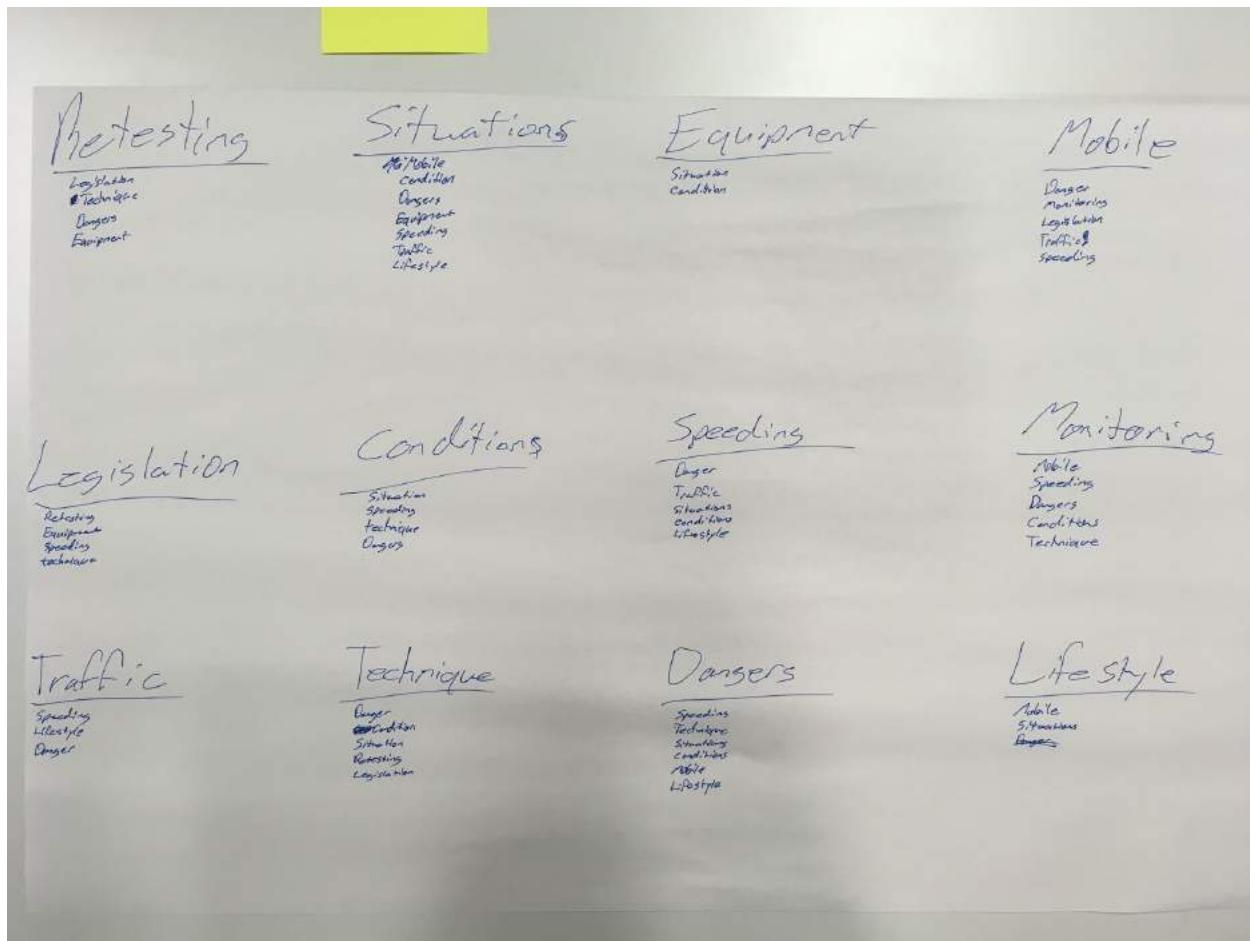
(Points about Technique from subject 6's interview)

Appendix 12.6.22



(Points about Mobile from subject 6's interview)

Appendix 12.6.22



(Themed Cluster Relations from subject 6's interview)

Insight statements and How Might We

Retesting

- Drivers feel that retesting would ensure that other drivers are knowledgeable with the rules of the road.
 - How might we encourage other drivers that retesting is for their best interest?
- Drivers feel that retesting would lessen the number of dangerous drivers on the road.
 - How might we ensure drivers that retesting might lessen the number of dangerous drivers on the road?
- Knowledge of important vehicle safety equipment should be essential for retesting.
 - How might we encourage drivers to carry vehicle safety equipment without making it essential?

Situation

- Some drivers feel that the use of a mobile phone is acceptable in certain driving situations.
 - How might we discourage the use of mobile phones no matter the situation?
- Proper driving knowledge may assist in dangerous driving situations.
 - How might we assist drivers who seek out information to aid them in dangerous driving situations?
- Safety equipment is essential in certain driving situations.
 - How might we provide drivers with a list of safety equipment essentials?
- Many drivers feel that speeding is acceptable in certain situations.
 - How might we ensure drivers that mobile use while driving is dangerous no matter the situation?
- Certain driving situations are caused by lifestyle choices.
 - How might we inform drivers that their lifestyle choices may cause certain driving situations?

Equipment

- Safety equipment should be readily available in any situation.
 - How might we assist the driver with obtaining safety equipment?

Mobile

- Many drivers see mobile phone usage while driving dangerous, but don't consider it dangerous if they do so.
 - How might we ensure drivers that mobile phone usage is dangerous no matter what?

- Certain drivers would like to be monitored if they were rewarded based on performance.
 - How might we encourage other drivers to be monitored?
- Most drivers do not take mobile phone usage legislation seriously.
 - How might we ensure drivers take mobile phone legislation seriously?
- Drivers who use mobile phones while driving feel it is safe, regardless of speed.
 - How might we prevent the use of mobile phones while driving?

Legislation

- Driving legislation for speeding should be stronger and far more strict.
 - How might we discourage drivers from speeding?
- Many drivers feel that new legislation should be brought in for retesting every X amount of years.
 - How might we encourage more drivers that retesting is beneficial?

Conditions

- Driving conditions should be met with appropriate speeds.
 - How might we suggest to drivers to drive the appropriate speed in certain conditions?
- Drivers should be knowledgeable about driving techniques for driving conditions.
 - How might we assist drivers in learning these driving techniques properly?
- Driving conditions can be a danger to drivers on the road.
 - How might we inform drivers of the dangers of road conditions?

Speeding

- Many drivers see speeding as the biggest danger on the road.
 - How might we inform drivers that other activities are just as dangerous as speeding?
- Drivers feel that speeding is situational.
 - How might we discourage the idea that speeding is situational?
- A driver's lifestyle may account for their speeding.
 - How might we assist the driver in their lifestyle to reduce their speeding?

Monitoring

- Monitoring is possible with current mobile phone technology.
 - How might we utilize such technology for monitoring purposes?
- Speeding is an aspect in which drivers and insurance companies are interested in via monitoring technology.
 - How might we provide a driver's statistics to them and or their insurance company?
- Some drivers see monitoring as a way to remove/reduce dangerous drivers from the road.
 - How might we ensure monitoring for potentially dangerous drivers?
- Drivers tend to have a different aspect as to why they would like to be monitored.
 - How might we cater to all drivers looking to be monitored?

Traffic

- Speeding within traffic can be dangerous.

- How might we discourage speeding within areas with traffic?
- A driver's lifestyle may be the reason as to why they may be in traffic.
 - How might we assist the driver to avoid traffic?

Technique

- Proper driving techniques may reduce dangers in driving conditions and situations.
 - How might we assist the driver in learning driving techniques for certain conditions and situations?
- Some drivers feel that driving techniques should be retested.
 - How might we encourage drivers to get retested?
 - How might we assist drivers in learning/evaluating their driving techniques?

Dangers

- Drivers feel that speeding in urban areas is more dangerous than rural areas.
 - How might we discourage drivers from speeding in all environments?
- Mobile phone usage is not seen as dangerous.
 - How might we show drivers that mobile phone usage is dangerous while driving?
- Poor lifestyle (lack of sleep, food, medication) may result in dangerous driving.
 - How might we display to the driver that their lifestyle may cause dangerous driving without upsetting/provoking them?
- Driving conditions are a danger on the road as drivers cannot always account for them.
 - How might we encourage drivers to be aware of possible road weather conditions?

Lifestyle

- A driver's lifestyle may lead them to using their mobile phone more often while driving.
 - How might we discourage the use of mobile phones while driving?
 - How might we prevent drivers from accessing their phone while driving?
- Driving situations (traffic) may be a result of a driver's lifestyle.
 - How might we change a driver's lifestyle to avoid traffic?

12.7 Google Form Survey Responses

Appendix 12.7.1

Timestamp	What is your gender ?	What is your age range ?
2016/10/14 10:54:55 AM GMT	Male	18 - 25
2016/10/14 12:17:44 PM GMT	Male	18 - 25
2016/10/17 10:38:04 AM GMT	Female	36 - 50
2016/10/17 10:43:35 AM GMT	Female	18 - 25
2016/10/17 10:51:04 AM GMT	Other	36 - 50
2016/10/17 10:58:32 AM GMT	Male	26 - 35
2016/10/17 11:03:56 AM GMT	Female	18 - 25
2016/10/17 11:13:28 AM GMT	Female	18 - 25
2016/10/17 11:39:29 AM GMT	Female	26 - 35
2016/10/17 11:43:14 AM GMT	Female	36 - 50
2016/10/17 11:54:05 AM GMT	Female	18 - 25
2016/10/17 12:09:30 PM GMT	Female	26 - 35
2016/10/17 1:03:54 PM GMT	Female	18 - 25
2016/10/17 1:06:40 PM GMT	Male	26 - 35
2016/10/17 1:42:13 PM GMT	Male	18 - 25
2016/10/17 4:20:21 PM GMT	Female	18 - 25
2016/10/17 5:24:13 PM GMT	Female	36 - 50
2016/10/17 5:58:21 PM GMT	Female	26 - 35
2016/10/17 6:41:29 PM GMT	Female	36 - 50
2016/10/17 6:48:15 PM GMT	Female	18 - 25
2016/10/17 7:53:00 PM GMT	Female	36 - 50
2016/10/17 9:10:50 PM GMT	Female	36 - 50
2016/10/17 9:30:35 PM GMT	Male	26 - 35
2016/10/17 9:34:20 PM GMT	Male	26 - 35
2016/10/17 9:49:31 PM GMT	Male	26 - 35
2016/10/17 10:00:39 PM GMT	Female	18 - 25
2016/10/17 10:30:00 PM GMT	Female	18 - 25
2016/10/17 10:43:08 PM GMT	Female	36 - 50
2016/10/18 4:57:34 PM GMT	Male	18 - 25
2016/10/19 6:23:25 PM GMT	Male	18 - 25

(Google Form Responses • Sheet 1 covers gender and age of respondents)

Appendix 12.7.2

How long have you been driving ?	Do you stay up-to-date with driving legislation ?
7 years	No
4 years	Sometimes
15 years	Sometimes
6 years.	Yes
4 weeks	No
2 years	Yes
Three years	Sometimes
5 years	Sometimes
8 years	No
6 years	Sometimes
6 Months	Yes
12 years	Yes
5years	No
8 years	Sometimes
3 years	Sometimes
4.5 years	Sometimes
24 Years	Sometimes
6 years	Yes
30 years	Sometimes
2years	No
19 years	Sometimes
24 years	Yes
12 years	No
13 years	No
5 years on a full license	Yes
since I was about 17, but as a learner. I am not yet fully licensed but my test is booked.	Sometimes
4 years	Yes
15 years	Yes
6 years	Sometimes
8 Years	Sometimes

(Google Form Responses • Sheet 2 covers time driving and if respondents kept up with driving legislation)

Appendix 12.7.3

How do you find out about legislation ?	How knowledgeable are you with the rule and regulations of the road? (1 - 10 range)
Radio	8
Tv	7
Tv	8
Social Media	10
Facebook	3
Newspaper	9
Tv	8
Family	9
Social Media	8
websites	7
Online	6
RSA website	8
Social Media	8
Newspaper	7
Tv	8
Social Media	8
Friends	8
no	10
Tv	8
Tv	10
Tv, newspapers, people	7
Rsa website and rukes of the road books	8
I dont	7
Tv	8
Tv	8
Social Media	5
Tv	8
Newspaper	10
Social Media	8
Radio	8

(Google Form Responses • Sheet 3 covers how they find out about driving legislation and how knowledgeable the respondent is on driving legislation)

Appendix 12.7.4

Do you agree with the laws on mobile phone usage ?	How often would you use your phone while driving ?
Completely	The odd time
Completely	The odd time
Completely	Never
Completely	A lot
Little too strict	A lot
Completely	Never
Completely	Never
Completely	The odd time
Completely	Never
Completely	Never
Completely	The odd time
Completely	Never
Completely	Never
Completely	The odd time
Completely	Never
Completely	The odd time
Completely	Never
Completely	Never
Completely	The odd time
Completely	The odd time
Completely	Never
Completely	A lot
Completely	The odd time
Completely	Never
Completely	The odd time
Completely	Never
Completely	Never
Completely	The odd time
Completely	The odd time
Completely	Never
Completely	The odd time
Completely	Never
Completely	Never
Completely	The odd time
Completely	The odd time
Completely	Never

(Google Form Responses • Sheet 4 covers if the respondent agrees with mobile phone usage laws and how often they would use their phone while driving)

Appendix 12.7.5

how would you rate your driving technique. Please be honest	How comfortable are you with parallel parking ?
Excellent	Not too bad at it
Excellent	Hate it
Excellent	Comfortable
Excellent	Not too bad at it
Poor	Hate it
Excellent	Not too bad at it
Excellent	Hate it
Excellent	Hate it
Excellent	Hate it
Excellent	Not too bad at it
Excellent	Not too bad at it
Excellent	Comfortable
Excellent	Not too bad at it
Excellent	Comfortable
Excellent	Comfortable
Excellent	Hate it
Excellent	Hate it
Excellent	Comfortable
Excellent	Comfortable
Excellent	Hate it
Excellent	Not too bad at it
Excellent	Comfortable
Excellent	Comfortable
Poor	Hate it
Excellent	Not too bad at it
Excellent	Comfortable
Excellent	Not too bad at it
Excellent	Not too bad at it

(Google Form Responses • Sheet 5 covers how the respondent would rate their driving technique and how comfortable they are with parallel parking)

Appendix 12.7.6

How comfortable are you with reverse parking in between two cars ?	How comfortable are you with overtaking?
Hate it	Comfortable
Hate it	Not too bad at it
Comfortable	Comfortable
Comfortable	Comfortable
Hate it	Comfortable
Not too bad at it	Not too bad at it
Not too bad at it	Comfortable
Not too bad at it	Comfortable
Hate it	Comfortable
Not too bad at it	Not too bad at it
Hate it	Not too bad at it
Not too bad at it	Not too bad at it
Hate it	Not too bad at it
Comfortable	Hate it
Not too bad at it	Comfortable
Comfortable	Comfortable
Hate it	Not too bad at it
Not too bad at it	Comfortable
Comfortable	Comfortable
Not too bad at it	Comfortable
Hate it	Not too bad at it
Comfortable	Comfortable
Comfortable	Comfortable
Comfortable	Comfortable

(Google Form Responses • Sheet 6 covers how comfortable the respondent is with the situation of reverse parking between two cars and overtaking)

Appendix 12.7.8

On a scale of 1 to 5, 5 being the most dangerous, how dangerous are the following choices while driving? People on Bicycles	Fast Drivers
4	4
3	5
3	5
4	3
5	2
2	5
2	5
3	4
5	5
1	5
3	4
1	5
3	5
2	4
4	4
4	5
4	3
5	5
5	5
5	5
4	5
2	4
2	5
3	4
3	4
3	4
2	3
3	5
2	4
2	5

(Google Form Responses • Sheet 8 covers how dangerous the respondent sees People on Bicycles and Fast Drivers)

Appendix 12.7.9

Slow Drivers	Road Works	Distracted Drivers	What should a driver do if their car gets into a rear-wheel sideways skid ?	What is the n
4	2		5 Turn the steering wheel in the same direction as the front wheels are heading	1.6 millimetri
3	1		4 Turn the steering wheel in the same direction as the rear wheels are heading	1.6 millimetri
4	3		3 Turn the steering wheel in the same direction as the front wheels are heading	1.6 millimetri
5	2		4 Turn the steering wheel in the same direction as the front wheels are heading	1.6 millimetri
5	4		1 Turn the steering wheel in the same direction as the front wheels are heading	0.6 millimetri
5	4		5 Apply the footbrake to bring the vehicle to a halt	1.6 millimetri
3	2		5 Turn the steering wheel in the same direction as the rear wheels are heading	1.6 millimetri
2	3		5 Turn the steering wheel in the same direction as the rear wheels are heading	0.6 millimetri
2	4		5 Apply the footbrake to bring the vehicle to a halt	1.6 millimetri
4	3		5 Turn the steering wheel in the same direction as the front wheels are heading	2.6 millimetri
4	4		5 Apply the handbrake to bring the vehicle to a halt	0.6 millimetri
3	3		5 Turn the steering wheel in the same direction as the front wheels are heading	1.6 millimetri
5	3		5 Apply the footbrake to bring the vehicle to a halt	1.6 millimetri
3	2		5 Turn the steering wheel in the same direction as the front wheels are heading	1.6 millimetri
4	4		4 Turn the steering wheel in the same direction as the front wheels are heading	2.6 millimetri
4	3		5 Turn the steering wheel in the same direction as the rear wheels are heading	1.6 millimetri
3	2		5 Turn the steering wheel in the same direction as the rear wheels are heading	1.6 millimetri
3	2		3 Turn the steering wheel in the same direction as the rear wheels are heading	1.6 millimetri
5	1		5 Apply the handbrake to bring the vehicle to a halt	1 millimetre
5	5		5 Apply the handbrake to bring the vehicle to a halt	1.6 millimetri
3	5		5 Turn the steering wheel in the same direction as the rear wheels are heading	1.6 millimetri
4	3		5 Turn the steering wheel in the same direction as the rear wheels are heading	1.6 millimetri
4	3		5 Turn the steering wheel in the same direction as the rear wheels are heading	1.6 millimetri
3	3		5 Turn the steering wheel in the same direction as the rear wheels are heading	2.6 millimetri
4	2		5 Turn the steering wheel in the same direction as the rear wheels are heading	1.6 millimetri
4	3		5 Turn the steering wheel in the same direction as the front wheels are heading	1.6 millimetri
2	3		3 Apply the footbrake to bring the vehicle to a halt	0.6 millimetri
4	3		5 Apply the handbrake to bring the vehicle to a halt	1.6 millimetri
3	2		5 Turn the steering wheel in the same direction as the rear wheels are heading	1.6 millimetri
5	5		5 Turn the steering wheel in the same direction as the rear wheels are heading	2.6 millimetri

(Google Form Responses • Sheet 9 covers how dangerous the respondent sees Slow Drivers, Road Works, and Distracted Drivers. The respondent also answers two theory test questions pulled from the driver's theory test)

Appendix 12.7.10

minimum legal tread depth for tyres on a car

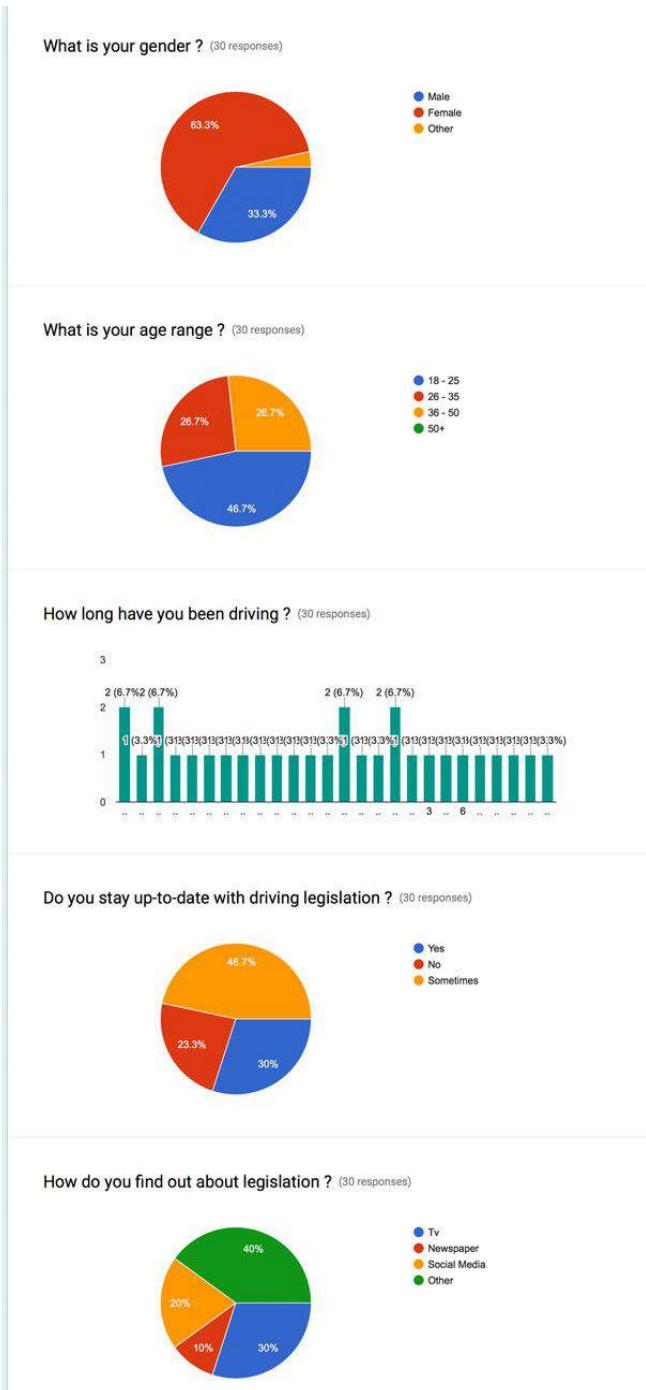
5 millimetres
5 millimetres

5 millimetres
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5 millimetres
5 millimetres
5 millimetres
5 millimetres
5 millimetres
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5 millimetres
5 millimetres
5 millimetres
5 millimetres
5 millimetres
5 millimetres

(Google Form Responses • Sheet 10 is a continuation of the last question in Appendix 12.7.9)

12.8 Google Form Survey Summary

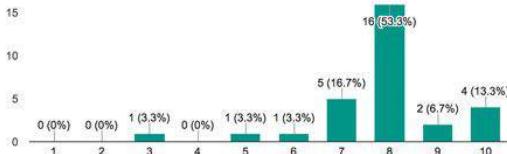
Appendix 12.8.1



(Google Form Summary Part 1)

Appendix 12.8.2

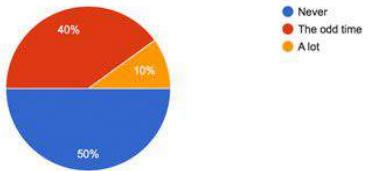
How knowledgeable are you with the rule and regulations of the road?
(30 responses)



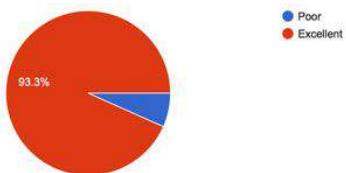
Do you agree with the laws on mobile phone usage ? (30 responses)



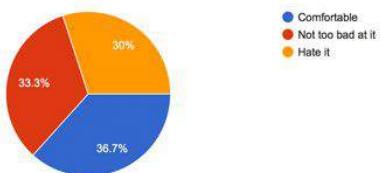
How often would you use your phone while driving ? (30 responses)



On a scale of 1 - 10, how would you rate your driving technique. Please be honest
(30 responses)



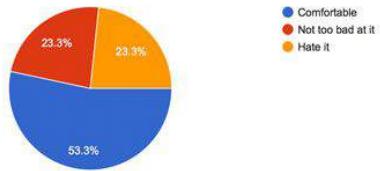
How comfortable are you with parallel parking ? (30 responses)



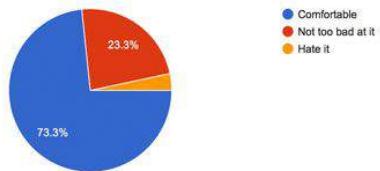
(Google Form Summary Part 2)

Appendix 12.8.3

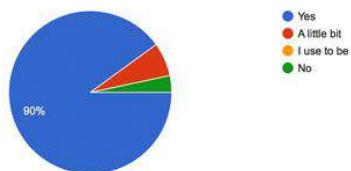
How comfortable are you with reverse parking in between two cars ?
(30 responses)



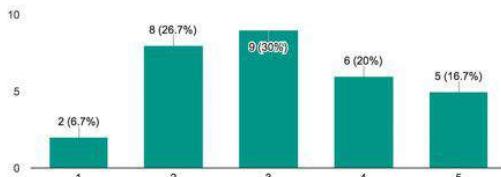
How comfortable are you with overtaking? (30 responses)



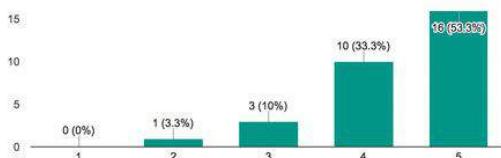
Are you aware of the rules of the road ? (30 responses)



On a scale of 1 to 5, 5 being the most dangerous, how dangerous are the following choices while driving?
(30 responses)

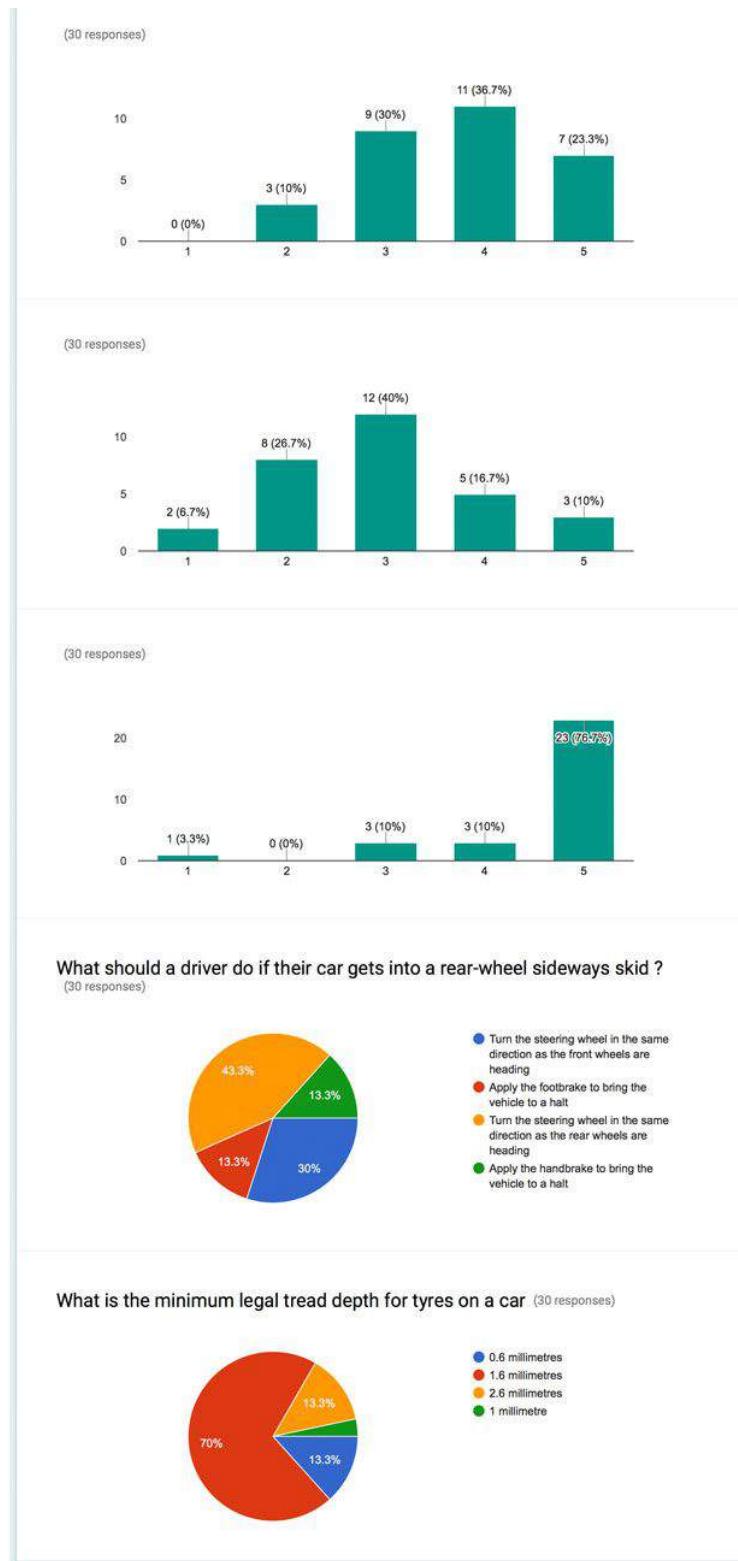


(30 responses)



(Google Form Summary Part 3)

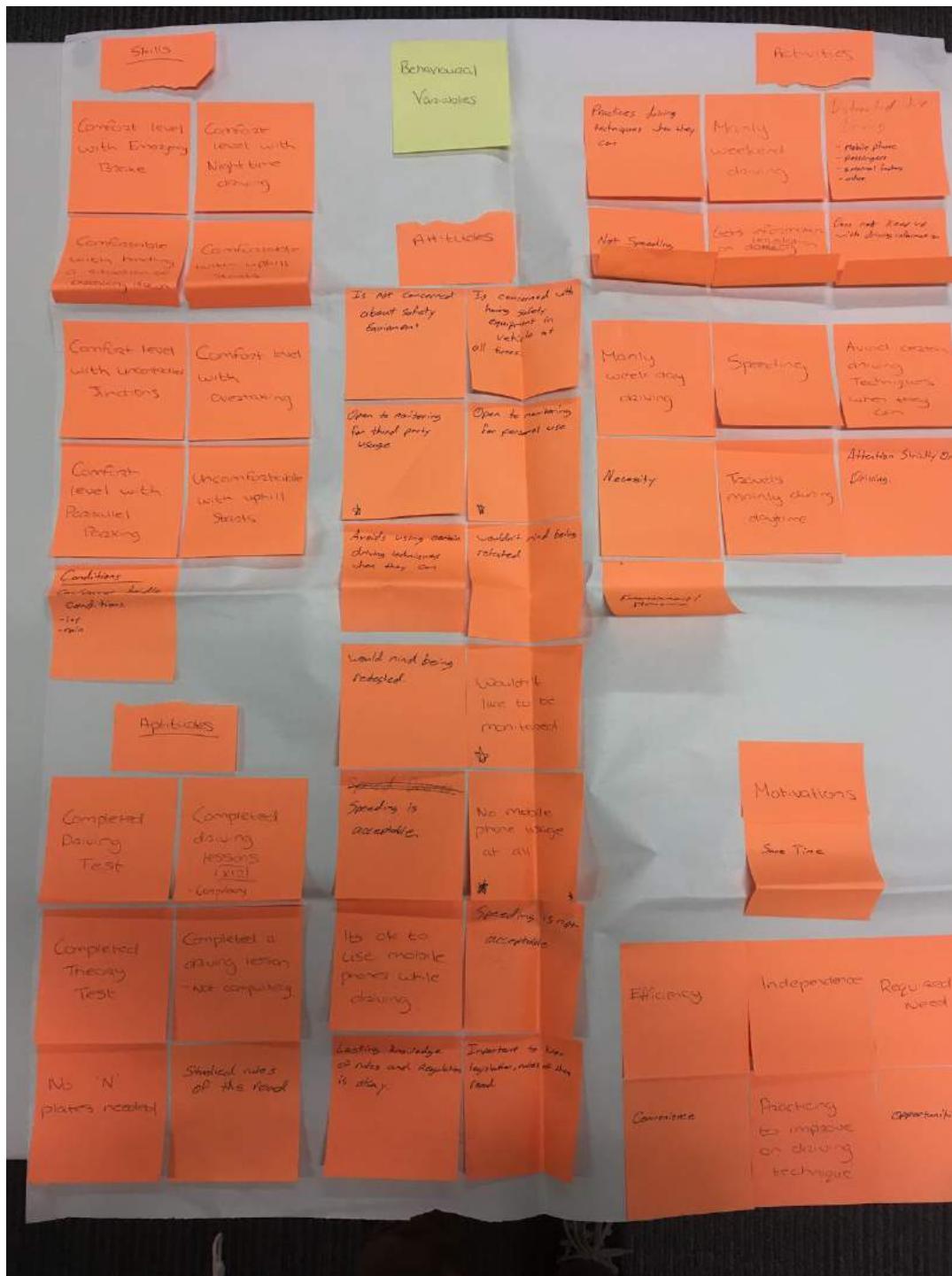
Appendix 12.8.4



(Google Form Summary Part 4)

12.9 Behaviour Variables

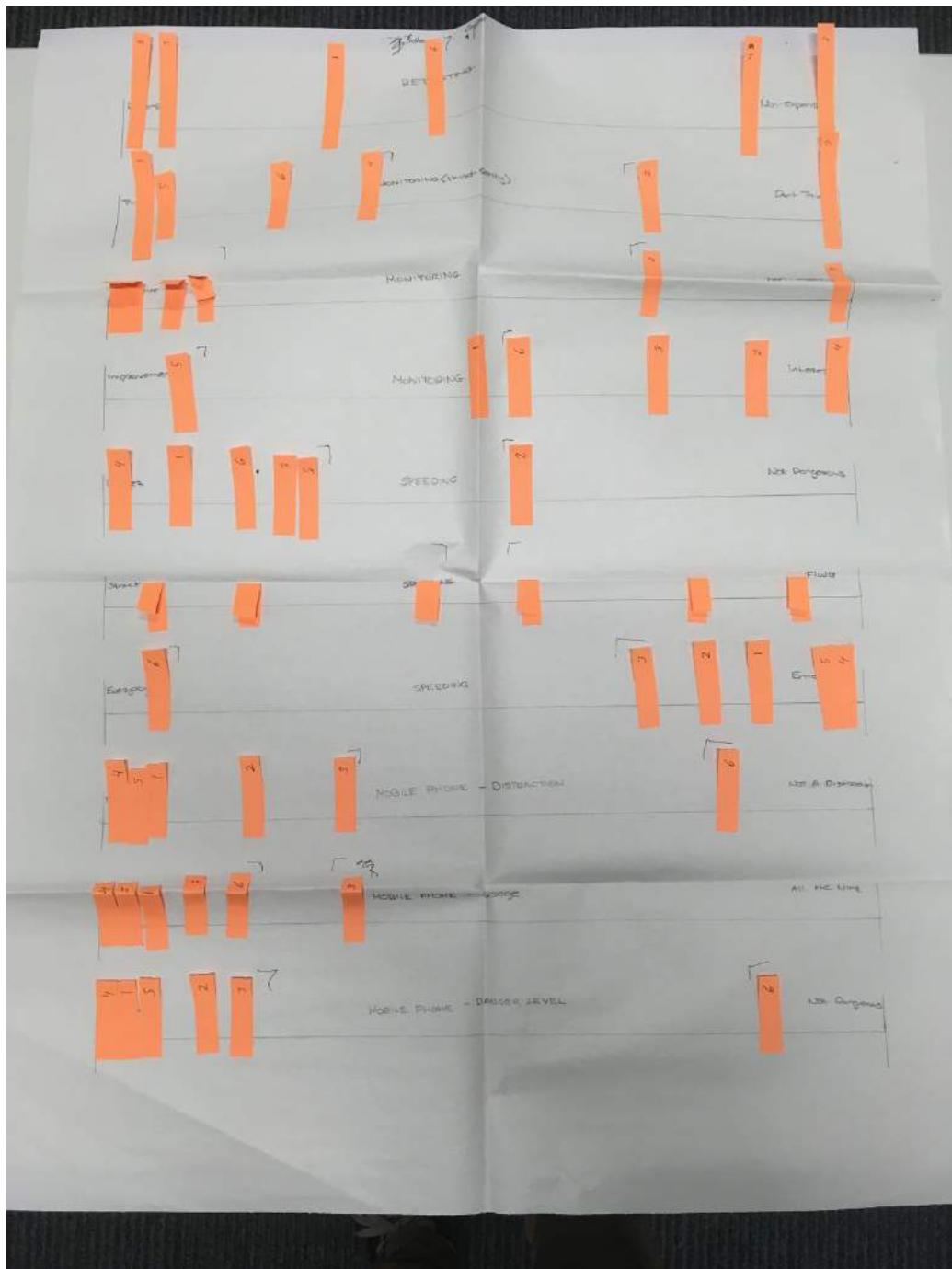
Appendix 12.9.1



(Behaviour variables derived from the design challenge which fall under Motivations, Aptitudes, Attitudes, Skills, and Activities)

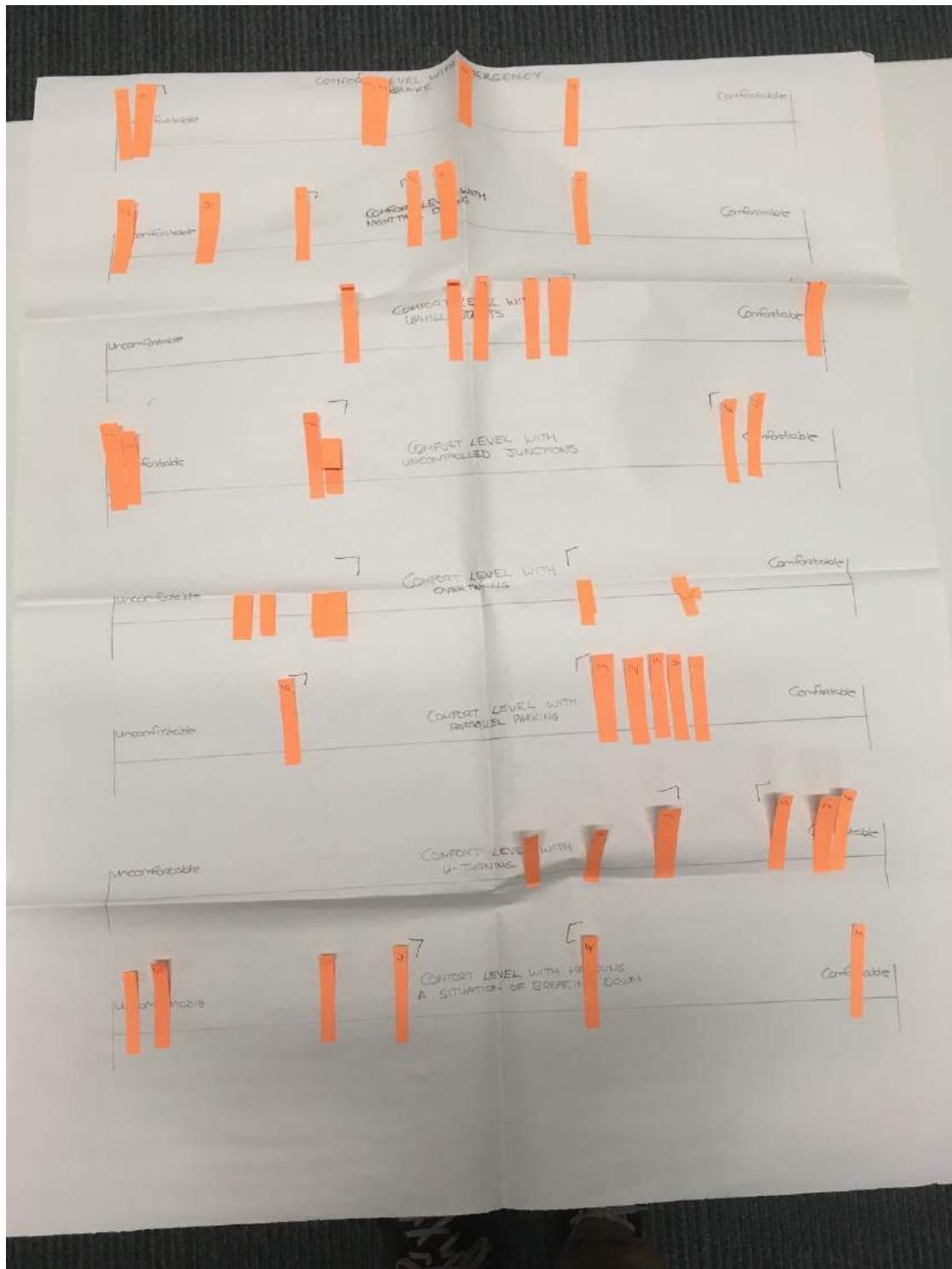
12.10 Subject Mapping

Appendix 12.10.1



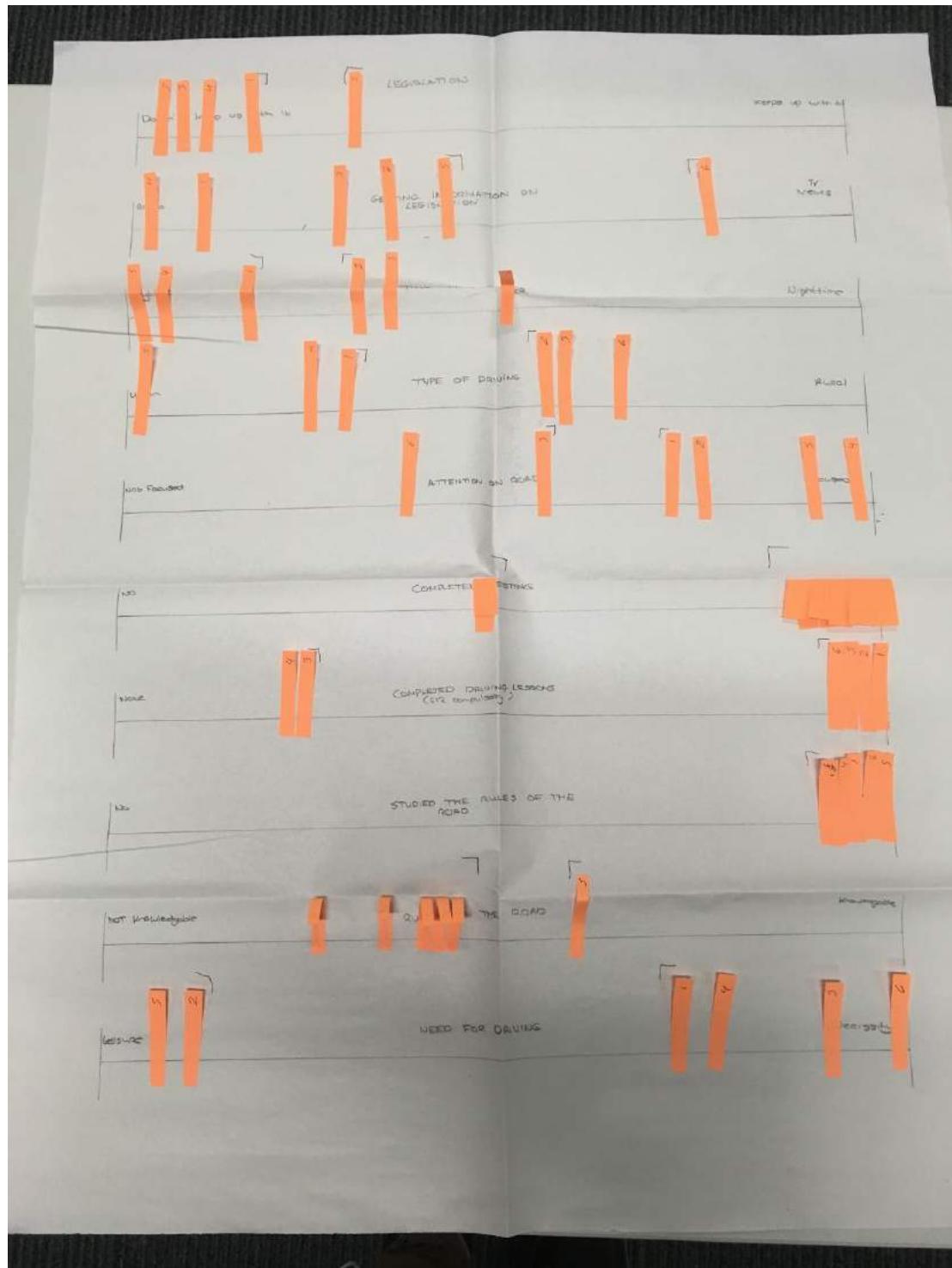
(Subject Mapping Sheet 1. Subjects were mapped on scales to assist with the creation of the personas)

Appendix 12.10.2



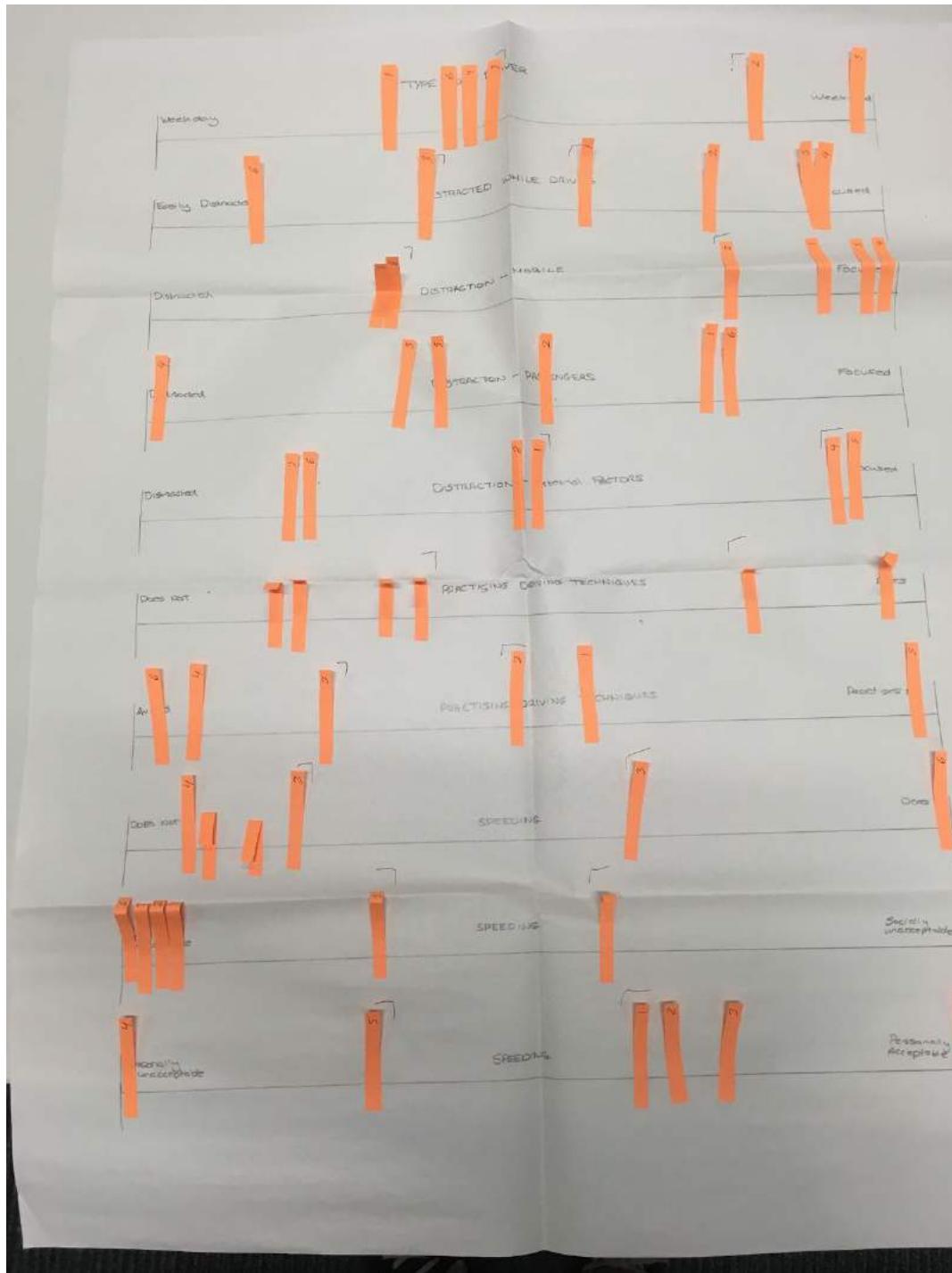
(Subject Mapping Sheet 2. Subjects were mapped on scales to assist with the creation of the personas)

Appendix 12.10.3



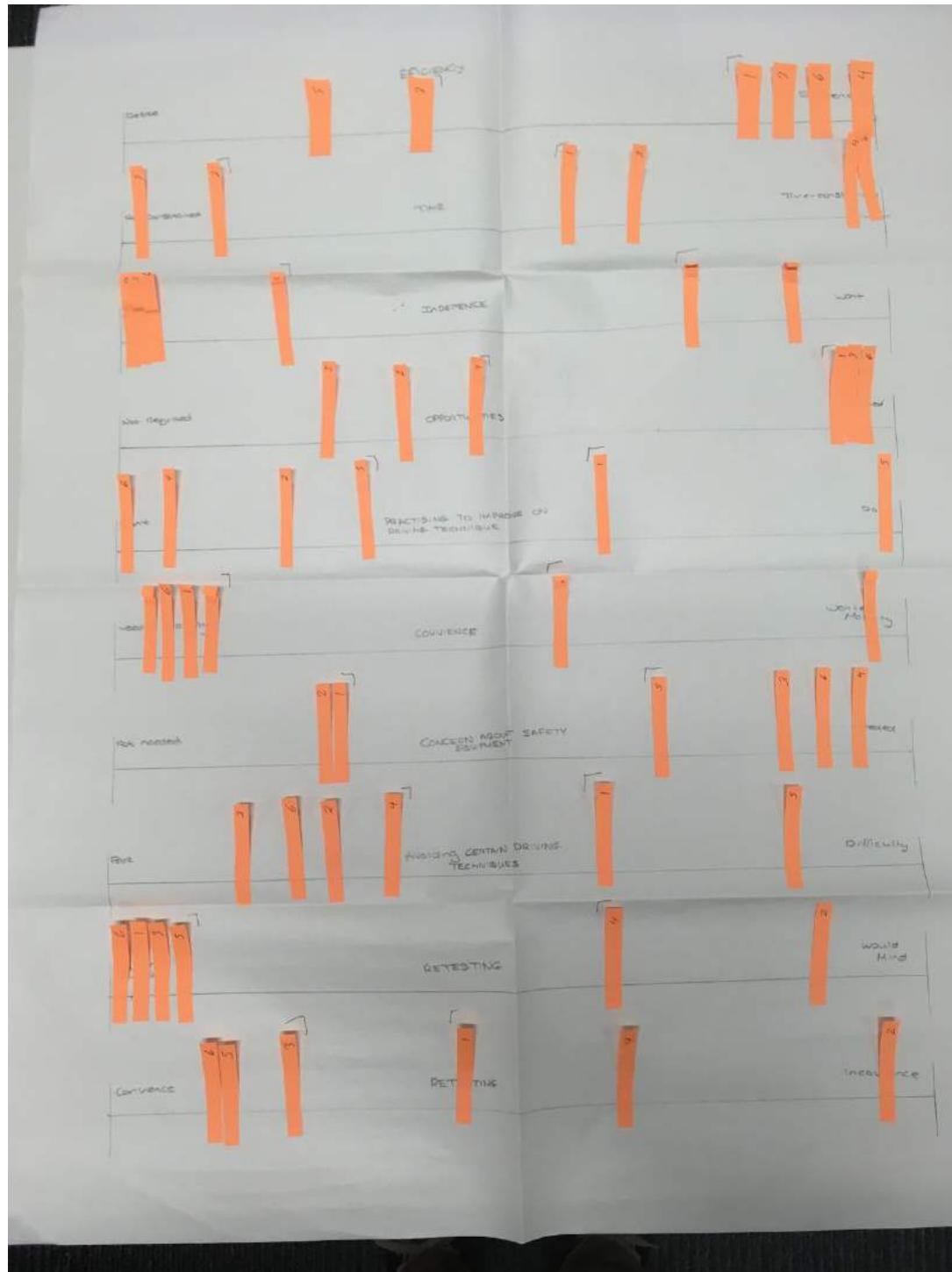
(Subject Mapping Sheet 3. Subjects were mapped on scales to assist with the creation of the personas)

Appendix 12.10.4



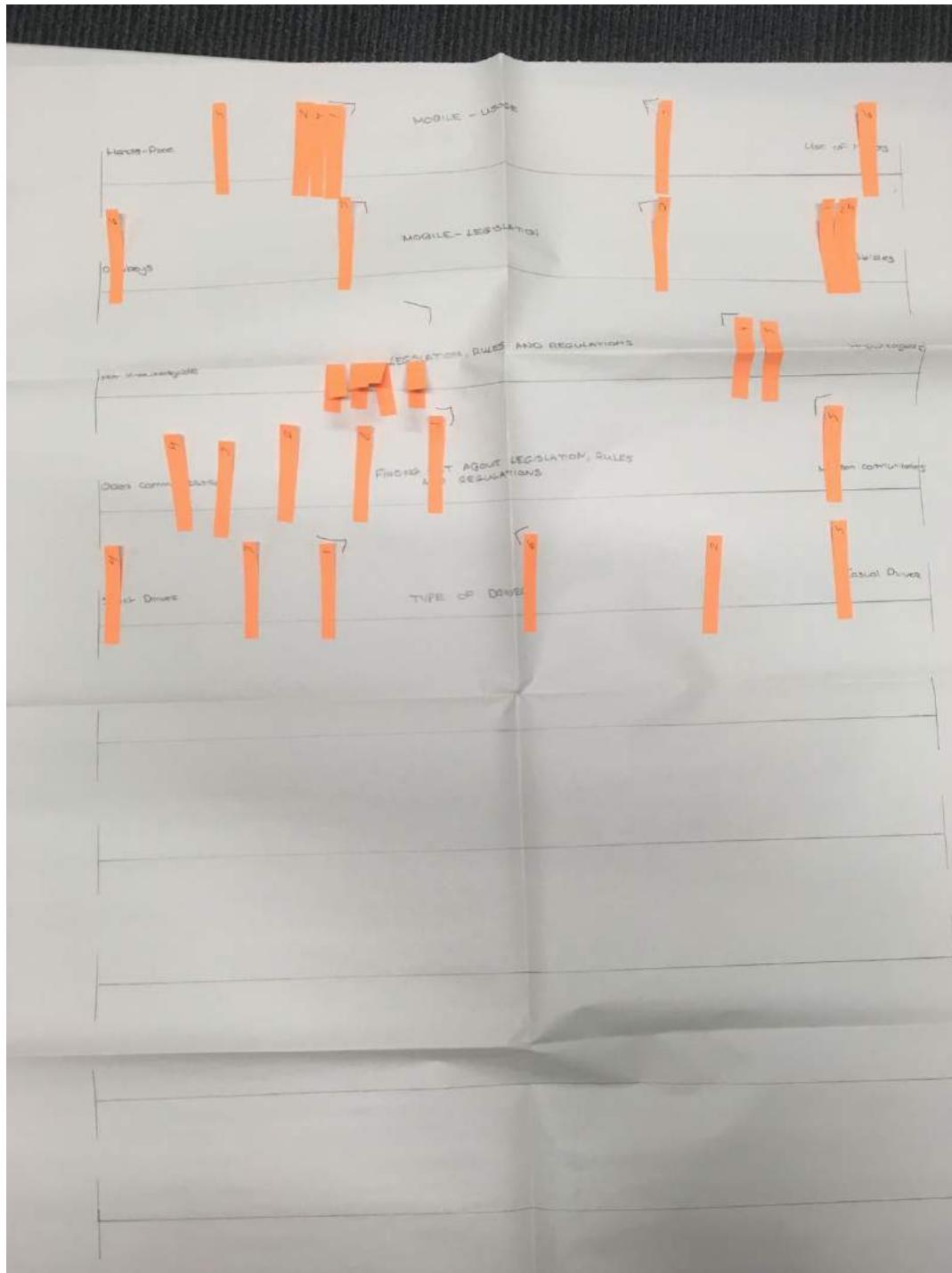
(Subject Mapping Sheet 4. Subjects were mapped on scales to assist with the creation of the personas)

Appendix 12.10.5



(Subject Mapping Sheet 5. Subjects were mapped on scales to assist with the creation of the personas)

Appendix 12.10.6



(Subject Mapping Sheet 6. Subjects were mapped on scales to assist with the creation of the personas)

12.11 Personas

Appendix 12.11.1

Specifications:

Primary:

- Could possibly update her on legislation
- Help her get over her fears with certain driving techniques
- Something to help her with her driving routines and that fits into her busy schedule
- Something that helps to further reduce the distraction of her phone
- Wouldn't mind monitoring but she needs an incentive
- Something that possibly retests her ability or helps her ability, she is confident in her ability but it is the skills and techniques that she fears
- Something to assist in her driving for leisure and desire
- Something that could provide her with information or checklist on safety equipment
- Something that may help improve her knowledge on the rules of the road

Secondary:

- Could possibly update him on legislation
- Improve upon his current driving techniques
- Wouldn't mind monitoring but would like the option to opt-out
- Something which could ensure he is kept up to date with rules of the road
- Keep track of his past and current driving for comparison
- Something which would reduce the amount of distractions from his phone
- Something that is not completely reliant on a strong mobile connection
-

Personal Construction

Persona 1:

- Mobile usage is mainly using hands-free or speakerphone
- Mainly finds out about updates to mobile legislation through older methods of communication i.e the radio, tv
- A strict type of driver who follows the rules of the road and wouldn't often break them
- Wouldn't mind if there was an expense for retesting
- Trusts monitoring through their devices and trusts 3rd parties fairly well
- Would participate in monitoring only if an incentive was provided
- Would use monitoring for their own interest and possibly for some improvement
- Feels that speeding is one of the most dangerous aspects on the road
- Rather strict with speed and will typically go above the speed limit for overtaking purpose or in an emergency, it is normally avoided
- Would only ever find themselves speeding in the case of an emergency
- Feels that using a mobile phone while driving is a distraction
- Would never consider using their phone while driving
- Feels that using mobile phones while driving is a huge danger on the road
- Is very uncomfortable with using emergency brake
- Isn't the most comfortable with nighttime driving and finds it difficult
- Finds uphill starts to an okay driving technique and has the ability to do it
- Feels uncomfortable with uncontrolled junction, wouldn't feel comfortable in a situation that calls them to do it
- Finds overtaking to be uncomfortable but definitely not as uncomfortable as emergency brake
- Feels a little uncomfortable with parallel parking
- Finds a bit comfortable with u-turning and wouldn't mind doing it
- Feels uncomfortable in a situation of breaking down but not too uncomfortable
- Hardly ever keeps up with driving legislation
- Finds out information mainly by hearing about driving legislation and its changes through the radio
- Is mainly an urban driver but does venture further afield a little bit
- Feels that they are a very focused type of driver and doesn't let distractions bother them
- Hasn't completed all 12 lessons but has completed a hand full of lessons, their license was received when before the lessons became compulsory
- They have studied the rules of the road
- Wouldn't be as knowledgeable about the rules of the road, in past they may have been very knowledge but currently not
- **Drives mainly for leisure but the odd time would drive for necessity
- Finds they are driving mainly for desire of wanting to drive but also for a bit of efficiency

- Finds they are time constrained in the times that they drive as they have routines that must be followed such as picking up kids from school
- Feels that driving is a need in order to get to different places and do different tasks
- Feels that driving is an aspect that is needed but not as needed for their lifestyle
- Doesn't use driving as an opportunity to practise techniques, they might for the odd time but wouldn't tend to
- Feels that driving is a needed mobility in order to get around and get tasks done
- Feels concerned having safety equipment in their vehicle but may be missing some safety equipment also
- Finds that they avoid certain driving techniques due to fear of doing them
- Feels they strongly wouldn't mind being retested and that it may be a good idea
- Feels that retesting wouldn't be a bad thing and that it wouldn't inconvenience them too much
- Finds they are mainly a weekday driver
- Feels they are a focused driver but at times can get distracted the odd time for example with kids in the car
- Strongly doesn't get distracted by the mobile phone, tends to leave it aside
- Can get distracted by passengers in the car sometimes
- Finds that they don't get distracted by external factors very often, might the very odd time but most of the time they wouldn't
- Doesn't find they practise driving techniques while driving, might the odd time but hardly ever
- Tends to avoid practicing driving techniques
- Avoids speeding, the odd time and in certain circumstances they may speed but not normally
- Feels that speeding is socially unacceptable and something people should not do
- Feels that speeding is personally unacceptable and would avoid speed in most opportunities

Persona 2:

- Mobile usage is a little more hands on approach
- Obeys mobile legislation but the odd time break it
- Knows most of the mobile legislation
- Uses modern communication methods to find out about changes and updates to mobile legislation through eg. social media
- More of a lenient and casual driver who sometimes forget to perform certain tasks such as indicating, not putting their seatbelt on when driving to the shop
- Feels strongly that there should be no expense for retesting
- Doesn't necessarily trust 3rd party monitoring but is not strongly against it
- Would participate in monitoring for non-incentive purposes
- Would use the monitoring to improve upon their driving greatly and would use it only for their own improvement
- Feels that speeding is not as much as a danger on the road but is still considered a high risk of dangers on the road
- Fluid with speeding. Will speed without the need to, i.e overtaking, emergency situation.
- Speeds almost everyday they drive.
- Feels that mobile phone usage is not too much of a distraction while driving.
- Will occasionally use their phone while driving, but tends to avoid using it.
- Does not see mobile phone usage while driving as a danger of the road.
- Sort of comfortable with use of the emergency brake in the car.
- Feels a little comfortable with nighttime driving.
- Very comfortable with uphill starts.
- Quite comfortable with uncontrolled junctions.
- Fairly comfortable with overtaking other drivers on the road.
- Rather comfortable with parallel parking in most situations
- Very comfortable with performing u-turns.
- Would be comfortable with handling themselves in a situation where they broke down on the side of the road.
- Is not familiar with recent driving legislation.
- Hears of new driving legislation from TV news over other mediums.
- Typically drives in the day, but also drives at night time occasionally.
- Focus is usually on the road, but is distracted by other factors occasionally.
- Completed the 12 compulsory driving lessons.
- Studied the rules of the road.
- Is somewhat knowledgeable of the rules, but doesn't remember everything.
- Driving is a necessity to them as they need to get places.
- Driving is efficient for their lifestyle as they live rurally.
- They are not constrained by time as they have little responsibilities outside of work.
- Drives as they want their independence so they can go anywhere at anytime.
- Many opportunities arise for them as they can drive.

- Practices driving techniques once in awhile, but only when they are comfortable in doing so.
- Driving is a convenience for them as they wanted mobility.
- Feels that safety equipment in a car is a good idea, but is not needed.
- Would mind a fair bit being retested for their driver's license.
- Feels that being retested would be an inconvenience as it may clash with their lifestyle.
- Primarily drives on weekends, and occasionally during the week.
- Is distracted fairly easily by external factors.
- Occasionally is distracted by their mobile while driving. (texting, notifications, snapchat).
- Fairly focused while driving with passengers, but can be distracted by them at times.
- Is sometimes distracted by external factors, (monuments, other drivers, miscellaneous) at times while driving.
- Practices driving techniques which they feel they are not comfortable with once-twice a month.
- Tends to speed most time they drive, except in urban areas.
- Feels that speeding is socially acceptable and that there is a social rule of driving 5-10KM/h over the speed limit.
- Speeding is personally acceptable as it is a necessity in their life and they feel it is alright to do so.
- Doesn't really abide by the set legislation on mobile usage
- Doesn't know a lot about mobile legislation, understand why you shouldn't use a phone while driving but isn't aware of the legislation in place

Primary Persona: Bob Loblaw

Why? - Bob is our Primary persona as we feel that he provides us with similar and alternative aspects in which we could design for, he is someone who is comfortable with many driving techniques and is a relatively new enough driver that he still knows the rules and regulations of the road. We feel that when designing for Bob we will allow us to tailor to a well rounded driver who wants to maintain their skill level of driving.

Secondary Persona: Jane Clark

Why? - Jane is our secondary persona as we feel she would not be inclined to use whatever technological solution we design as she already does not use her phone while driving. Jane is an experienced driver, but is not comfortable with certain aspects and techniques of the road, but does not attempt to learn the techniques or keep up with legislation. She is concerned with her bills, and this technology could potentially be used to lower the cost of her car insurance, but that is the only benefit it would have for her.

Appendix 12.11.3

Persona 1: Jane Clark



Jane is 38 years old and has been driving for the last 15 years, she spends most of her time taking her 3 kids to and from school as well hurling, ballet and swimming training.

When Jane was learning to drive it was not compulsory at the time to complete 12 driving lessons but she has completed a hand full of driving lessons in the lead up to getting her full licence. Also as part of her learning in obtaining her full driving licence she had to study the rules of the road. Currently, she wouldn't say that she is very knowledgeable about the rules of the road but in the past she would have been. With this, what she is aware of she wouldn't break the rules either.

Jane lives in the town and finds herself only driving when required, otherwise she's happy to walk to and from places. She enjoys driving as a pastime and finds she mainly drives mainly for leisure and from time to time she would venture out to the countryside at the weekends. Most her driving is during the week due to her need for mobility in order to get her weekly tasks and children pickups done. Because of this necessary mobility she tends to find that driving is time-constrained to follow certain schedules.

Jane believes that she is a strict type of driver, wouldn't dare use her phone while driving, she believes strongly that phones should never be used while driving and this is something she tries very hard to avoid but the odd moments she can find herself using her phone with a hands-free set. She believes that mobile phones are one of the biggest distractions and dangers on the road. She has a tendency to remain focused while driving and hardly lets things distract her. That being said she does face some distractions such as dealing with her children in the back of the car when they get a bit too excited but she doesn't usually allow for distractions while driving including external factors in her driving environment.

Jane is someone who is mindful of the various safety equipment and items that she should have in her car at all times, she isn't perfect and may not have all the necessary equipment but is would be conscience to have many.

She feels strongly about speeding and it is something she hardly ever does and believes it is personally and socially unacceptable. She has a tendency to avoid speeding at all costs but there is a possibility that she will speed in the case of an emergency or when she is overtaking another car. She believes it is a huge danger on the road.

When it comes to legislation Jane would find out about new and changing rules and regulation through other communications such as radio and tv, campaigns. She wouldn't find herself keeping up with the latest legislation and would only hear about if it is being discussed on the radio.

When it comes to driving, Jane is confident in her skills and wouldn't use driving as an opportunity to practice her skills and techniques. There may be the odd time that she would do a technique just for the sake of doing to see does her ability still align with the ways she has been taught in the past but normally this wouldn't be the case. In saying this, she knows she is not the perfect driver and still feels uncomfortable with certain techniques such as night time driving, uncontrolled junctions, overtaking and dealing with a situation of breaking down. She would say that she is a little uncomfortable with parallel parking. She finds that she has a tendency to avoid doing some of these techniques based on fear of doing them. But there are techniques in which she is comfortable in such as u-turning and uphill starts.

In terms of retesting, Jane wouldn't mind if she had to be retested at some point during her driving life and actually thinks it might not be a bad idea for all drivers to be retested. Retesting wouldn't be something that would inconvenience her too much as she lives in a town and can easily access anywhere in a short period of time and wouldn't mind if she had to pay a small fee.

Jane would trust 3rd parties such as her insurance company to monitor her driving abilities as she drives if there was incentive provided for example a reduced fee, otherwise she might not see the benefit for herself to be monitored.

Day in the life of Jane

At 7am Jane's alarm rings, alerting her it is time to get up and get the kids ready for school. She wakes her three children - Dylan, Alex and Sarah. She helps them to get ready for school as she makes their lunches and ensures that their bags are fully packed. When Sarah and the kids are ready she rushes them out the door and reminds them to put on their seatbelts.

As Jane is driving the kids to school, she sees the driver in front of her using their phone and slightly swerving on the road, not focused at all, their speed increasing. She gives out about the driver in front not paying attention to the road and following the rules of the road. The driver in front suddenly slows down greatly and turns right forcing Jane to suddenly brake. She believes that if the driver in front was to be retested they would fail, entertaining this idea she sees that retesting could be used to help reduce dangers on the road. She personally wouldn't mind being retested as she believes she is a strong enough driver and takes the rules of the road seriously.

As she is dropping the kids off at school, Dylan complains of feeling unwell but Jane convinces him to give school a try. She drives towards the supermarket. Her phone lies on the passenger

seat and beeps letting her know that she has received a text message. Jane is interested in seeing the message but wouldn't dare look at it while driving and allows it to remain untouched as 2 more messages come in. As she gets towards the center of town she must drive through an uncontrolled junction, upon reaching this she hesitates to move out when it's her turn as she fears the possible chance of a collision. She slowly inches forward and when she feels its clear she quickly moves out of the junction. As she indicates into the supermarket car park she notices it is full but spots a space at the other side of the road where she will have to parallel park. In order not to have to do this technique she decides to drive around the full supermarket car park until she finds a space.

Once finished her shopping she gets back into the car and puts on the radio while she drives, the news comes on and she hears about the latest changes made in driving legislation, she thinks to herself that the only time she ever hears about driving legislation is while she is driving and mainly on the radio. This news makes her think back to the time when she first started driving and the fact that she has only ever had 5 driving lessons in total and studied the rules of the road but it has been many years since she has looked at the rules of the road, she knows that if someone were to quiz her now she wouldn't know them at all now.

As she is on her way home with the groceries, her phone rings and she gets a little nervous thinking it could be the school calling since Dylan wasn't feeling the best. She decides to answer the phone call by holding the steering wheel with one hand, reaching for her phone and answering with her other, she quickly looks down at the screen and clicks loud speaker, she then places the phone on the dashboard as she talks to the caller. She feels bad about having answered her phone especially since it wasn't the school but in fact her sister looking for a chat. She thinks that phones are one of the biggest distractions and a major danger while driving.

When Jane goes to pick up the children from kids, they are full of excitement and gushing with news, while driving home Dylan and Alex get into an argument over who owns a toy, the boys continue to argue, getting louder. Jane finds it hard to remain focused on the road and the cars surrounding her. She finds herself turning around and quickly looking between the road and the children in order to stop the fighting. When Jane finally manages to settle the argument she notices that she has been speeding over the speed limit by 10km and reduces her speed to follow the speed limit.

When Jane finally arrived home, she notices that the post has been delivered, as she goes through each one she noticed a bill for her car insurance. The bill is quite high and Jane doesn't know what they are going to do with having more bills piling up for this month. If there was some way in which she could help lower her fee she would go for it and wouldn't go the extra mile if it meant her fee was smaller.

As the evening light begins to dim, Dylan begins to feel worse, Jane checks his temperature and it is very high and he is very pale, she decides to bring him to Care Doc as it is outside normal hours. As she's worried about Dylan, she decides it is an okay situation for her to speed a little

bit above the limit, she hates speeding and when others speed but when her child is sick she will not question using speed to get her son help. Another car is in front of her and is going very slow, she decides to brave overtaking as it is normally something she dislikes doing but given the situation she will do it. As she overtakes, her speed momentarily increases even further. Once finished at the doctor's, Jane notices it is night time, another situation in which she is uncomfortable with, she puts on her lights on full beam and drives herself and Dylan home, she slows down and sometimes brakes as she comes across other drivers as she's driving home.

Shortly they reach home and she sends Dylan up to bed after taking his medicine and goes to relax by the fire and tv after a long day.

Janes Specifications:

- Could possibly update her on legislation
- Help her get over her fears with certain driving techniques
- Something to help her with her driving routines and that fits into her busy schedule
- Something that helps to further reduce the distraction of her phone
- Something that could possibly help in
- Wouldn't mind monitoring but she needs an incentive
- Something that possibly retests her ability or helps her ability, she is confident in her ability but it is the skills and techniques that she fears
- Something to assist in her driving for leisure and desire
- Something that could provide her with information or checklist on safety equipment
- Something that may help improve her knowledge on the rules of the road

Appendix 12.11.4

Persona 2: Bob Loblaw



Bob received his driving license 4 years ago and typically drives to go to work during the weekdays and to friends on the weekend.

As Bob received his license 4 years ago, it was mandatory for him to receive 12 driving lessons before attempting his full driver's license. He did not have to use N plates for the two years as that was brought into legislation at a later time. Bob is quite knowledgeable of the rules of the road as he studied them only 5 years ago.

He does not remember all of the rules, but he remembers the more general content.

Bob lives with his parents in a rural area as he is not financially able to move out yet. Driving is a necessity for Bob as he works in a town 30 minutes away from where he lives. Bob originally felt he needed his license for independence as he lives far away from any towns or cities. Most driving is done in rural areas as he drives between home and work. Bob is typically not constrained by time as he lacks many responsibilities outside of work. He drives on weekends to visit friends on weekends and drives during that time more than he does through the week.

Even though Bob received his full license 4 years ago, he typically not a strict driver. Bob is easily distracted by external factors while driving, as well as by his mobile phone. He uses his mobile phone occasionally while he is driving as he does not see it as a danger on the road. Bob will typically take calls and text while driving. Speeding is a daily occurrence with Bob's driving, typically going 5 - 10 km/h over the speed limit as he feels it is socially and personally acceptable to speed, especially in rural areas, but less so in urban areas.

Bob feels that because he is in a rural area that it is a good idea to have road safety equipment in the car, but he feels that he would never need it for himself.

Bob does not usually keep up with legislation as he feels it is unimportant. Usually, he will hear of updates to legislation by ads on TV over other mediums.

Bob is a confident driver, but feels that it is important to improve upon the current skills he already has. When he is met with a situation where he is comfortable he will practice his driving techniques such as parallel parking, reverse around the corner, reverse parking, etc. Bob finds that he is quite comfortable with most techniques as he recently passed his driving test and will practice those skills at least once a month.

As a confident driver who recently obtained his licence, Bob would mind a bit if he had to be retested every so many years. If the government was to introduce retesting for driving licences, Bob feels that it should not be an expense on the driver as it is the Government who are wanting to retest drivers. It would be a big of an inconvenience for Bob as he works most days, lives out in a rural area, and enjoys his weekends with his friends.

Bob is kept up-to-date on technology and is not trusting of third parties monitoring his activities online, but is not strongly against it. If he was to be monitored, he would prefer it to be for non-incentive purposes as he feels companies would be less likely to monitor the data which they collect. Any technology which Bob uses typically revolves around his own interest to improve upon himself, rather than for interest.

Bob would like something that

- Could possibly update him on legislation
 - Improve upon his current driving techniques
 - Wouldn't mind monitoring but would like the option to opt-out
 - Something which could ensure he is kept up to date with rules of the road
 - Keep track of his past and current driving for comparison
 - Something which would reduce the amount of distractions from his phone
 - Something that is not completely reliant on a strong mobile connection
-

Day of Bob

Bob wakes up at 7:00am during the weekdays as he works at Venture Co. as a Junior Analyst. Bob starts work at 9:00am every day, so he typically leaves around 8:10am. Bob has a bit of a lay in and then proceeds to get ready. Once he has showered for work, Bob heads downstairs for breakfast where he has the morning news on in the background while he is chatting with his parents and eating breakfast. Bob realizes that he was suppose to leave 5 minutes ago and rushes off after saying goodbye to his parents and cleaning up his dishes.

Once in the car, Bob starts it up and speeds out of his parents driveway and off to work. During his drive to work, Bob decides he wants to listen to his music. With one hand on the wheel, he grabs his phone from his pocket and attempts to plug in the AUX cable. Bob is having difficulty with inserting the AUX cable with only one hand. As he knows the roads in the area, he waits for a straight strip of road where he thinks it is safe to drive with no hands on the wheel for only a second. Bob reaches this part of the road and decides to steady the wheel with his knee, while maintaining his current speed of 95km/h, with the speed limit being 80km/h. Once Bob has plugged in the AUX cable, he places his right hand on the wheel again, but uses his left hand to select the music he wants to play. Once Bob has picked his favourite A Day To Remember album, he places his phone on his passenger seat and focuses on driving.

As Bob gets closer to work, his friend Ryan texts him asking if he is coming down to the city this weekend. Bob thinks nothing of it and proceeds to pick up the phone. Bob's phone is capable of speech to text, but he finds that it is more of a nuisance than anything. With his left hand, he begins to text away on his phone while checking the road every second or two. Once he has sent his text, he lowers his phone out of sight from others while keeping it in his hand. Bob is now in Stratham, where Venture Co. is located. The city is populated, but as it is the morning, not many people are out. Bob lowers his speed to the respectable 50km/h. Ryan messages back saying "That is awesome! Will see you later tonight. Going to a sesh at Leo's place.". Bob looks at the text and begins to reply until he sees a school cross walk. Bob puts his phone down and proceeds to stop for the crossing guard. Bob smiles as the crossing guard as she waves to him. 7 or 8 kids are crossing to the Stratham Primary school. Once the children have crossed, the crossing guard waves again and proceeds to walk to the sidewalk. Bob begins to drive on to work, checking the clock in his car to check the time, 8:40am, he thinks he has made excellent time despite leaving late. Once Bob arrives to work, he notices that there is a great parking spot up near the front of the building, but he will have to parallel park. He feels confident enough to attempt parallel parking as there are no other cars in the parking lot. Bob slowly proceeds with parallel parking, remembering what he learned when he first started driving. After just one attempt, and some straightening up, Bob pulls up his hand break and turns off the car. He sits in his car for a minute collecting everything he needs before remembering Ryan messaged him. Bob texts Ryan immediately as he feels he needs to respond in a timely manner. Bob walks in to work and puts his phone on silent as his employer is quite strict with mobile phone usage at work.

At work, Mary, a co-worker, talks to Bob about her morning commute issues. She tells Bob about her car getting a flat this morning. She proceeds to tell him that she had the spare tire and that her father was a mechanic, so she is comfortable with changing a tire, but she didn't have a jack or a tire iron. She had to call her father to come help, hence why she was late. While Mary is talking about her morning crisis, Bob is thinking if he has the appropriate equipment in his car for if he ever broke down, but then thinks he would never break down. Once Mary is finished telling her story, Bob proceeded to tell her to get the proper equipment as it is important to always have it in case of an emergency.

Once work is over at 5:30pm, Bob stays back till 6pm as he finds there is less traffic and he can finish up small tasks. Once 6pm rolls around, Bob proceeds to his car. He plugs in his phone to his car and turns on some music. He sits there for 5 minutes or checking his social media and text messages before heading off to Duncaster for the weekend. Bob knows it is faster to go on the motorway to Duncaster as it is a more direct route than any backroads. He proceeds to the motorway which, is just down the road from his work. Once on the motorway, Bob speeds to 110km/h as he feels it is socially acceptable and needed as he is in the fast lane. While driving, Bob messages his parents telling them he is going to Duncaster for the weekend, he then proceeds to texts his friends telling them that he is driving down now. Bob is somewhat a confident driver at night as he typically drives during the day, but as the days are getting shorter

he has to get use to darker evenings. While he is composing the text to his friends, he begins to go into the other lane, where he is approaching another car. The car ahead of him honks the horn. Bob's attention is immediately back on the road and he goes back into his lane. As Bob passes the driver seems to be yelling at him through the window while making obscene hand gestures. Bob feels bad as he knows he was in the wrong and almost got into an accident. He proceeds to leave his phone on the passenger's seat for the majority of the drive until the feeling of embarrassment leaves. Bob proceeds to check his phone once again, but with hesitance because of his prior incident. Once he reaches Duncaster, Bob proceeds to his friends place. Duncaster has many hills, so Bob sees it as a way to test out his hill starts as he doesn't get to do them at his parents or in Stratham. Bob comes up to a light and proceeds to pull up his hand brake once he has shifted to second gear and lost momentum. Bob waits for the light to change and shifts down to first gear. Once the light changes to green, Bob revs the engine and releases the handbrake and begins going forward through the light. As he reaches Ryan's place, Bob decides to reverse into the parking space as he can drive out tomorrow as it is a bad road to reverse on to. Bob proceeds past the driving, pulls up his handbrake and shifts into reverse. Bob uses his mirrors while also looking back to see behind him. Bob begins to turn the wheel to direct the car to his friends driveway. Bob sees a car approaching and feels nervous as he does not want to block another driver Bob begins to reverse a little faster, hoping to be out of the other driver's way. With speeding up, Bob manages to back up into his friend's driveway before the driver approached him, but in doing so he parked on an angle. He feels that he is in the driveway and that being at an angle is nothing bad. Bob proceeds to turn off the car and put on his handbrake. Once Bob has done so, he checks his phone and messages his friend saying he is outside. Bob leaves his vehicle for the night and begins his weekend with his friends.

12.12 Brainstorming

Appendix 12.12.1

How Might We Iterative Process

In order to decide on the How Might We questions we will be using for our brainstorming, we are going to be going through an iterative process of choosing our favourites and eliminating others as we come to the final decision

Round 1:

- How might we encourage drivers practice driving techniques to ensure they grasp the concept?
- How might we monitor drivers speeds more effectively?
- How might we expand upon the current platforms in which people learn about legislation?
- How might we reduce the amount of accidents caused by distracted drivers?
- How might we track a driver's skill progression?
- How might we show drivers the benefits that can be found through monitoring?
- How might we encourage drivers to remain up-to-date about legislation?
- How might we display to drivers the importance of safety equipment?
- How might we inform drivers of proper driving techniques to combat certain situations?
- How might we prevent decay of a driver's technique?
- How might we discourage the idea that speeding is situational?
- How might we ensure drivers that mobile phone usage is dangerous no matter what?

Round 2:

Each picked their top 3

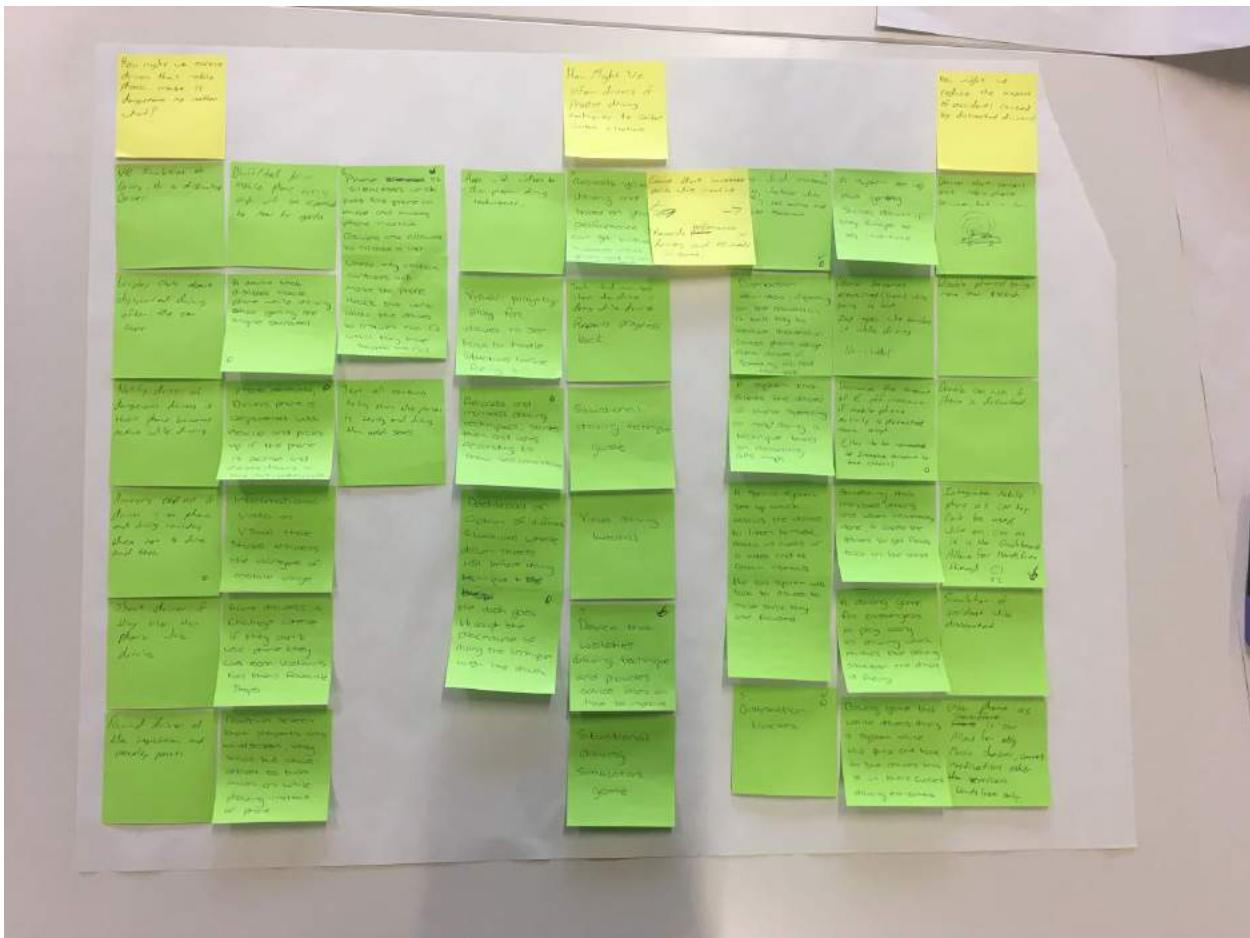
- How might we monitor drivers speeds more effectively?
- **How might we inform drivers of proper driving techniques to combat certain situations?**
- How might we encourage drivers to remain up-to-date about legislation?
- How might we reduce the amount of accidents caused by distracted drivers?
- How might we track a driver's skill progression?
- How might we ensure drivers that mobile phone usage is dangerous no matter what?

Round 3:

Each picked their top 1

- How might we inform drivers of proper driving techniques to combat certain situations?
- How might we reduce the amount of accidents caused by distracted drivers?
- How might we ensure drivers that mobile phone usage is dangerous no matter what?

Appendix 12.12.2



(Brainstorming session after three How Might We questions were selected.)

Appendix 12.12.3

Colc

Select Your Best Ideas

1+ hours

# <u>1</u>	Least	Most
Instinctively, how excited are you about this idea?	1 2 3 4	5 (5)
How innovative and different from what's out there does this idea feel?	1 2 3 4	5 (5)
How practical do you think this idea is? Does implementing it seem realistic?	1 2 3 (3) 4	5
Total =	13.5	
# <u>2</u>	Least	Most
Instinctively, how excited are you about this idea?	1 2 (3) 4	5
How innovative and different from what's out there does this idea feel?	1 2 (3) 4	5
How practical do you think this idea is? Does implementing it seem realistic?	1 2 3 4	(5)
Total =	11	
# <u>3</u>	Least	Most
Instinctively, how excited are you about this idea?	1 2 (3) 4	5
How innovative and different from what's out there does this idea feel?	1 2 3 (4) 5	
How practical do you think this idea is? Does implementing it seem realistic?	1 2 (3) 4	5
Total =	10	

(Brainstorming Sheet which had us pick 3 designs each and rate all 6 on a scale)

Colc

Select Your Best Ideas

1+ hours

4

Instinctively, how excited are you about this idea?

	Least		Most	
1	2	3	4	5

How innovative and different from what's out there does this idea feel?

1	2	3	4	5
---	---	---	---	---

How practical do you think this idea is? Does implementing it seem realistic?

1	2	3	4	5
---	---	---	---	---

Total = 9.5

5

Instinctively, how excited are you about this idea?

1	2	3	4	5
---	---	---	---	---

How innovative and different from what's out there does this idea feel?

1	2	3	4	5
---	---	---	---	---

How practical do you think this idea is? Does implementing it seem realistic?

1	2	3	4	5
---	---	---	---	---

Total = 10

6

Instinctively, how excited are you about this idea?

1	2	3	4	5
---	---	---	---	---

How innovative and different from what's out there does this idea feel?

1	2	3	4	5
---	---	---	---	---

How practical do you think this idea is? Does implementing it seem realistic?

1	2	3	4	5
---	---	---	---	---

Total = 12

Einen

Select Your Best Ideas

1+ hours

1

Instinctively, how excited are you about this idea?

Least	2	3	4	5
1	2	3	(4)	5

How innovative and different from what's out there does this idea feel?

Least	2	3	4	5
1	2	3	4	(5)

How practical do you think this idea is? Does implementing it seem realistic?

Least	2	3	4	5
1	2	(3)	4	5

Total = 12

2

Instinctively, how excited are you about this idea?

Least	2	3	4	5
1	2	(3)	4	5

How innovative and different from what's out there does this idea feel?

Least	2	3	4	5
1	2	3	(4)	5

How practical do you think this idea is? Does implementing it seem realistic?

Least	2	3	4	5
1	2	3	(4)	5

Total = 11

3

Instinctively, how excited are you about this idea?

Least	2	3	4	5
1	2	(3)	4	5

How innovative and different from what's out there does this idea feel?

Least	2	3	4	5
1	2	(3)	4	5

How practical do you think this idea is? Does implementing it seem realistic?

Least	2	3	4	5
1	(2)	3	4	5

Total = 8

Eisen

Select Your Best Ideas

1+ hours

# <u>4</u>	Least	Most
Instinctively, how excited are you about this idea?	1 2 3 4 5	3
How innovative and different from what's out there does this idea feel?	1 2 3 4 5	4
How practical do you think this idea is? Does implementing it seem realistic?	1 2 3 4 5	3
Total =	11	

# <u>5</u>	Least	Most
Instinctively, how excited are you about this idea?	1 2 3 4 5	4
How innovative and different from what's out there does this idea feel?	1 2 3 4 5	4
How practical do you think this idea is? Does implementing it seem realistic?	1 2 3 4 5	3
Total =	11	

# <u>6</u>	Least	Most
Instinctively, how excited are you about this idea?	1 2 3 4 5	5
How innovative and different from what's out there does this idea feel?	1 2 3 4 5	4
How practical do you think this idea is? Does implementing it seem realistic?	1 2 3 4 5	3
Total =	12	

Appendix 12.12.4

Gut Check

Design Challenge

“How to educate experienced drivers to improve on road safety”

How Might We Question?

How might we reduce the amount of accidents caused by distracted drivers?

Describe Idea

As the user starts up the application for their car, it would check XML feeds of the weather in their area. It would suggest tips on how to drive in that weather condition, which the user can either accept or ignore.

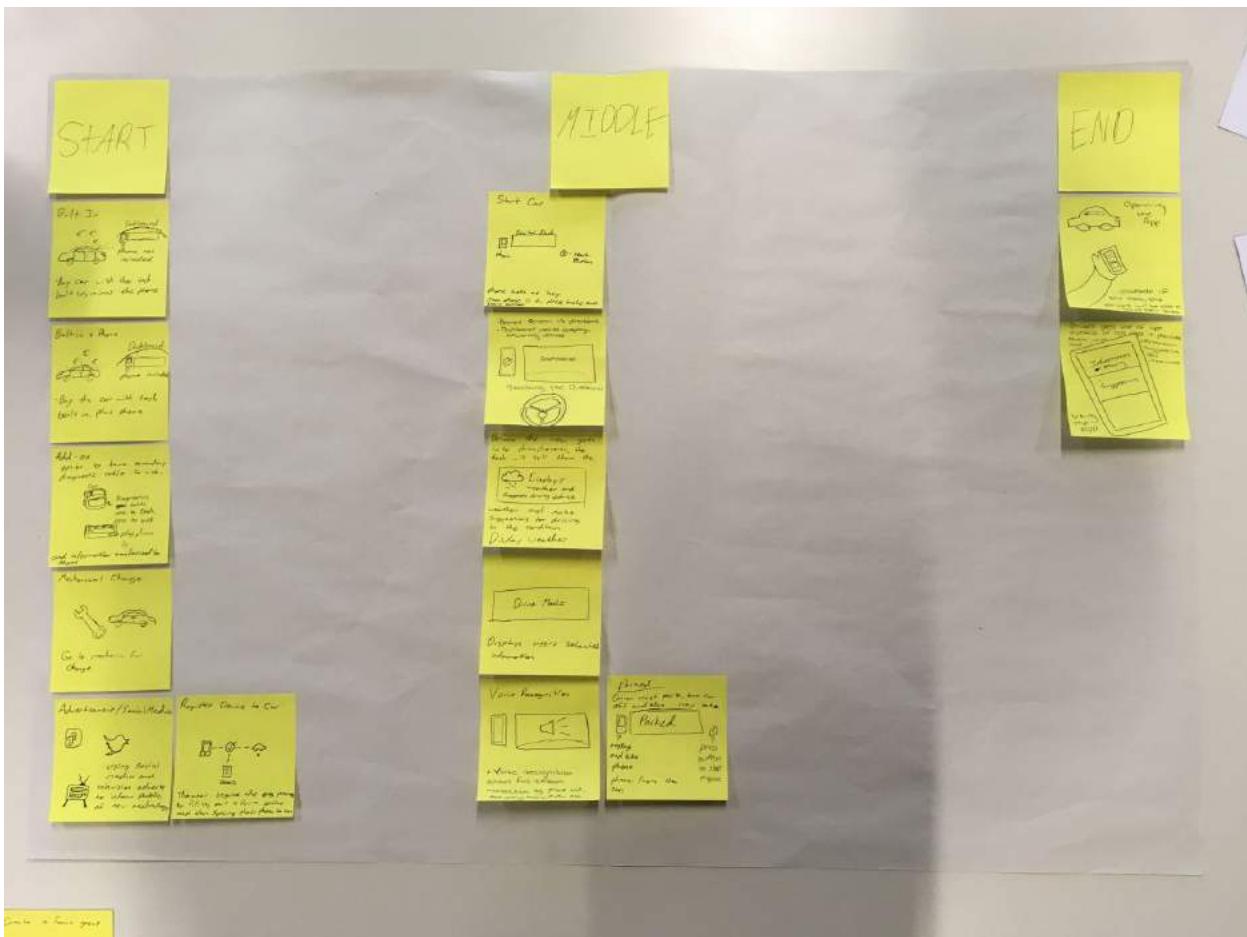
Mobile phone would be used as the car's key and the dashboard. Phone would display various driving components such as speed, petrol, etc. Notifications would be silent, but allow for texts and phone calls to come through. These would be answered through bluetooth. The phone would also accept voice commands such as turning on the radio, calling or texting people, etc.

Once the driver has come to a complete stop and turned off their car, the app would then analyze their driving performance and make suggestions based on performance to improve upon their driving skills and safe driving.

How will this idea have impact on the challenge you're addressing?

It will allow users to remain focused on the road, while they are driving as their mobile phone will be incorporated into their driving, thus reducing distractions. Before and after the user's drive, the phone will give suggestions on safe driving or on the user's driving techniques and how they can be improved upon.

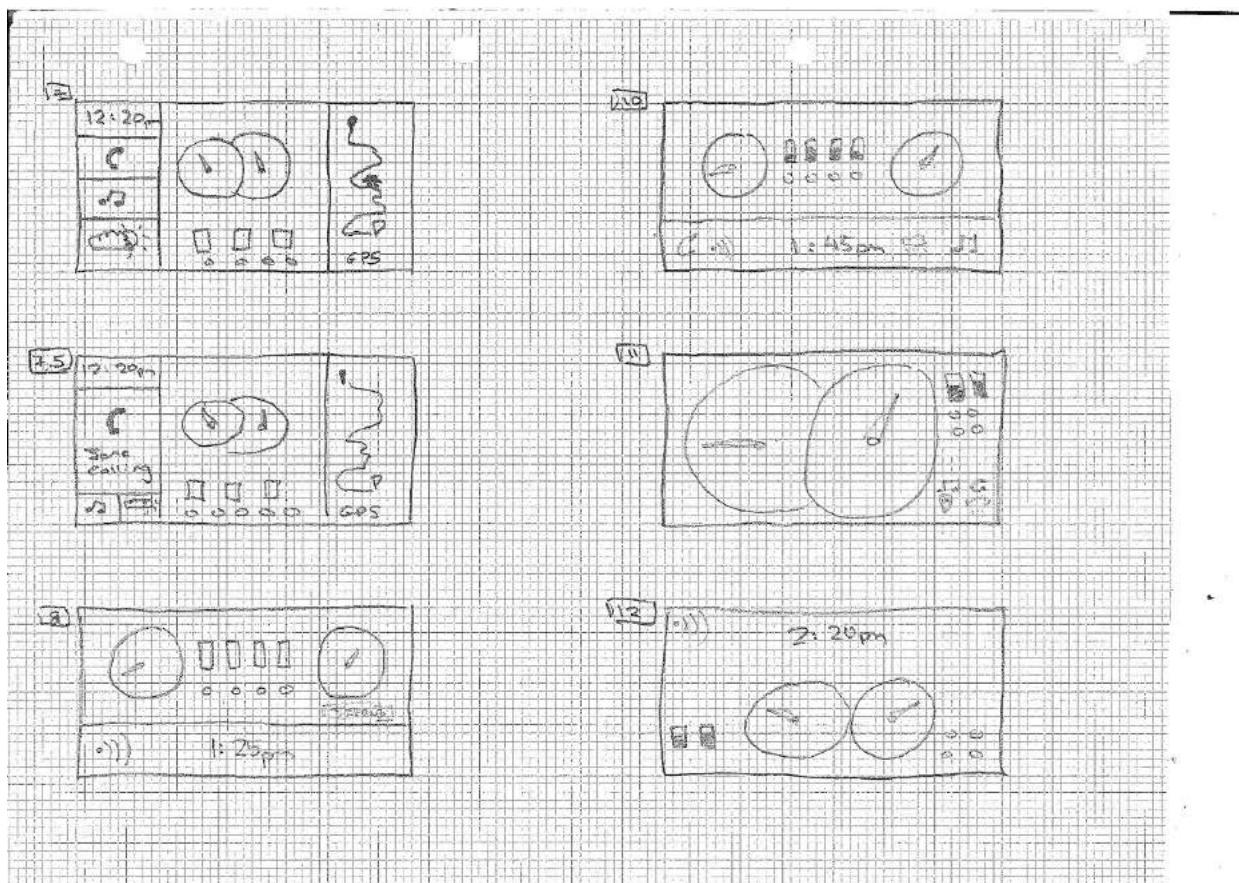
Appendix 12.12.5



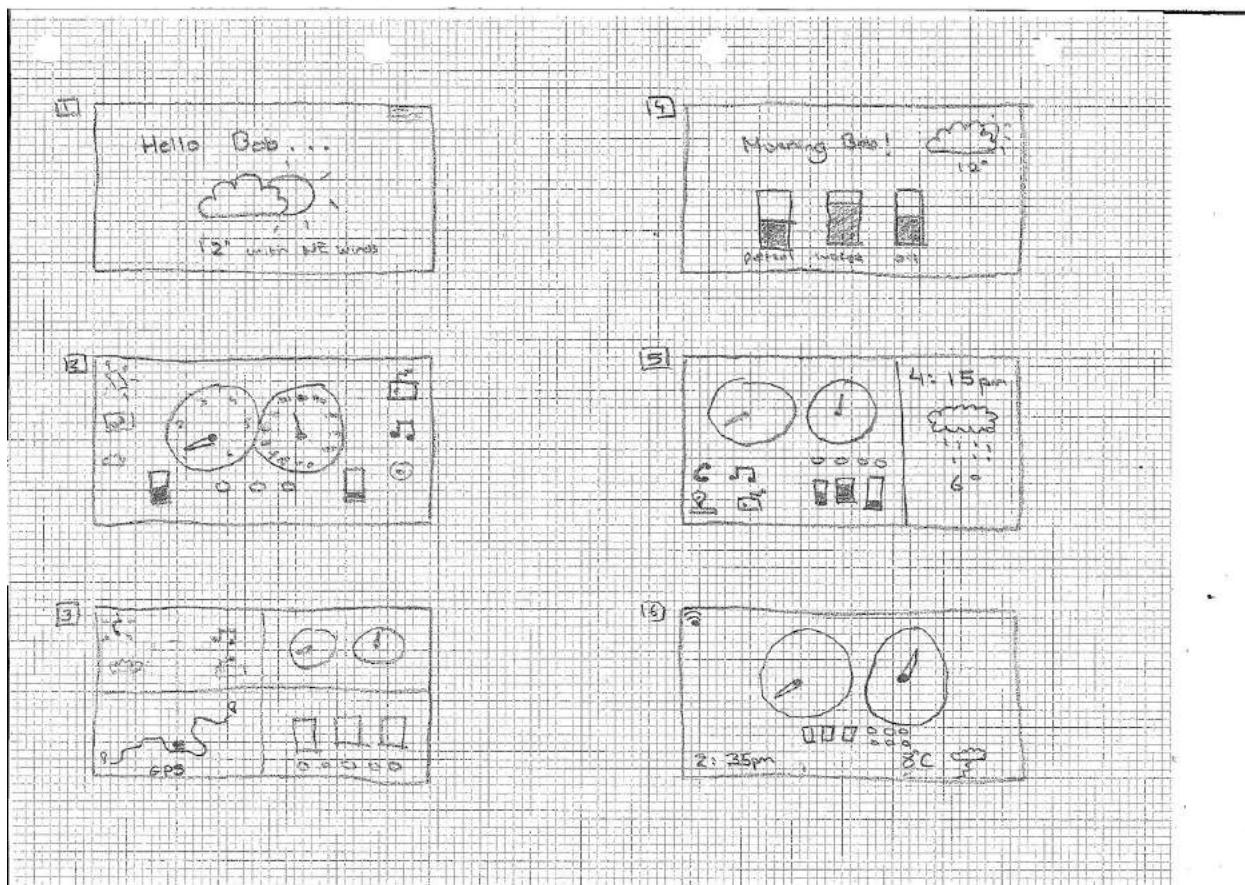
(Storyboard of final idea and how the user would first get the product, use the product and the end result)

12.13 Wireframes

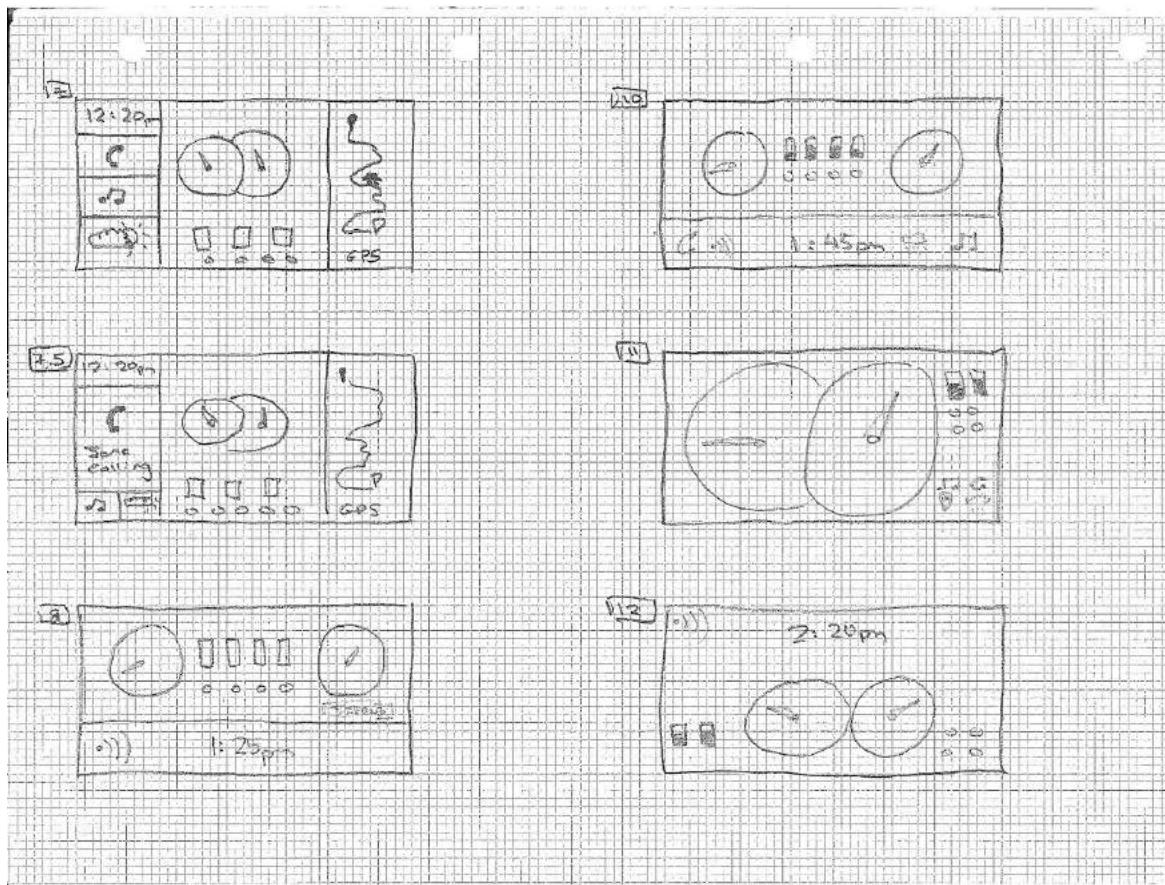
Appendix 12.13.1



Appendix 12.13.2

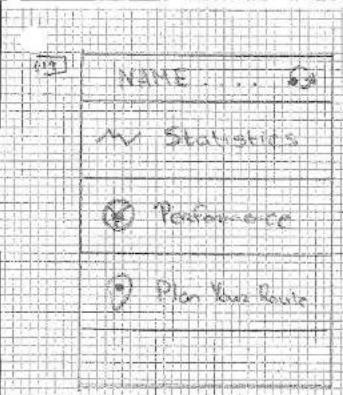
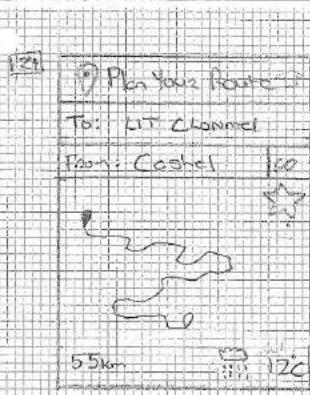
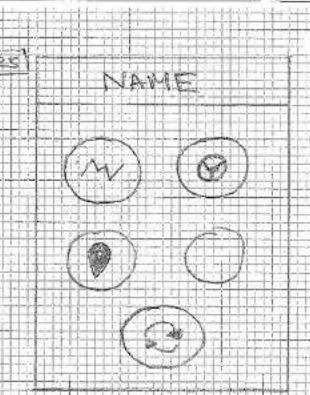
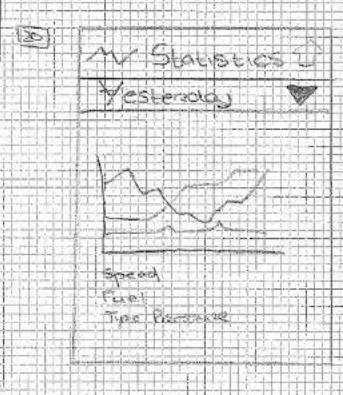
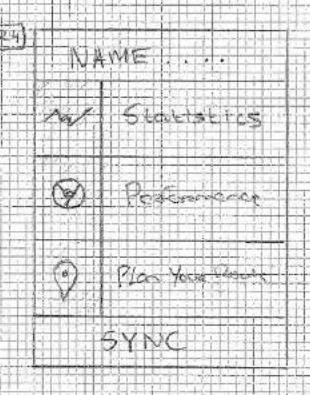


Appendix 12.13.3

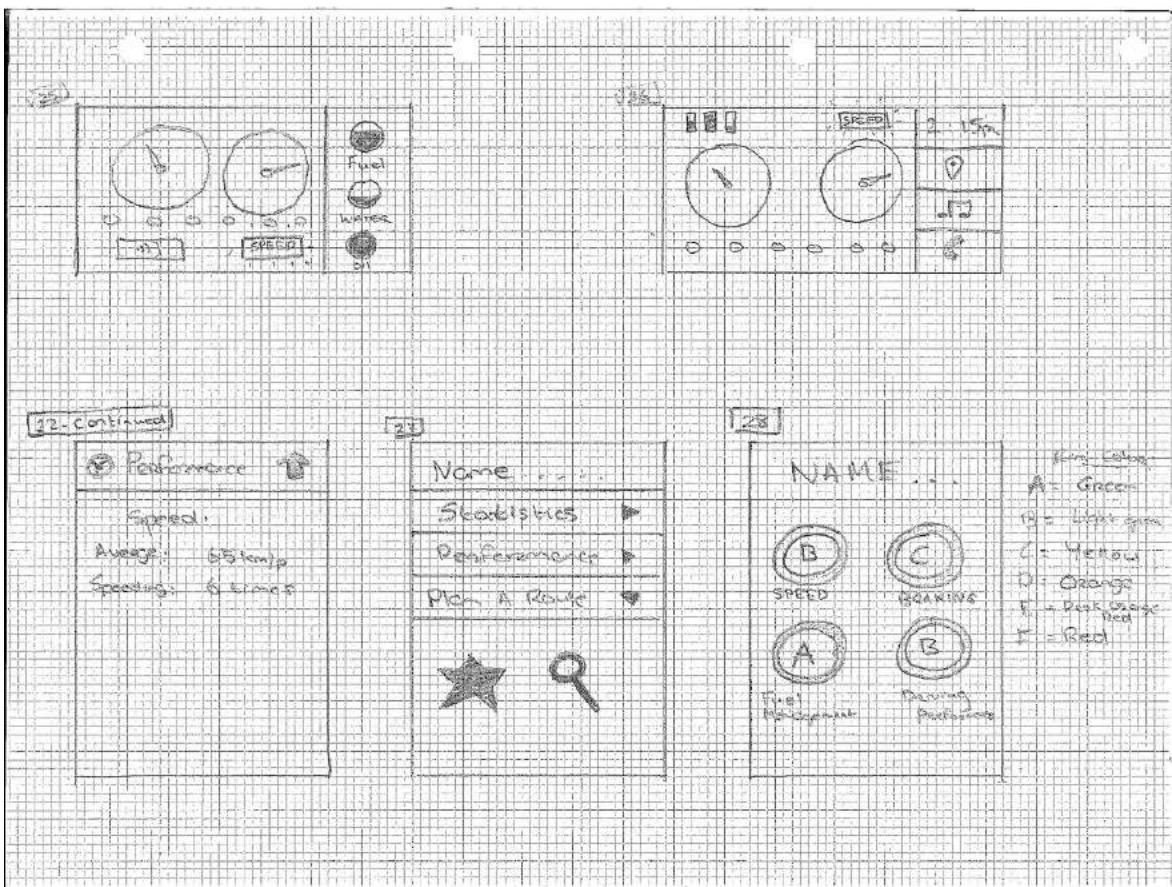


(Wireframes of what the dashboard might look like)

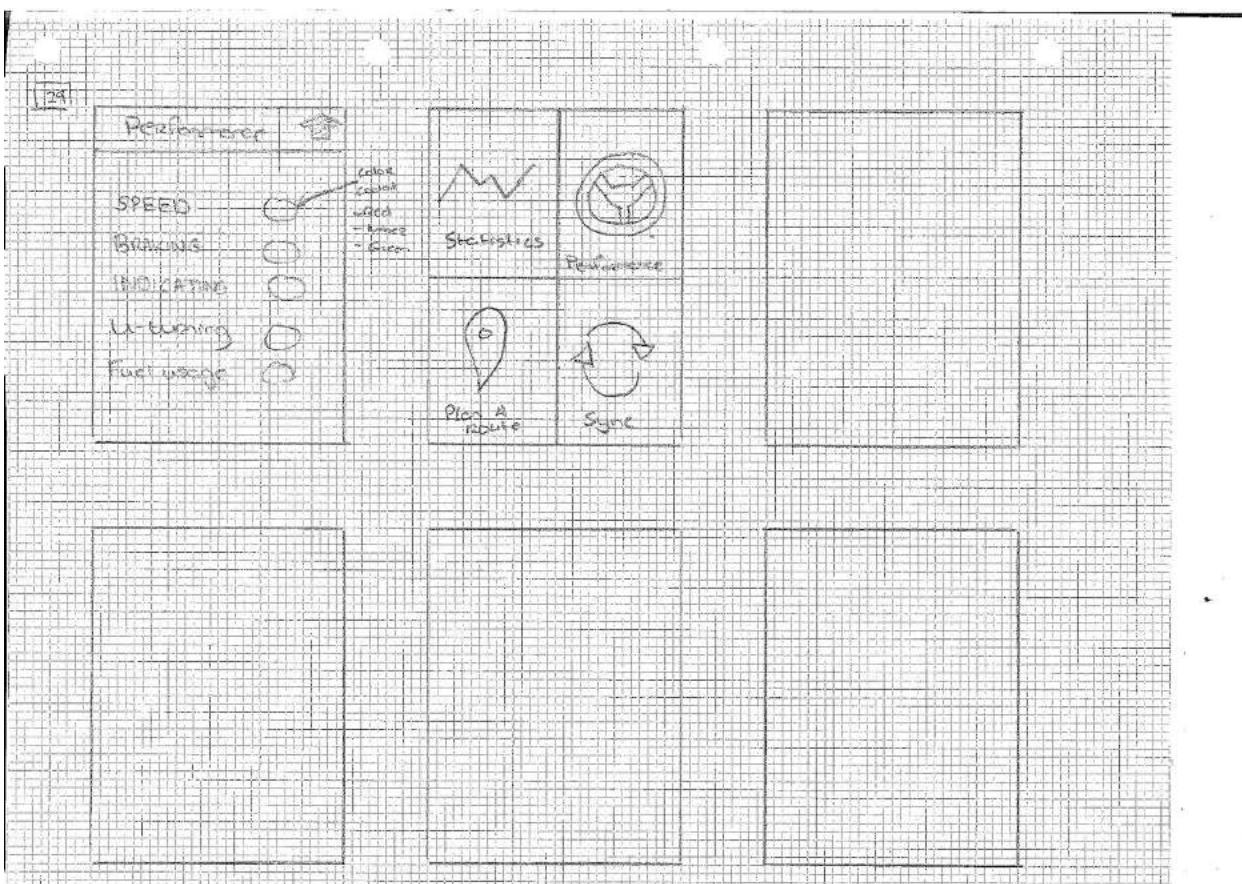
Appendix 12.13.4

(1)  <p>NAME . . . 63</p> <p>AV Statistics</p> <p>Performance</p> <p>Plan Your Route</p>	(2)  <p>Plan Your Route</p> <p>To: LIT Channel</p> <p>From: Cashel 100</p> <p>55km 120</p>	(3)  <p>NAME</p> <p>W</p> <p>7</p> <p>1</p> <p>2</p> <p>3</p>
(4)  <p>AV Statistics</p> <p>Yesterday ▼</p> <p>Speed</p> <p>Fuel</p> <p>Tire Pressure</p>	(5)  <p>Performance</p> <p>Fuel 50%</p> <p>Distance: 15km</p> <p>Tire Pressure</p> <p>Techniques</p> <p>Braking: ● ● ● ● ●</p> <p>Turning: ● ● ● ○ ○</p>	(6)  <p>NAME . . .</p> <p>AV Statistics</p> <p>Performance</p> <p>Plan Your Route</p> <p>SYNC</p>

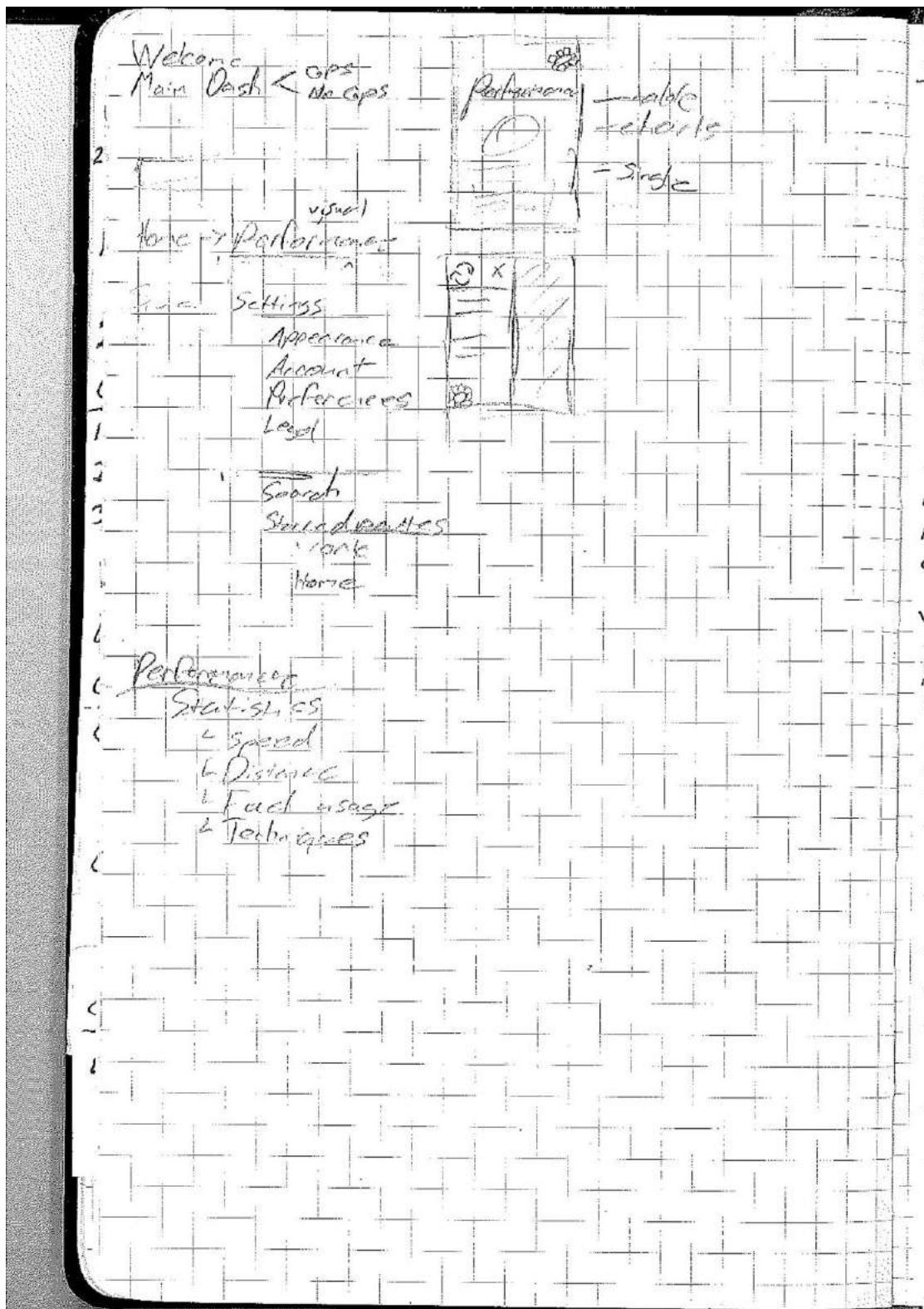
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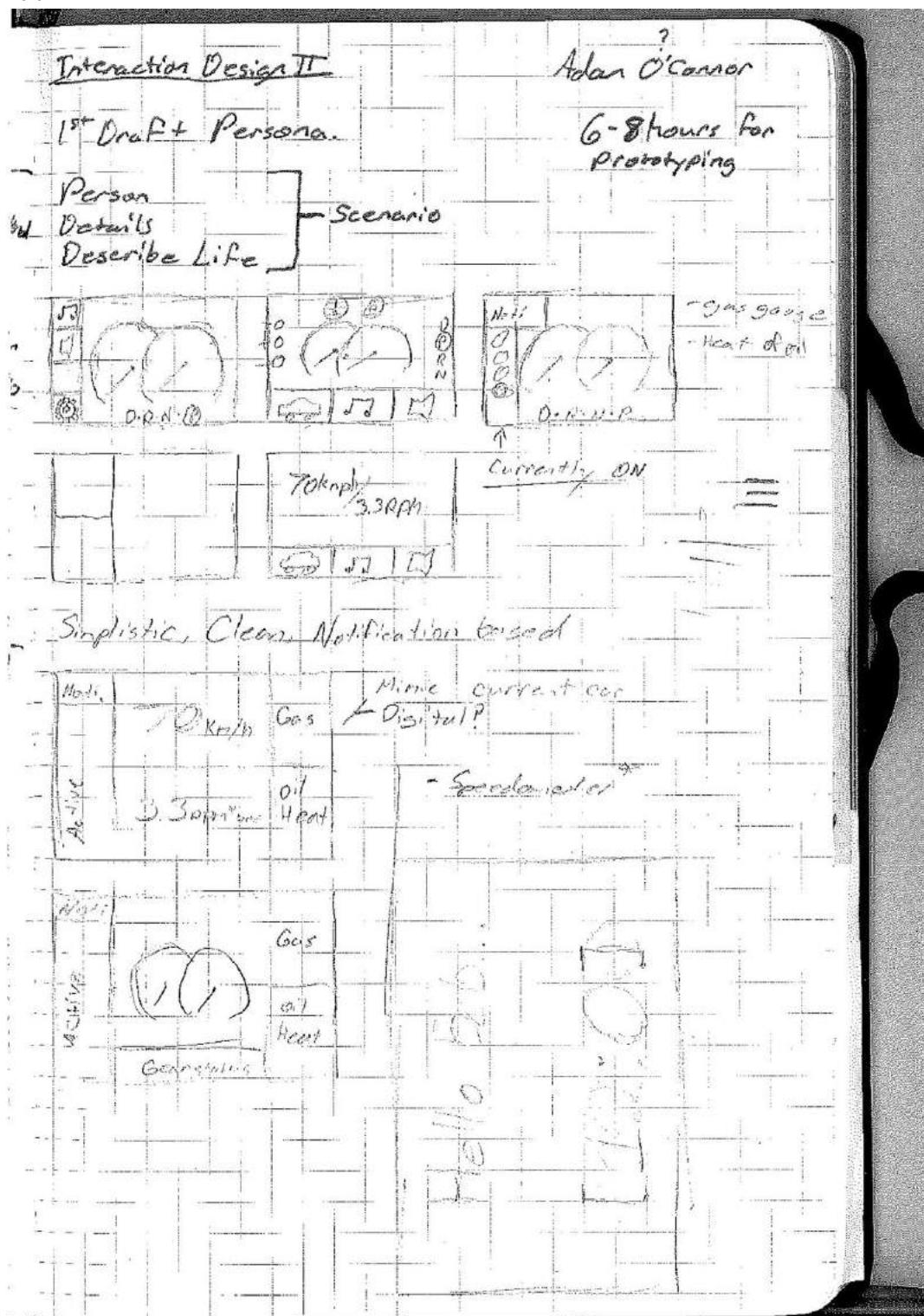
Appendix 12.13.6



Appendix 12.13.7

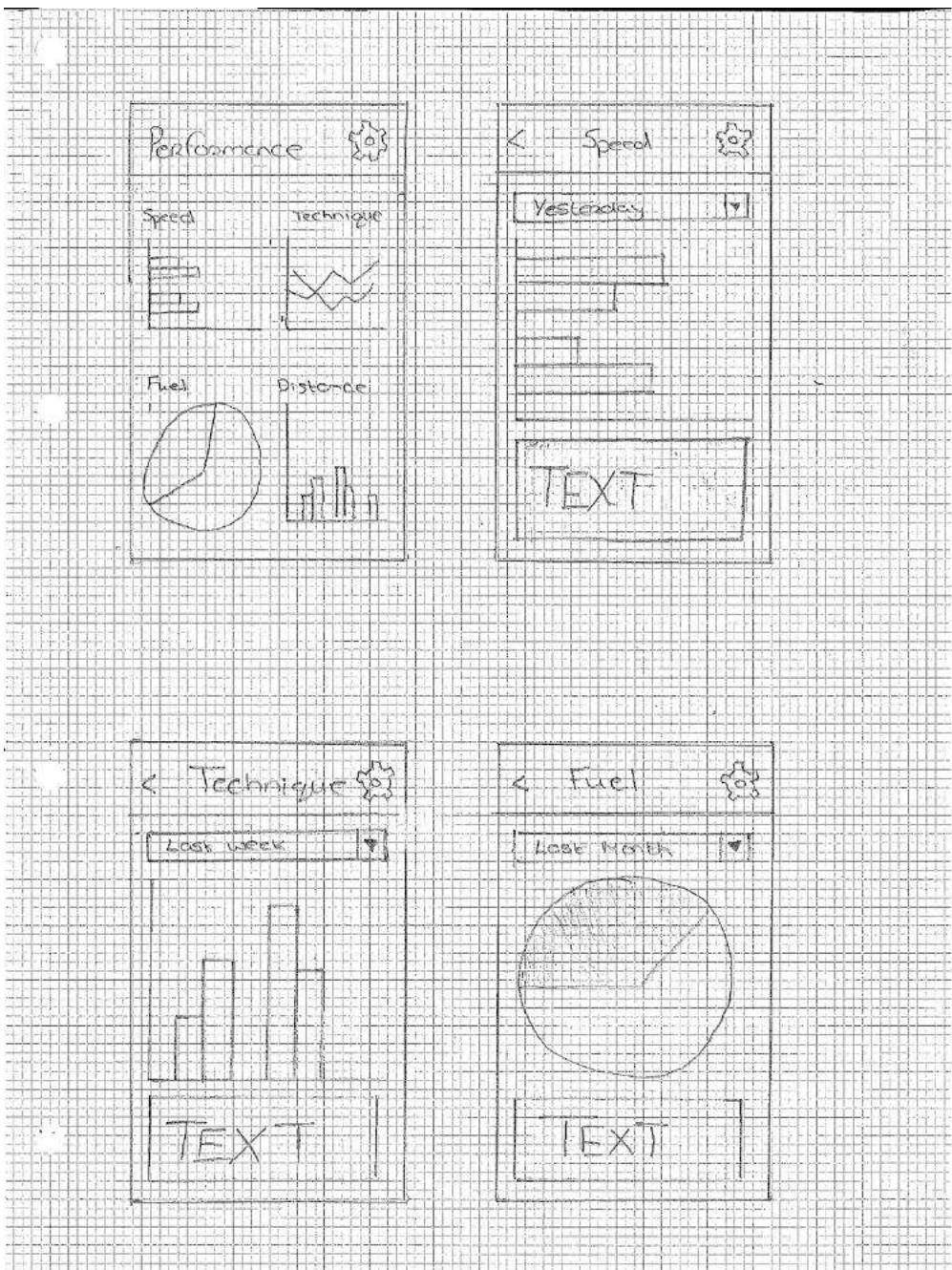


Appendix 12.13.8



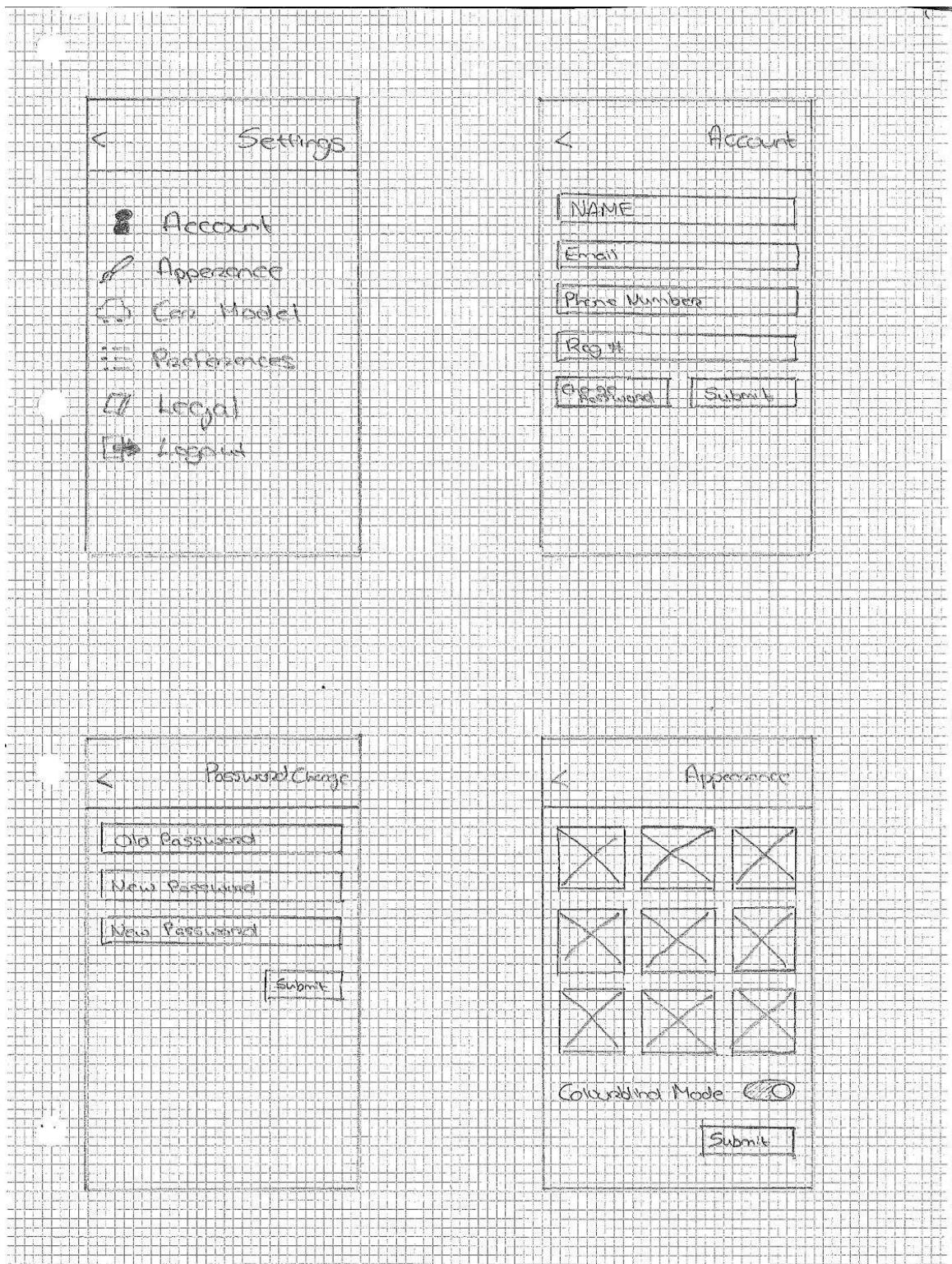
(Wireframes of what the application might look like)

Appendix 12.13.9



(Final Wireframes)

Appendix 12.13.10



(Final Wireframes)

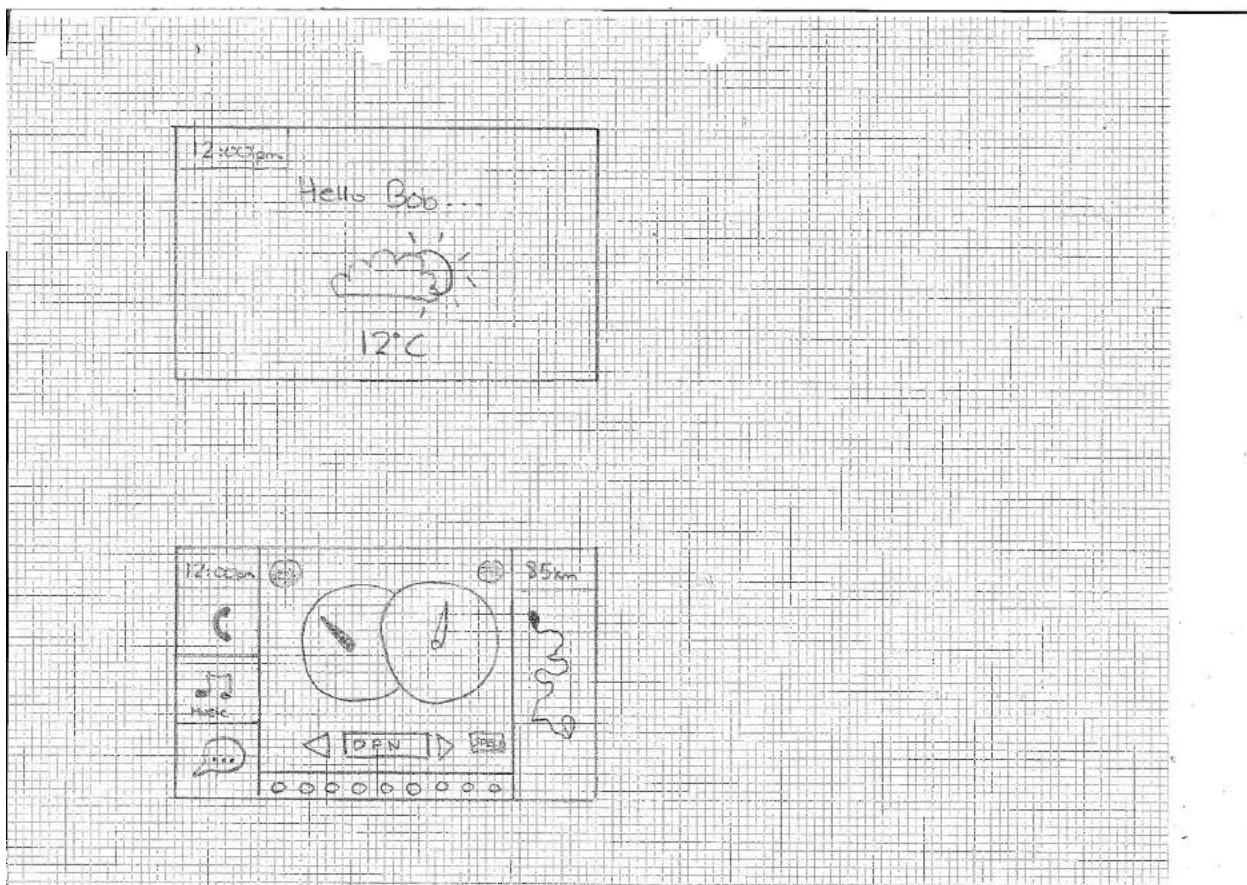
Appendix 12.13.11

The image displays four wireframe screens arranged in a 2x2 grid, representing a mobile application's settings section. Each screen is enclosed in a rectangular frame with a back arrow at the top left.

- Settings Screen:** This screen lists several menu items: Account, Appearance, Car Model, Preferences, Legal, and Logout. "Account" is highlighted with a bold font.
- Account Screen:** This screen contains input fields for NAME, Email, Phone Number, and Reg #. It also features a "Forgot Password" link and a "Submit" button.
- Password Change Screen:** This screen includes fields for Old Password, New Password, and Confirm New Password, along with a "Submit" button.
- Appearance Screen:** This screen shows a 4x3 grid of nine square icons, each containing a stylized geometric shape. Below the grid is the text "Coloured Grid Mode" with a circular switch icon, and a "Submit" button.

(Final Wireframes)

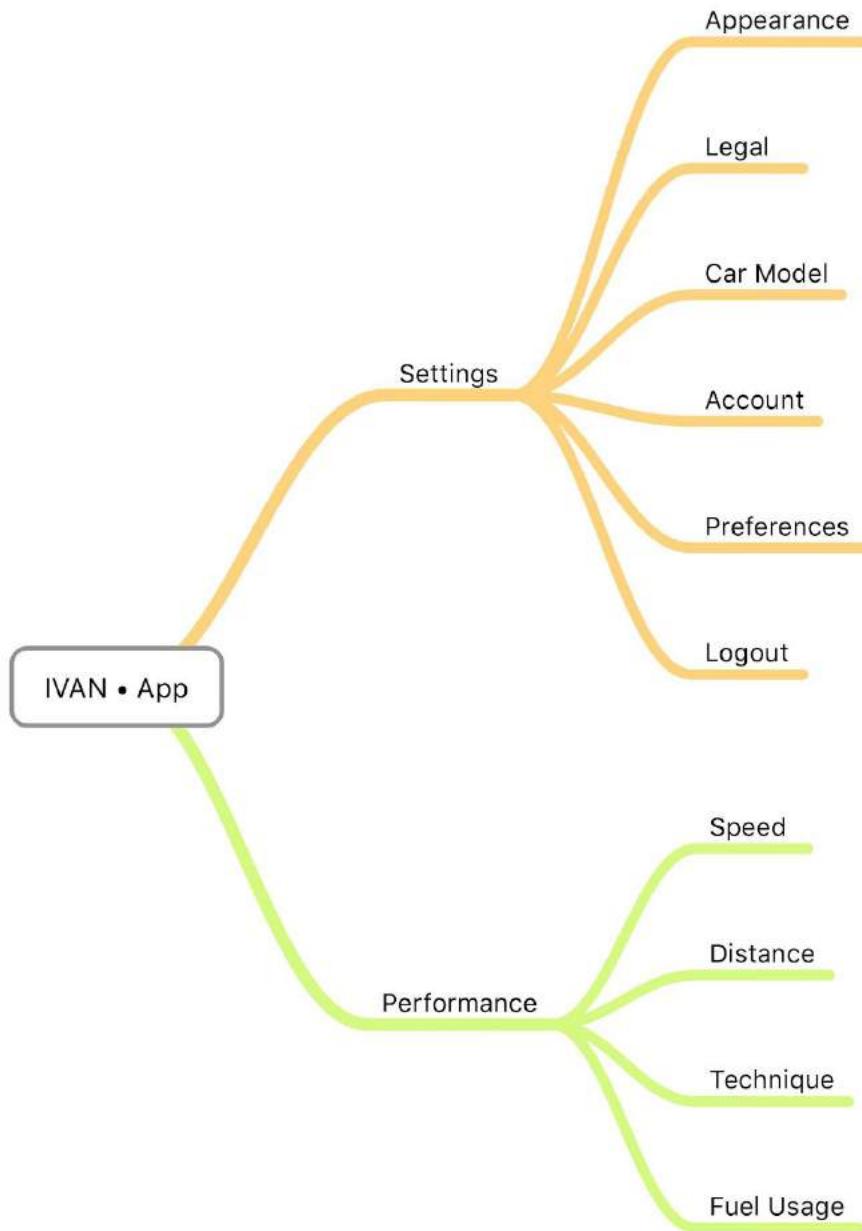
Appendix 12.13.10



(Final Wireframes)

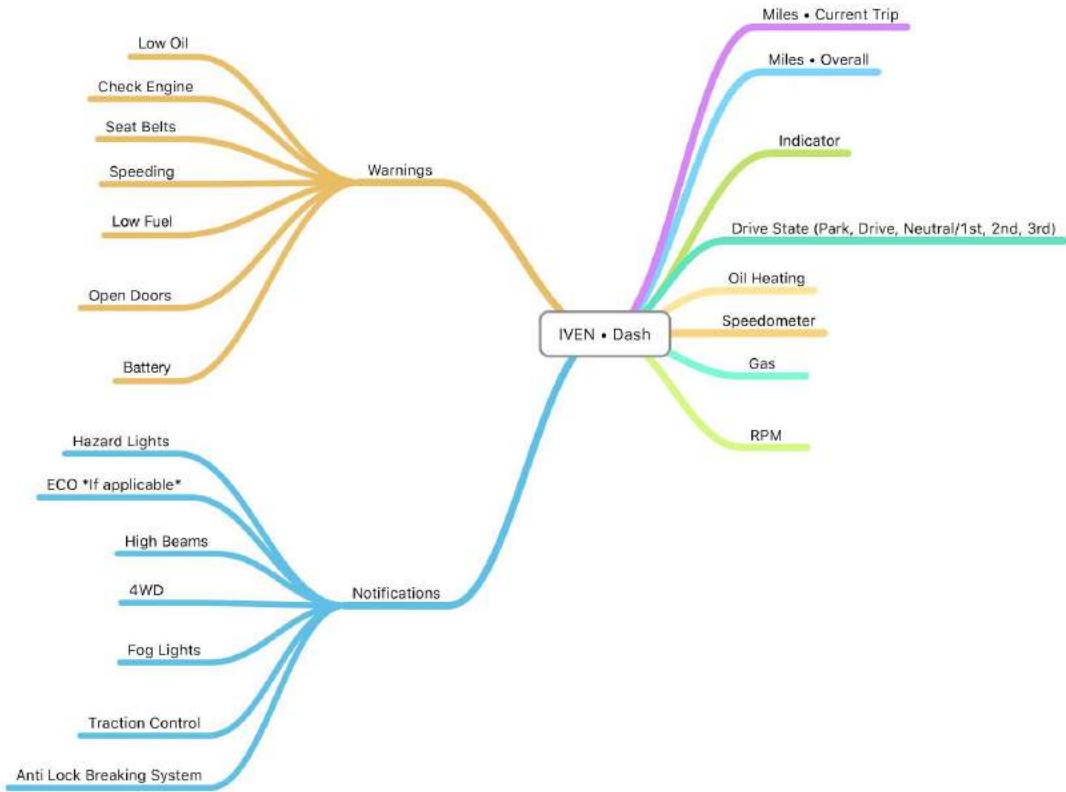
12.14 Prototype Mindmaps

Appendix 12.14.1



(Mind Map of IVEN Application)

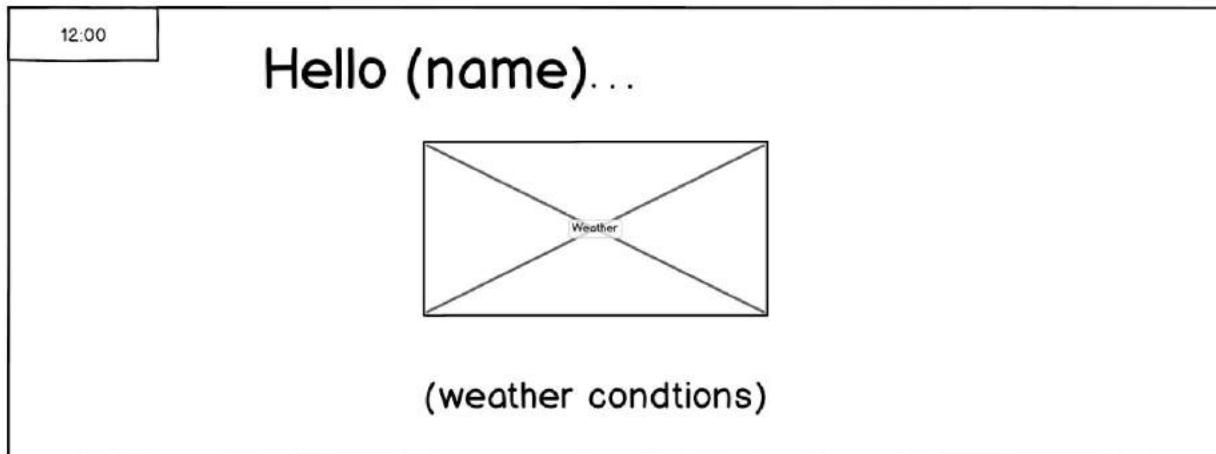
Appendix 12.9.2



(Mind Map of IVEN Dashboard and what would be required)

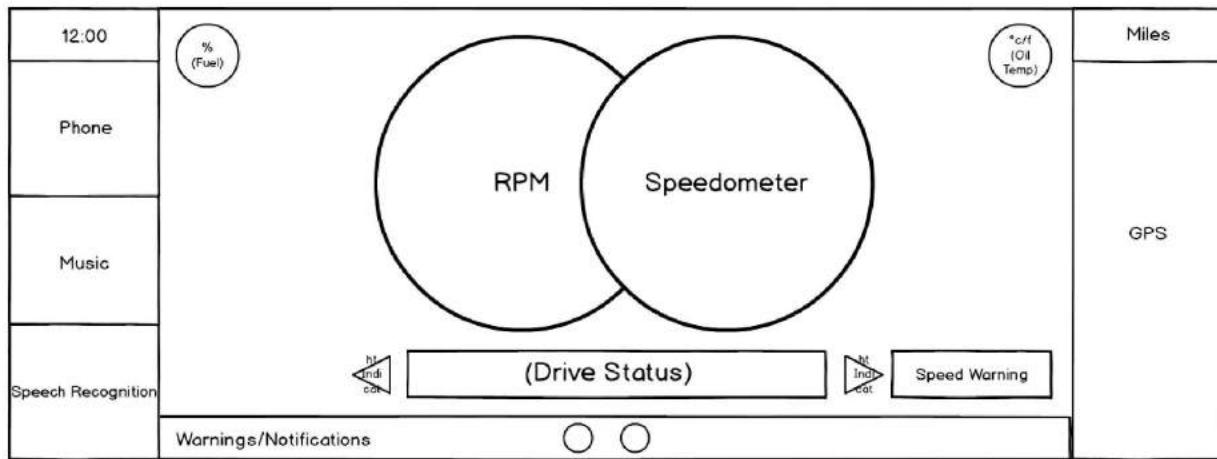
12.15 Prototypes

Appendix 12.15.1



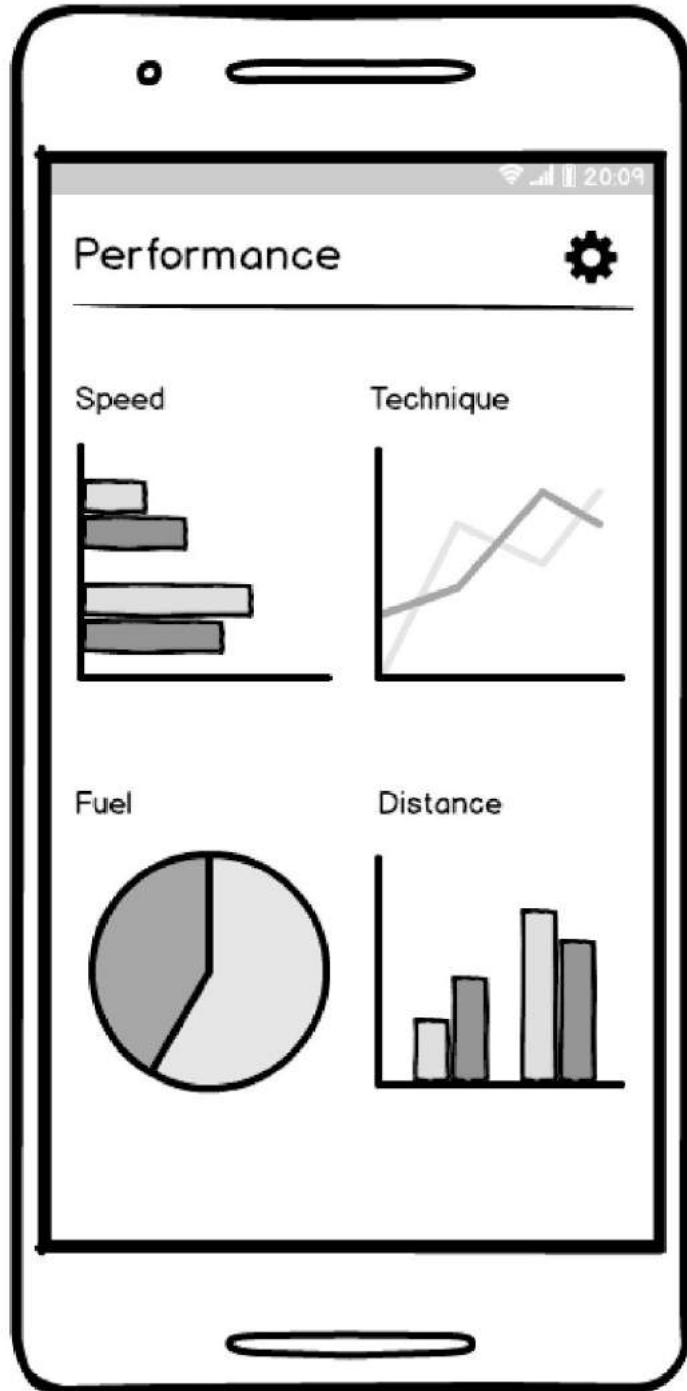
(Prototype of Dashboard)

Appendix 12.15.2



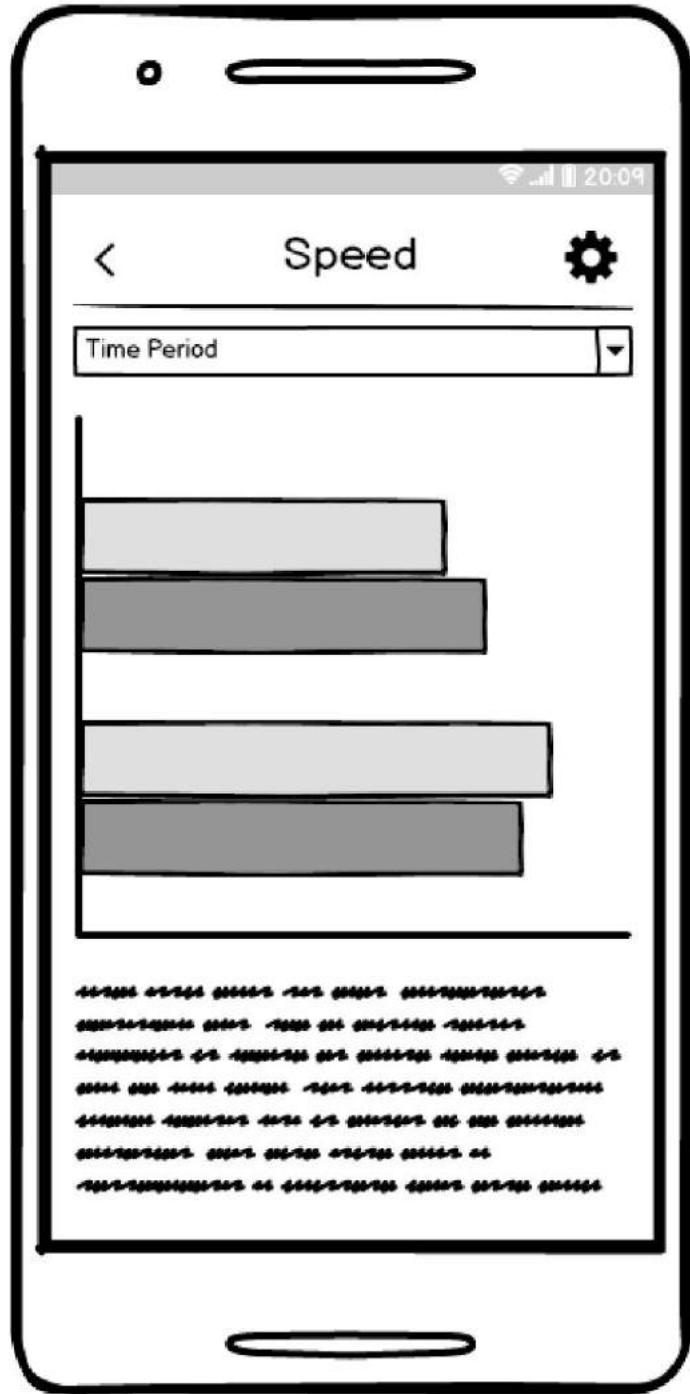
(Prototype of Dashboard)

Appendix 12.15.3



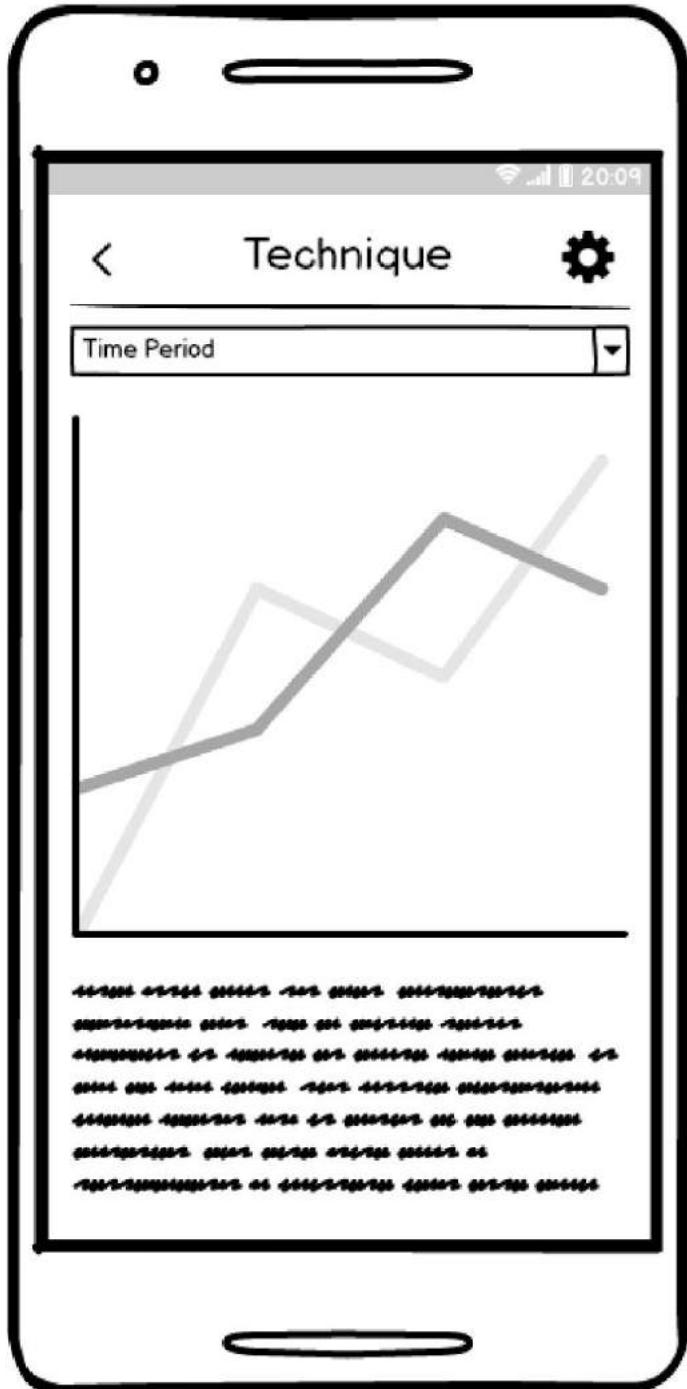
(Prototype of App)

Appendix 12.15.4



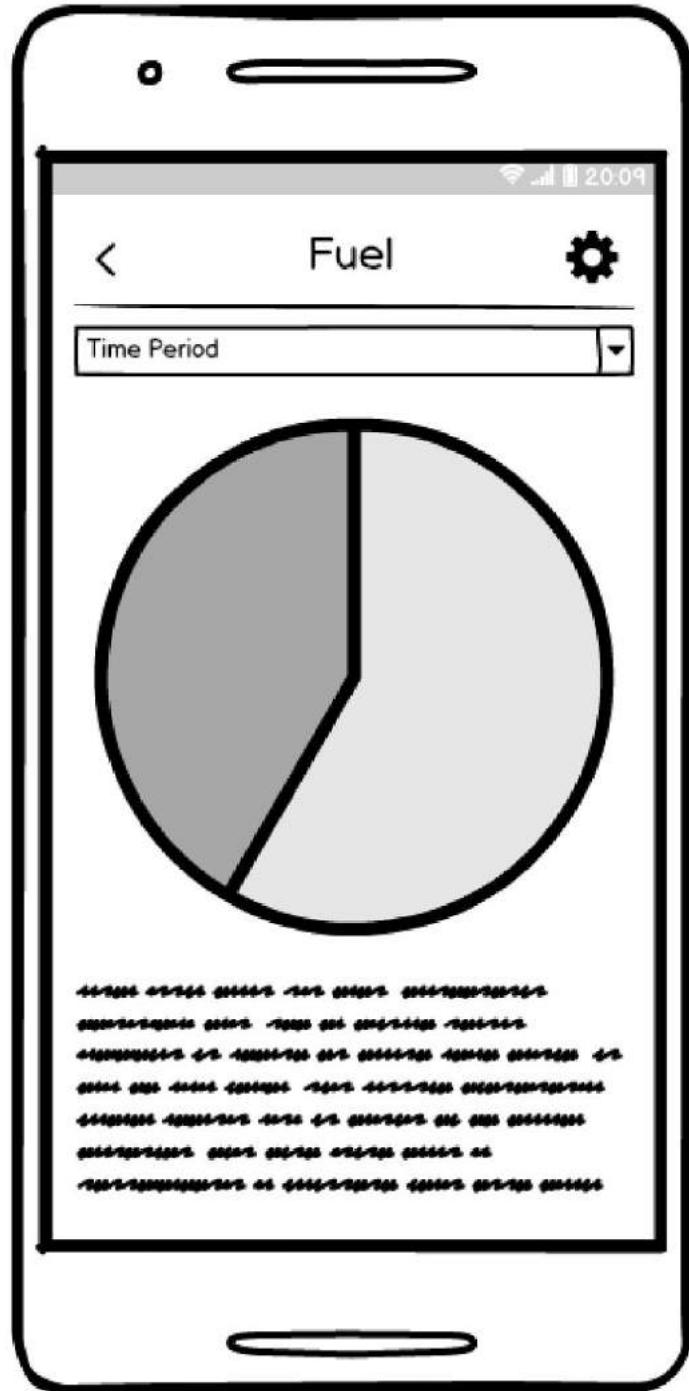
(Prototype of App)

Appendix 12.15.5



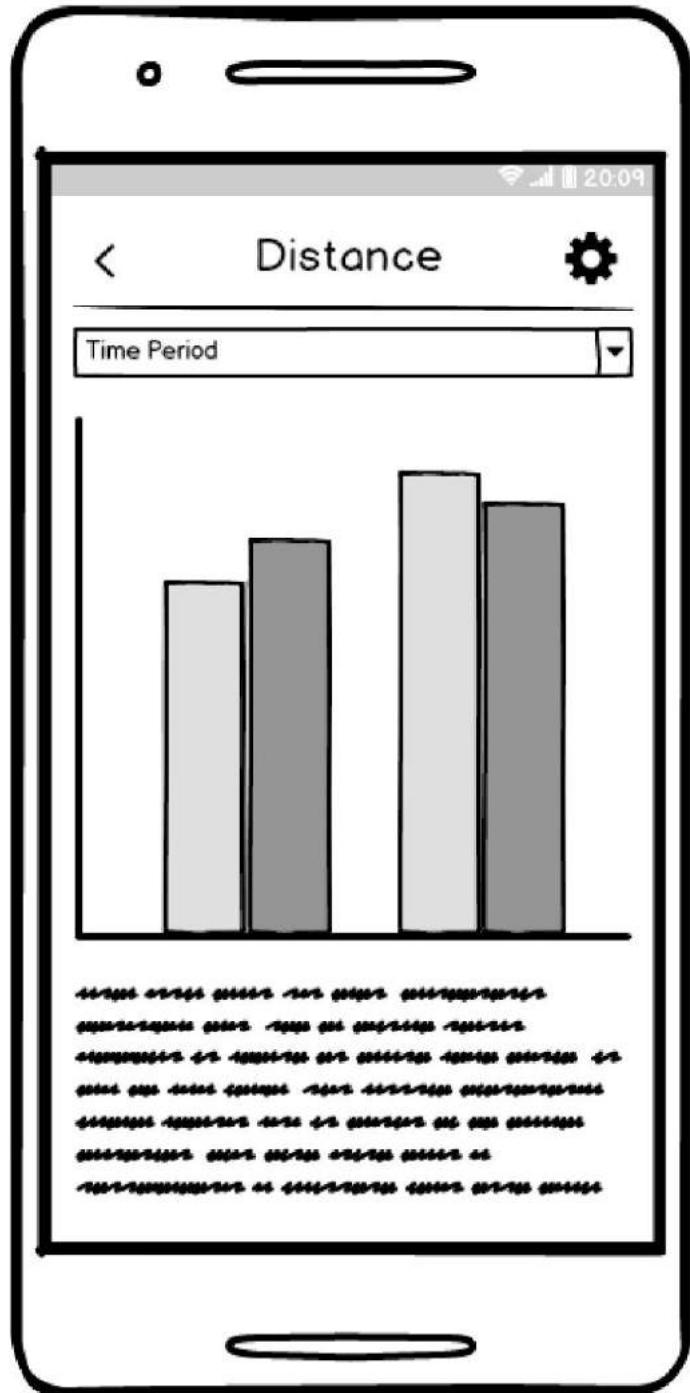
(Prototype of App)

Appendix 12.15.6



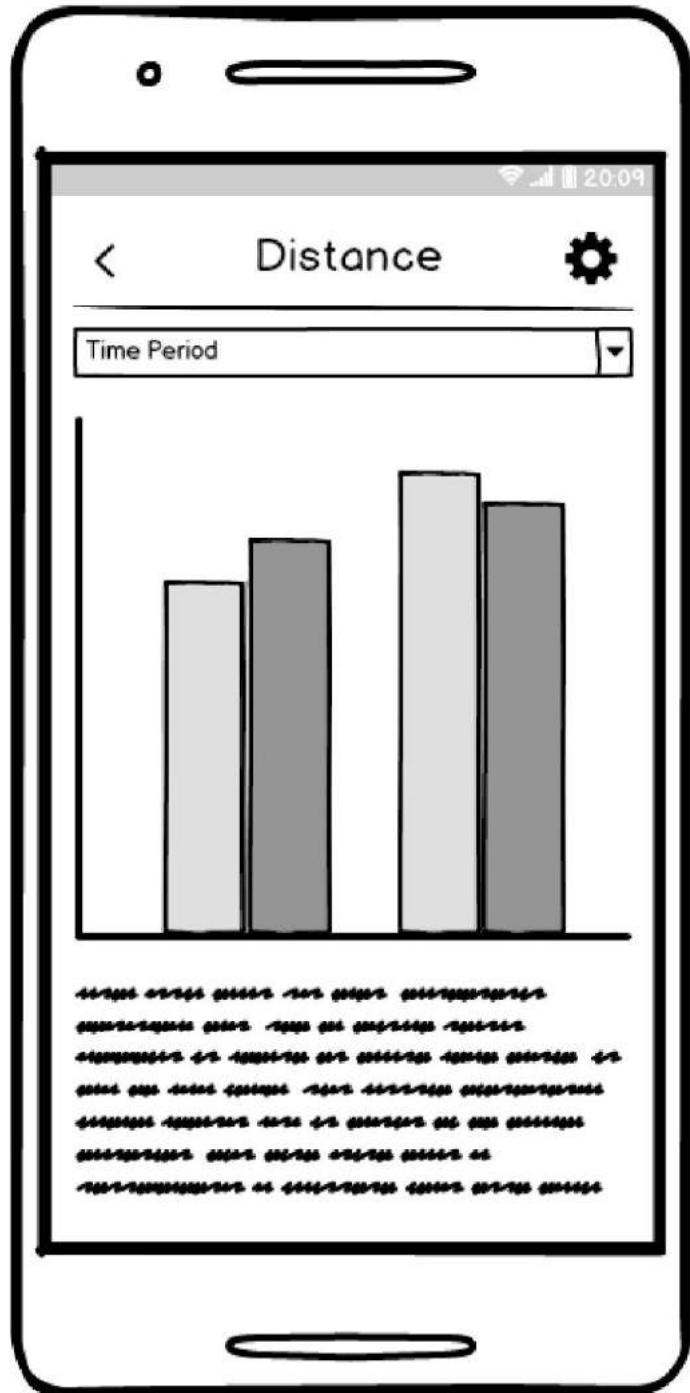
(Prototype of App)

Appendix 12.15.7



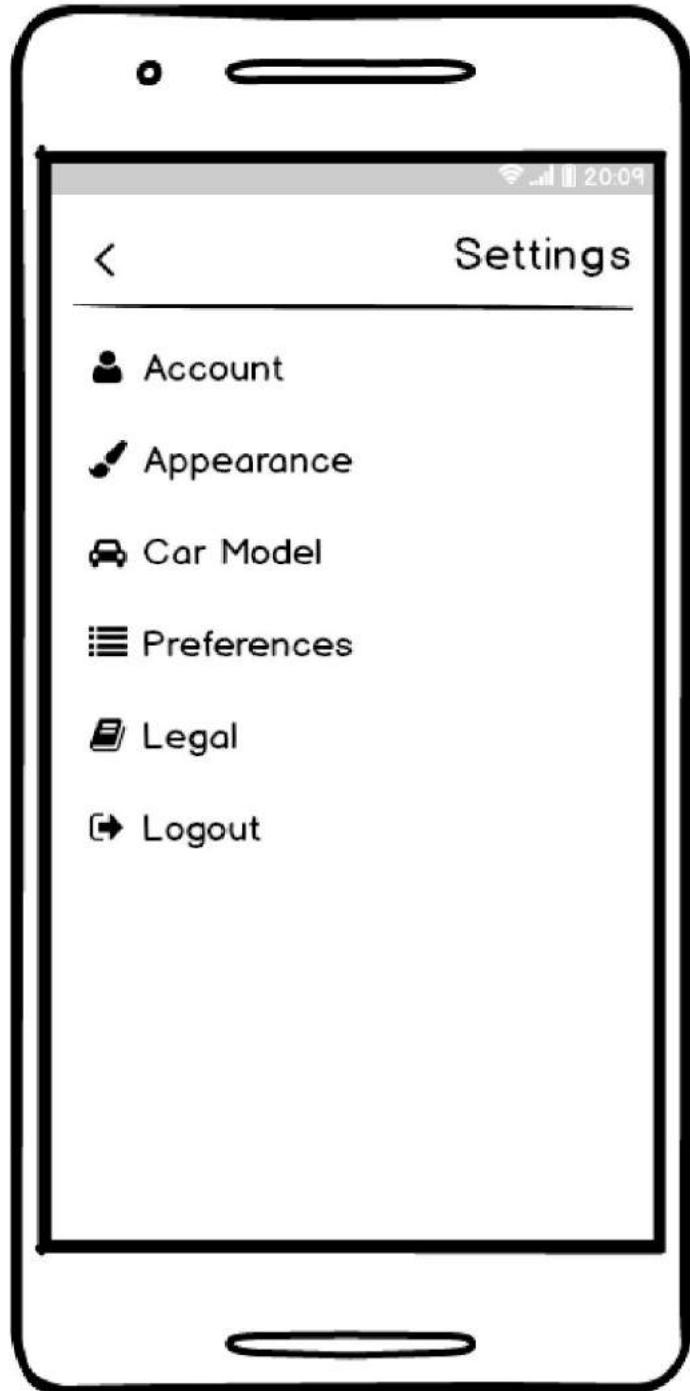
(Prototype of App)

Appendix 12.15.8



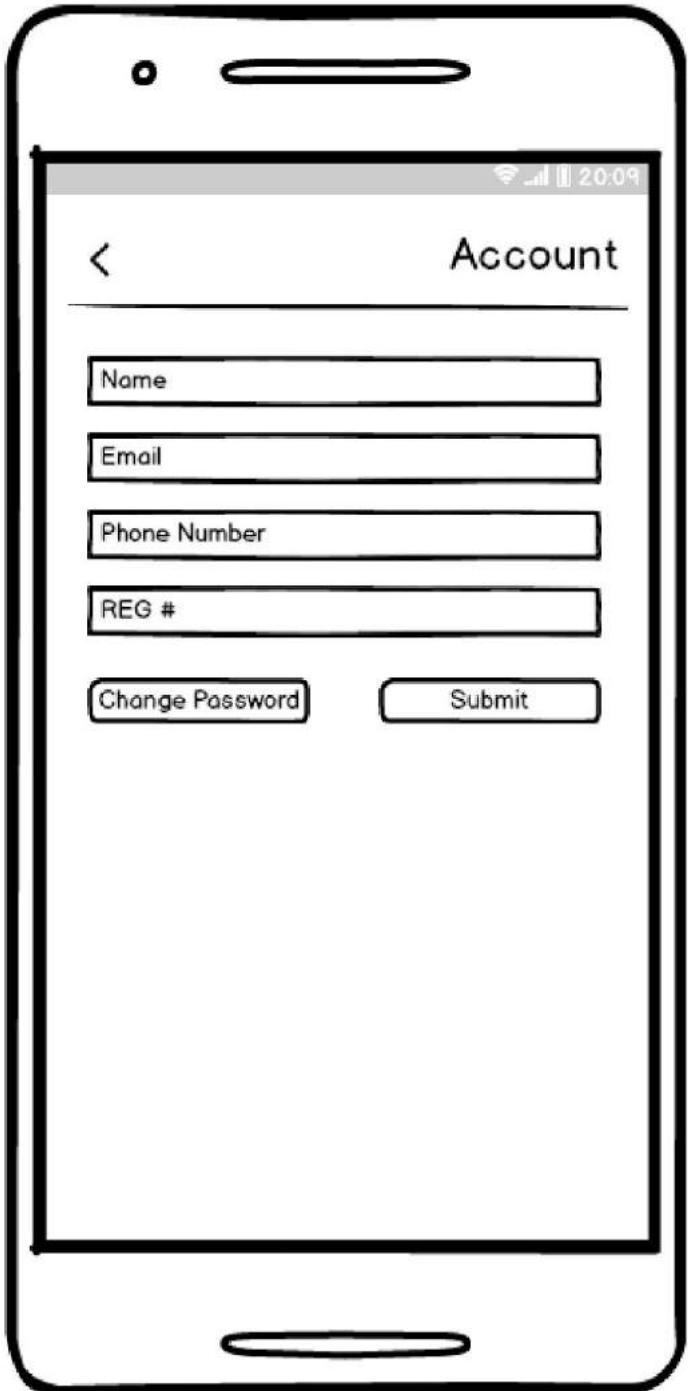
(Prototype of App)

Appendix 12.15.9



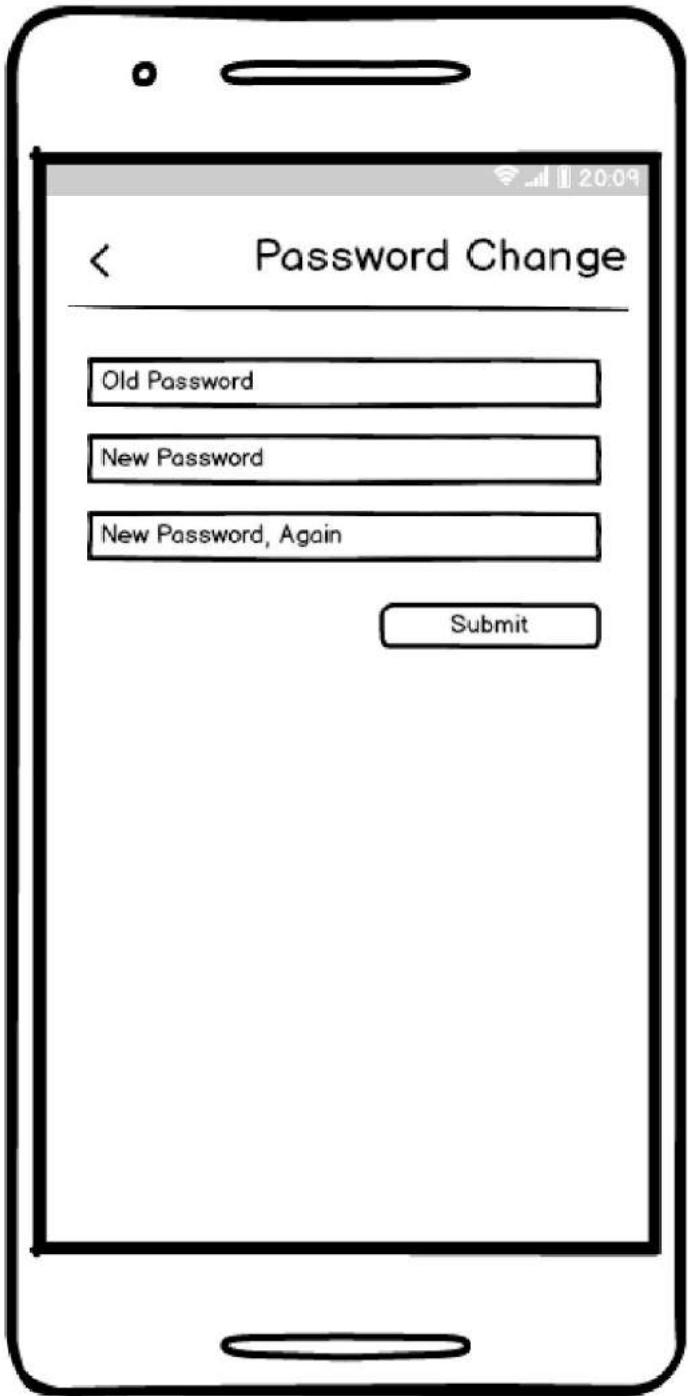
(Prototype of App)

Appendix 12.15.10



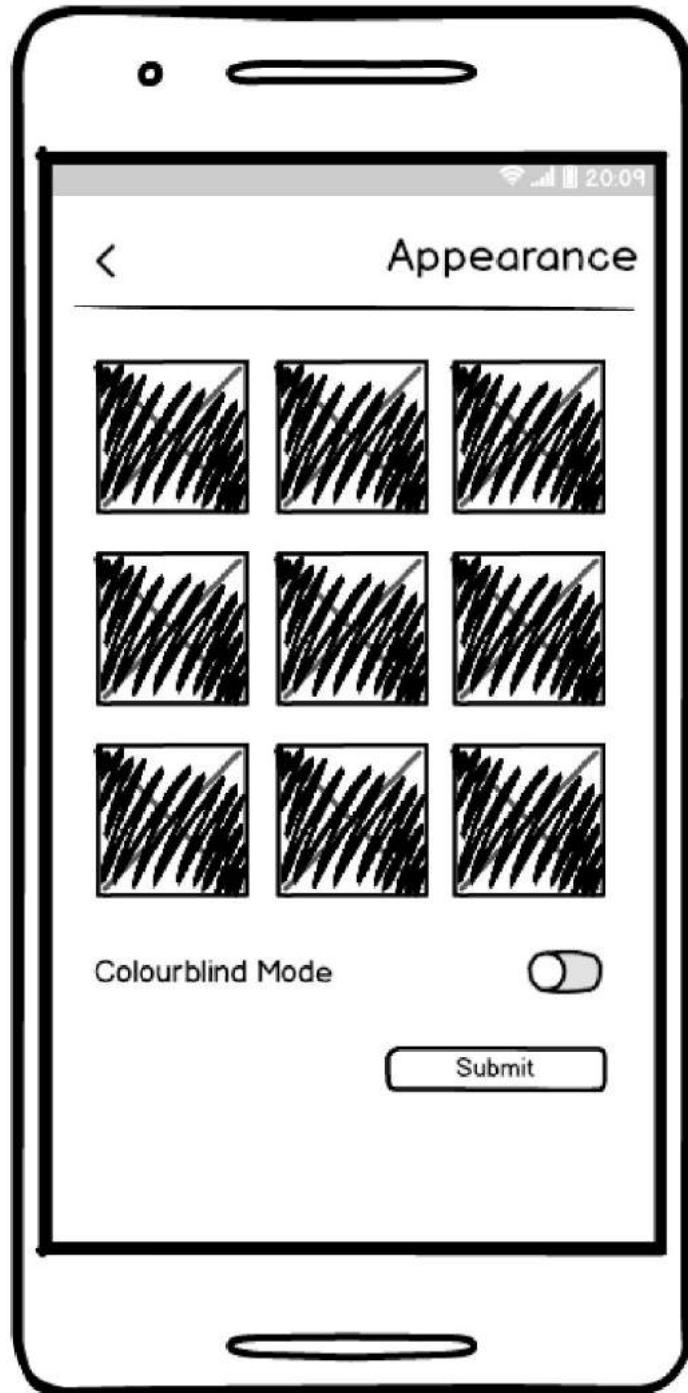
(Prototype of App)

Appendix 12.15.11



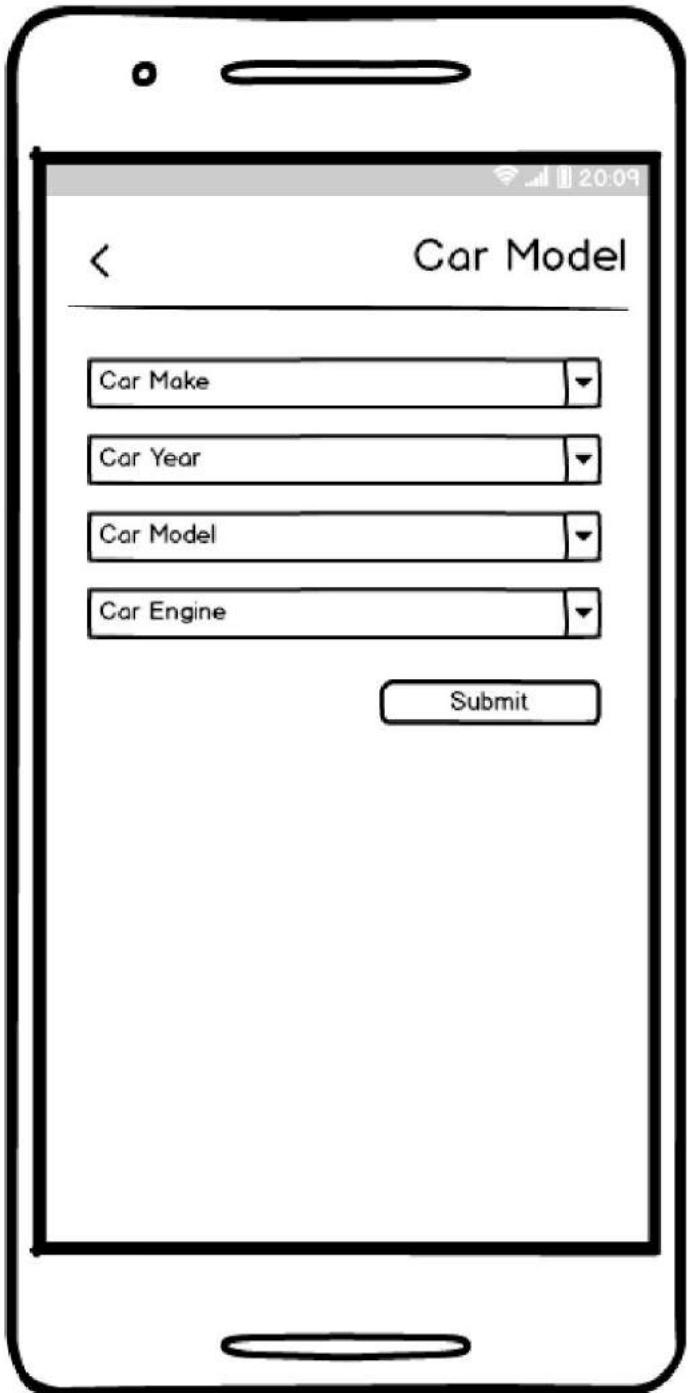
(Prototype of App)

Appendix 12.15.12



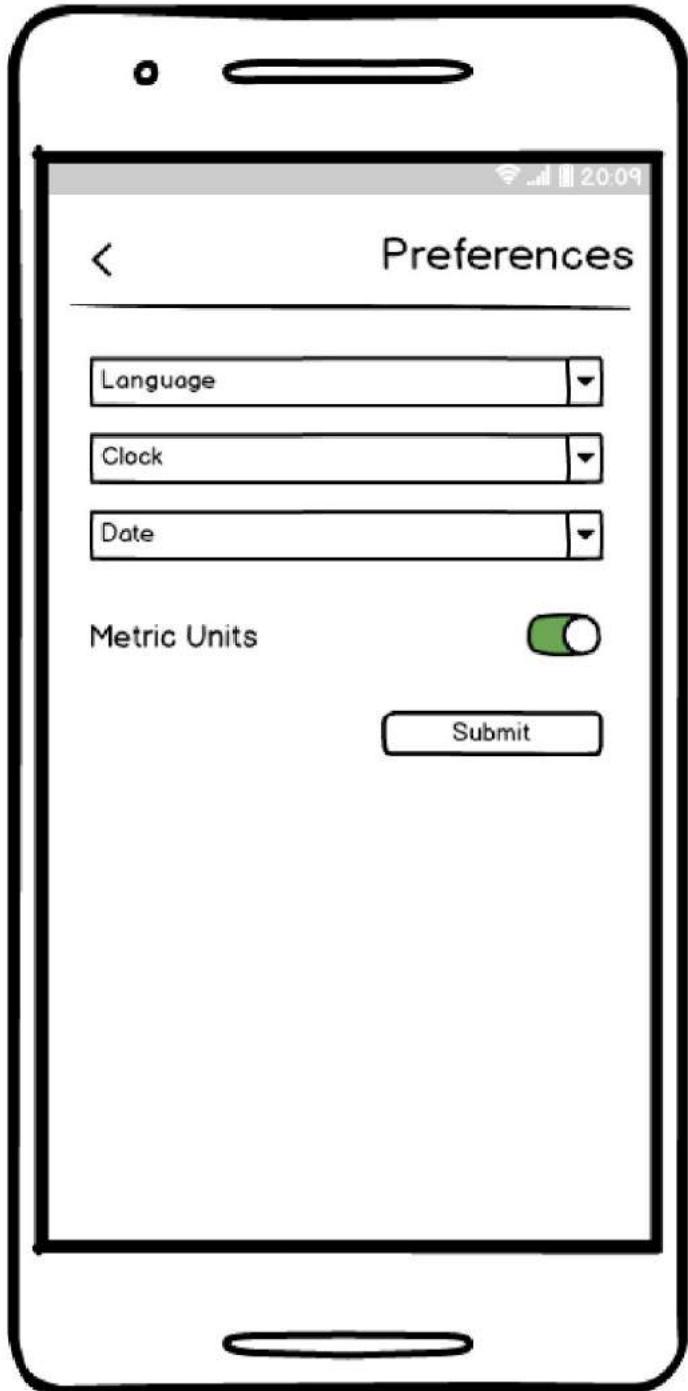
(Prototype of App)

Appendix 12.15.13



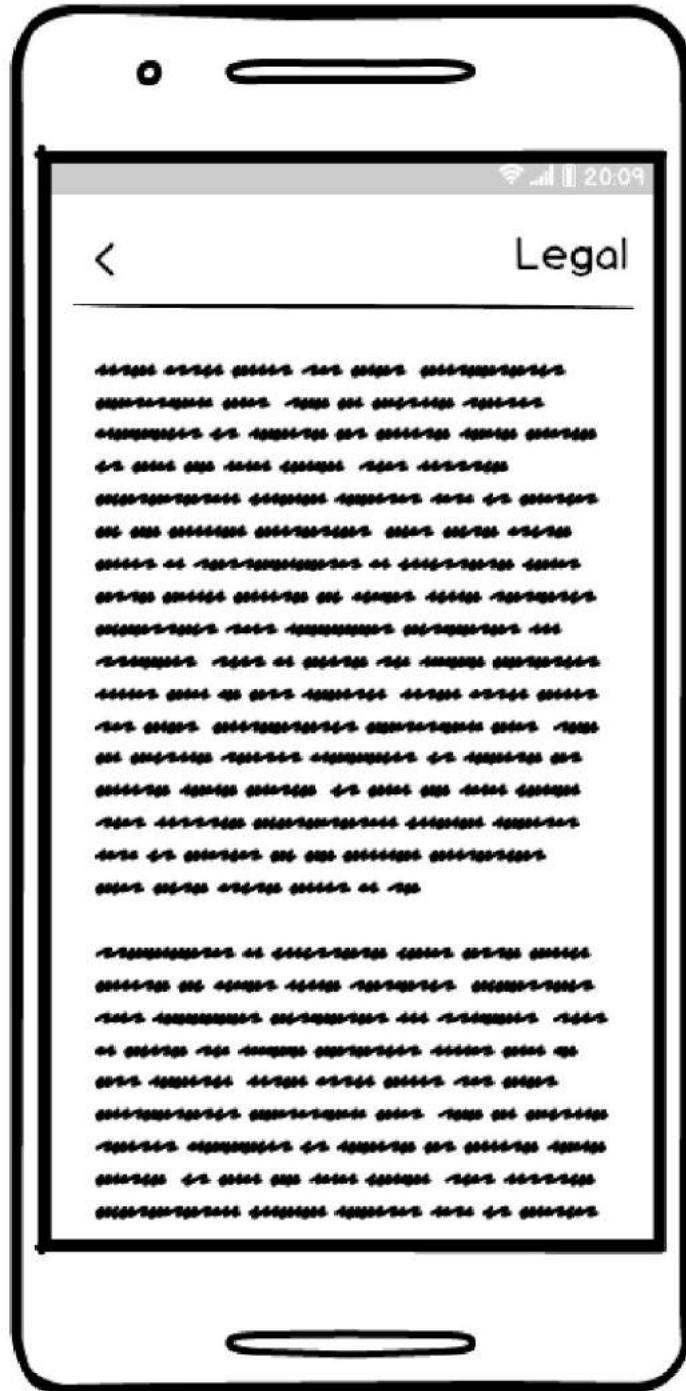
(Prototype of App)

Appendix 12.15.14



(Prototype of App)

Appendix 12.15.15



(Prototype of App)