Computer says no
Error recovery with the OV-chipcard

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ABSTRACT

With the introduction of the OV-chipcard for public transportation in the Netherlands came a wave of complaints about usability issues. This paper studies the usability of error recovery from errors experienced with the OV-chipcard at the checking in/out poles and gates of the Dutch Railways. The study was conducted as an observational study with a staged scenario where the participants were given a malfunctioning OV-chipcard. Concluding we have identified that there are actually two main problems the participants needed to solve: Fixing the underlying problem with the card and to catch the next train despite the error. A very important issue was that participants had difficulties understanding the error messages, they were too ambiguous and did not guide the users in the right direction to solve their problem.

Keywords
usability, OV-chipcard, error recovery

INTRODUCTION

Since the introduction of the OV-chipcard in 2009, the card has gained an almost infamous reputation (Verkeer in Beeld, 2010). It has been designed to simplify the use of public transportation, allowing travelers to use multiple types of transportation while paying for their tickets with just one digital card. The idea is simple, yet the card has been a source of many frustrations. After a long implementation period, the whole public transportation sector in the Netherlands is now using the OV-chipcard. By 2013 the Dutch Railways (Nederlandse Spoorwegen; NS) will discontinue the traditional paper ticket, and everyone using public transportation will have to own an OV-chipcard.

The OV-chipcard makes the system efficient and agile. However, the new system has also introduced many new usability issues, for instance in situations unable to check in or out, or when cards suddenly stop working. These errors, though the responsibility of NS and Trans Link Systems (the developer of the OV-chipcard system), cause bad experiences for travelers, and eventually makes it hard to appreciate such a big change in public transportation.

In this paper we will outline a usability study commissioned by Delft University of Technology and NS. This study explores the usability issues of the OV-chipcard, focusing on error recovery from problems that can arise while trying to check in at the stations. We have chosen this domain because we acknowledge that in such a complex system, there will always be errors occurring from time to time. For travelers, the check-in touchpoints are the first, and sometimes the only, touchpoints where they can get feedback on the current status of their card. This makes them an important player in the error recovery process.

The study will give insights in how travelers experience errors in an unexpected situation, both at open stations with poles and at closed stations with gates. The aim is to gain a deeper understanding of the usability issues when needing to recover from an error. The participants get a malfunctioning OV-chipcard, and are observed as they try to figure out how to fix the problem that is preventing them from checking in. We are particularly interested in how they attempt to solve the problem they are presented with; what considerations they make and why.
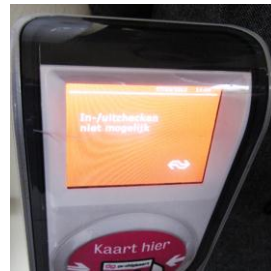
METHOD

The user study was carried out as a combination of observation in usability testing and a semi-structured interview (Rogers et al., 2009). Since an error situation is rare in normal use of the system, a scenario was staged in order to observe users in error situations under controlled circumstances. The observations and interviews were conducted with 16 participants at four different train stations in the Netherlands, at daytime outside of rush hours. The stations were chosen by convenience of proximity to TU Delft and participants.

The study was set up as a between-subjects study to avoid transfer of learning from one error situation to the next (Nielsen, 2010). Two different solutions for check-in touchpoints were tested (see table 1). Furthermore,

three different error situations were tested by giving the participants an OV-chipcard that was in one of three categories (see table 2).

Check-in touchpoint	Standalone poles	Closed gates
Stations	Delft Den Haag HS Den Haag Laan van NOI	Schiedam
Appearance		
Feedback interface	Vertical screen Feedback lights above the screen, red or green Screen lights up in either red, yellow or black Sound feedback	Inclined screen No feedback lights above the screen Screen lights up in either red, yellow or black Sound feedback

Table 1: Matrix of the different check-in touchpoints that were tested.

Cause of problem	Card is blocked	Card is broken	Insufficient credit
Audiovisual feedback from check-in touchpoint	Error sound Blinking red light Yellow screen	No reaction from touchpoint Continuous green light Black screen	Error sound Blinking red light Red screen
Message on screen	*Probeer opnieuw* (Try again)	*In-/uitchecken* (Check-in/out, default screen)	*Inchecken niet mogelijk* (Check-in not possible)
Appearance			

Table 2: Matrix of the error situations that were tested.

Participants

In total there were 16 participants in the study, of which four were acquaintances and twelve were people approached while waiting in or outside the train stations (See table 3). The acquaintances were chosen on the basis of availability and proximity to nearby train stations. The people we approached at train stations were chosen on the basis of the following criteria:
- Not in a hurry for a train
- Did not seem busy
- Not a tourist
- Could complement the diversity of our participants
- Willing to participate

To meet these criteria, some of the participants we recruited while sitting on benches outside the train stations.

Total participants: 16	Male	Female
Student	5	3
High school student	0	1
Worker (young)	1	1
Worker (middle aged)	2	2
Retired	0	1

Table 3: Demography of participants

Procedure
The participants were told they were participating in a student project from TU Delft for NS. One person had the role of the test leader while one or two others were taking notes and recording video. The participants were given an OV-chipcard – asked to imagine it being their own – and were presented a scenario in which they arrive at the station in good time before their train leaves. They were asked to think aloud about their actions and considerations. (See setup of user study, Appendix A)

The study started when the participants began acting out the scenario. When the participant tried to check in – and thereby experienced the error – we observed the situation without interrupting. If they turned towards us without having said much, we encouraged them to think aloud about the situation by asking "What happened now?". When they had stated what they thought was wrong, we encouraged them to act out further what they would do next. We then followed them acting out the next steps, for instance going to the service counter or a ticket machine. The test was stopped when the participant stated that the next step would be to go on the train, or first to buy a separate ticket and then go on the train. If participants came to the end of the test fast, we asked the participants to act out what they would do if they had time to fix the problem at the station.

A short semi-structured interview followed the observation study. The questions were follow-ups on interesting situations from the observation study, as well as a wrap up of their thoughts and experiences. We also asked about their opinions about what the ideal situation would be in such a situation. (See Appendix A)

Data analysis

For data analysis, the qualitative research method *identifying recurring patterns or themes* was used (Rogers et al., 2009). In the raw data phase, transcripts were made for all video-recorded tests (See Appendix B). The transcripts indicated the time of action, action and verbalization (de Jong, 2011).

In the data structuring phase, we mapped out an overview of the data. The videos were watched by the team, using the transcripts as handouts. Then actions were mapped out on one poster per participant, specifying quotes, feedbacks, external influences and influences from the test leader (See figure 1) (See Appendix C). From this step and onwards, all of the data analysis steps were conducted as team work in order to facilitate a common knowledge level in the team. Furthermore, user action maps were made in order to identify and quantify the different user patterns from the different error situations: Poles with empty card, poles with broken card, poles with blocked cards and gates with blocked cards (See table 1 and 2).
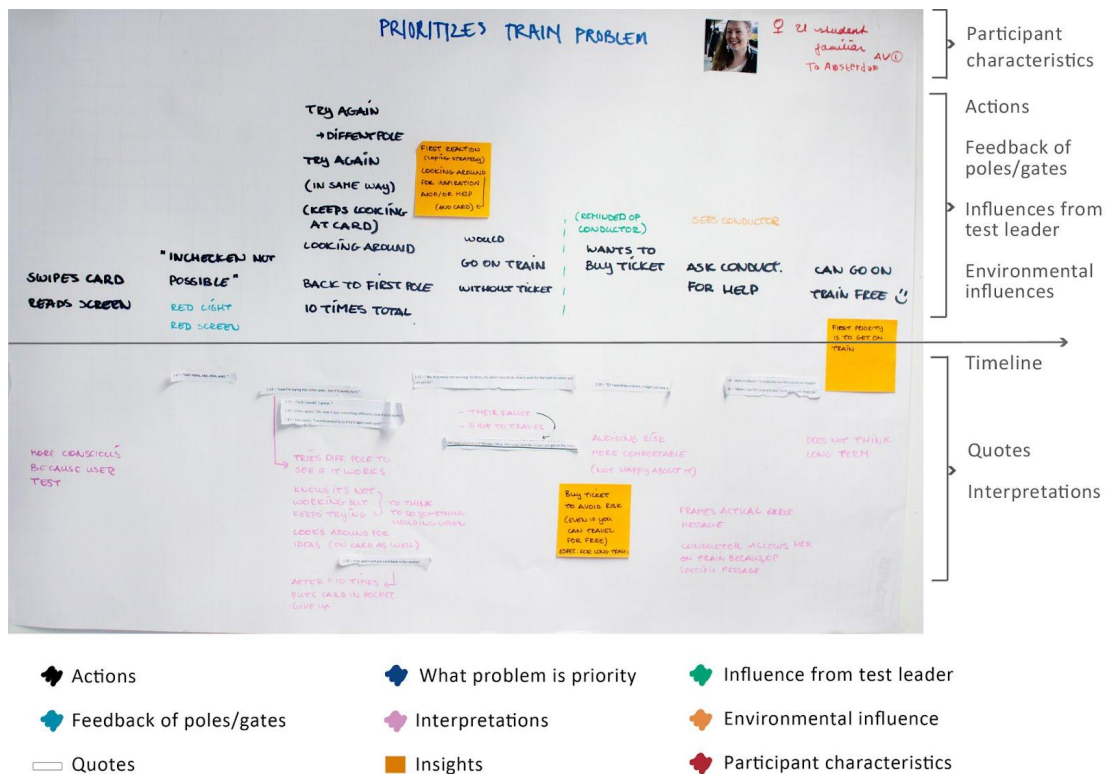
Figure 1: Example of a poster after the data structuring phase and the interpretation phase.

On data structuring posters, the simplified user's actions were noted chronologically from left to right and were paired with quotes from transcripts. With pink color, interpretations were formulated by the whole team, and focused on the process of understanding and solving the problem by the user. Other important factors were also recorded on the poster such as feedback from the pole, environmental influences and interviewer influences. The top right corner contained the user's photo and personal characteristics (name, gender, age, occupation, first user or familiar with OV-chipcard). We specified whether the user prioritized catching the next train, or tried to solve the underlying problem right away. (Stappers, P.J. et al. 2011)

In the insight phase, insight cards were composed on basis of our interpretations, quotes and the other influencing factors. The valuable insights were written on post-its and were arranged on the poster in chronological order. Insights were continuously checked and compared with previous insights and when similarities were discovered a yellow dot was sticked as a multiplicator. Insights (wisdom) (Rowley, 2006) describe people's behavior and thoughts, which helped to understand and map the critical usability issues. The insight cards were then clustered by the means of our research questions.
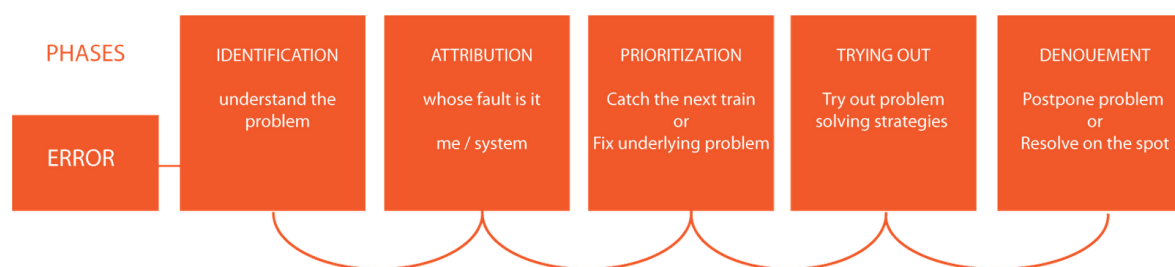
RESULTS

Figure 2: Over view of the different phases of a NS traveller encountering an error.

We have identified different stages of considerations users make while trying to recover an error (see Appendix D). Not all the participants went through every stage, nor did they follow them in this specific order, but these are the most relevant considerations of our participants combined.

The stages are: identification, attribution, prioritizing, trying out and denouement. (see figure 3)

Identification

The first reaction of the participants is that they assume something went wrong with the swiping action, when they swipe the card a second time and the error still occurs, the user tries to find out what the problem is. All participants tried to do so by swiping the card again and rereading the error message. Participants look for information at the check-in screen and some look on the card for any visual damage.

Attribution

To figure out whether the error is their own fault (no credit, forgot to check out) or a system error, 5 out of 16 participants tried the card at a second pole/gate. 7 out of 16 tried the card at the same pole/gate but swiped it in a different manner, taking the card out of their wallet, flipping the card or slowly tracing the curve of the pole. When the message is repeated several times, users interpreted the feedback messages differently regarding what the feedback was (see table 4). People ask themselves if it is their fault (not enough credit, forgot to check out etc.) or the system's fault (out of order or a temporary fluke).
Only one of the participants mentioned that the problem might be a central error that prevented him to check in.

Prioritizing

Participants have to prioritize between the problem of catching the next train and the problem of solving the underlying error of the card. Catching the next train is a short term solution which was prioritized by 6 out of 15 participants. The second is to fix the actual problem with the card, a long term solution which was prioritized by 9 out of 15 participants. This prioritization is influenced by the time, location and experience of the participants.

If people were in a hurry they tended to catch the train, whereas the opposite occurred when they had more time: they tried to solve the problem. The distance to the nearest ticket machine or service desk poses a barrier (if the distance is large, which it usually is) for users, making them consider the effort it will take them to solve the problem. If participants don't have enough time they are likely to use the distance factor as an objection and catch the train. If the participants had experienced the error before, they confidently were able to solve it because they knew how to solve the problem, how much time it takes and where to go.

Trying out the problem strategies phase

The general strategy is to find a human representative
- Go to service desk (8 out of 15)
- Go to conductor (5 out of 15)

Usually participants look for NS officials and go with the first opportunity that catches their eye. NS officials are humans, and can therefore be reasonable and be forgiving. At the platform, the closest NS official is usually a conductor. The conductor might not able to solve the problem, but they can let you travel for free and provide you with information on how to solve the problem. If participants cannot identify the problem from this, they look around for any inspiration on what step to take next. If there is no conductor present, they look for a service desk.
- Go to ticket machine (2 out of 16)

Few go to the ticket machine, because they think the ticket machines can not provide any more information than the check-in screen. One participant stated that he did not think of using the ticket machines for solving the error, because "Ticket machines are for selling tickets, not for solving problems with my card." (Partcipant 6, Appendix B).
- Go on train without ticket (6 out of 15)
- Go on train with valid travelling ticket (charged OV-chipcard or ticket) (7 out of 15)

- Unclear (2 out of 15)

If people think the error may be their own fault, they are more likely to buy a paper ticket before they board the train. Time pressure was also greatly influencing the coping strategies of participants. If the train already was at the station, participants were more likely to only care about how to board the train, caring less about the problem with the card. Some participants stated they would rather risk a fine than to miss the next train. Furthermore, students and monthly subscribers are more likely to board the train without a ticket, because they feel they already have the right to travel for free.
- Talk to NS information by using the information pole (0 out of 16)

Figure 3: Information Poles at Schiedam centrum

None of the participants even recognized that there was an information/SOS service pole at the station, even if it was right next to them. (See figure 3). These poles are meant for communicating with NS whenever there is a problem with checking in. The poles appear quite anonymously by being visually paired with gates; they have the same colors and materials and they are aligned as parts of the same barrier. Furthermore, the service poles were not located where the participants expected to find help; when looking for help, the participants looked around for a service desk, ticket machine or another distinct touchpoint, and did not consider of the gate area as a place to get contact with NS.

Denouement

In this final stage the participants have solved the problem, or at least have the feeling they solved the problem.
- Board train without ticket (6 out of 15)
- Board train with valid travelling ticket (charged the OV-chipcard or ticket) (7 out of 15)
- Get allowed on train for free (2 out of 16)
- Solves the problem (put credit on card) (2 out of 5)
- Understands the error and knows how to solve it (at home) (? out of 16)
- Gets it unblocked at the trainstation (0 out of 8)

Differences in behaviour of closed gates and standalone poles

Gates form a physical barrier not only to the platform but also to the conductors present on the platform. Approaching conductors to solve problems or try to travel for free becomes more difficult, reducing the amount of people taking a risk and try to dodge fares. Gates lead more people to the service desk than poles if they are prioritizing solving the problem with their card. When their priority is to board the train, people buy paper tickets as an interim solution. Furthermore, gates make people more likely to try another touchpoint, compared to stations with poles (in order to actually get into the station).

Differences in behaviour with different error messages

	Insufficient credit tested at poles	Blocked card tested at poles	Blocked card tested at gates	Broken card tested at poles
Error message	"Check-in not possible"	"Try again"	"Try again"	"In-/uitchecken" (default screen)
Visual feedback	Error sound Blinking red light Red screen with white lettering	Error sound Blinking red light Yellow screen with black lettering	Error sound White screen with black lettering	No reaction from touchpoint Continuous green light Black screen with white lettering
Interpretation of the feedback	Something is wrong. Not clear whether problem lies with the card or the pole, or is the user's own fault.	Something is wrong Not clear whether problem lies with the card or the pole. Suspected the error to be a technical malfunction. Expected the problem to be temporary because the card can still be read.	Something is wrong Not clear whether problem lies with the card or the gate. Suspected the error to be a technical malfunction. Expected the problem to be temporary because the card can still be read.	Realizes there is a serious problem with the card Expected that the card probably has to be replaced.
Actions	Go to ticket machine, (2 out of 5) Go to conductor (1 out of 5) Do not know what to do (2 out of 5)	Go on train without ticket (2 out of 2)	Go to service desk (5 out of 6) Go to ticket machine (1 out of 6)	Go to service desk (3 out of 3)
Solution	Charged card (2 out of 5) Got allowed on train for free (1 out of 5) Did not solve problem (2 out of 5)	Go on train without ticket (2 out of 2)	Got a telephone number of web address from service desk to solve the problem at a later time (5 out of 6) Ticket machine told the participant the card was blocked an he needed to go to a service desk (1 out of 6)	Got a telephone number of web address from service desk to solve the problem at a later time (3 out of 3)
Buy ticket or not	Would check in after solving problem (2 out of 5) Got allowed on the train for free by a conductor (1 out of 5) Did not specify (2 out of 5)	Would not buy ticket (2 out of 2)	Would buy ticket (4 out of 6) Would not buy ticket (2 out of 6)	Buy ticket (2 out 3) Got allowed on the train for free by a conductor (1 out of 3)
Details	Participants with previous experience knew how to solve the error. When stating actual error participant was allowed on train for free. The 'not possible' in the message gave the participants the idea there was nothing they could do.	They did not figure out what the problem was, but stated they would call the helpdesk or consults the NS website at a later time. Participants felt the problem was the responsibility of NS so they did not feel the need to buy a ticket	The gates prevented the participant from going on the train, and therefore they had to prioritize the card problem. It should be possible to unblock the card at the service desk, yet no NS official suggested to do so. Would try to get on the train without a ticket because they have the student right to travel for free so they would not feel the need to buy a ticket	One participant looked for a conductor at first, but could not find one, so he went to the service desk instead. It is not possible to order a new card at the service desk.

Table 4: Example of a poster after the data structuring phase and the interpretation phase.

DISCUSSION

From the tests we have identified that there are actually two main problems the participants needed to solve: Fixing the underlying problem with the card and to catch the next train despite the error. An issue was that participants had difficulties understanding the error messages. The problem solving strategy of the participants was largely influenced by individual differences in how the different error messages were interpreted.
We also noticed that most participants prioritized to board the train, and did not consider that the card might still be malfunctioning when they have to travel at another time.

We believe that the most important reason for this is that the participants were in an artificial setup. Since the test card is not their own, the participants may have difficulties immersing into a scenario where the card suddenly stops working after long time use. Some participants actually mentioned that they would be more surprised and stressed if it was their own card that suddenly stopped working. One participant stated that he maybe would have been more into solving the actual problem if it was a real error with his own OV-chipcard (Appendix B, participant 6). The artificial setup may also make participants more suspicious and attentive towards unexpected situations. This could have influenced the results of the study.

It proved to be difficult to keep each user test exactly the same. A train station is a busy environment for a user test and interview. Additionally a lot of users were pressed for time, since they had a train to catch, so not all tests and interviews had the same level of elaboration. In the interview, some ad hoc questions might have been too leading. Furthermore, the interviewee may have got confused in cases where another team member than the interviewer stepped in with questions. Also, being observed by three people and a video camera might make the participants more self-conscious and act differently.

Invited users were more willing to talk and express their feelings and ideas, because they were prepared for the interview situation and they were aware of the time. Time pressure and anxious feeling were also much less on the interviewer.

CONCLUSIONS

From all of our research, eight main findings on usability and user experience were formulated:

- The error messages of the poles and gates are too ambiguous and do not provide the user with a clear direction for problem solving.
- NS does not provide a clear, transparent and consistent way in guiding users towards a solution for recovering an error.
- When experiencing an error the general tendency is to find a human representative from NS. Human representatives are seen as reasonable and forgiving, in contrast to rigid machines.
- The appearance of the information service poles does not convey to the users that they can be used for problems with the OV-chipcard. This stems from the overall appearance (the information service pole is not noticeable) and that the SOS function deters users from recognizing its other functions.
- Being allowed on the train by the conductor gives the user a positive experience, even though the underlying problem of their card remains unsolved.
- When checking in is not possible, users generally feel that they need an acceptance in order to feel allowed to board their train.They either seek a paper proof that they – due to an error – are allowed to board the train, or they seek a conductor to explain their situation, hoping to be allowed on for free. This assures the traveler because it removes the uncertainty of risking a possible unpleasant ticket control.
- Students and monthly subscribers do not seem to feel the need of acceptance as strongly: They are more likely to board the train without obtaining permission first. They feel they already have the right to travel without buying a ticket, so if NS cannot provide a solution for checking in, they will not put in much extra effort into solving it themselves. If they are checked by a conductor on the train, they will just explain the situation and hope the conductor will let it slide.
- Users experiencing errors at a station with gates do not have the ability to contact a conductor at the platform. This forces people to tackle underlying problems with the card immediately, but gives a negative user experience in the cases where the user's priority is to catch the next train. The gates that lock you out of the station with an ambiguous message can be seen as an unreasonable bouncer.

The fact that NS has planned to discontinue all paper tickets and install gates at all major train stations by 2013 is very interesting in this regard; users are then left with fewer options to legitimately board the train in situations where there is an error with their card. We believe that this will result in more negative user experiences, therefore we see a lot of design opportunities in this area.

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Appendix

APPENDIX A – USABILITY STUDY SETUP

Introduction

Hi. We are students from the TU delft working in a NS project about the OV-chipkaart. Would you like to participate in our research? It takes like 10 minutes.

We want you to imagine that this is your OV-chipkaart, and that you are arriving the platform in good time before your train leaves. We will observe what you as a user would do in such a scenario.

We want to get insights in your behavior and your thoughts in the different situations that play out. Therefore we would like you to think aloud about your actions and considerations. For instance: "Now I'm walking to platform 8 because that's where my train leaves from".

Also, we will stand a bit in the back and try not to guide you. We "are not here" to help you, we would rather see how you would tackle the situations yourself.

Is it OK if we record video of your actions?
Remember: We are not testing you, we are testing the system. There is no right or wrong.

Test procedure

They get their OV-chipcard and start acting out the situation. If the way to the check-in touchpoint was long, the test leader can make some small talk with the participant on the way.When the error message occurs we are curious to see what actions they take and why. What considerations are they making, and where do they seek information to get further?

We want the play to act out as deep as possible – If they would like to ask a conductor to get further information, we would like them to do exactly that. Same goes with calling NS, going to the ticketing machine or the service desk. It is interesting to see how they frame their situation to NS. (If they want to call NS, we may provide them with a phone so they don't need to spend money themselves. Still we would not provide them the number)

If they get stuck we will guide them further. Our participants are stuck when they repeat an action three times, are silent for ten seconds, they tell us they are stuck. Questions: What happened now? What would you do next?

If they are asking for our approval of their behavior, we will just ask them to play it out further.

Interview afterwards

After the usability test, we will ask them some questions about how it went, and if they have had similar experiences.
- *How did you realize how to solve the problem that came up?*
- *Could you describe how you felt during [a situation that played out]?*
- *[What did the poles tell you?]*
- *Have you ever experienced other or similar error messages before? Could you tell us what happened?*
- *How did you then realize how to solve the problem? What did you do to solve the problem?*
- *What would be the ideal situation for solving such an error?*

Thank you for your time!

APPENDIX B - TRANSCRIPTS

Participant 1,
22 year-old girl, student
testing gate with blocked card at Schiedam location

Time	Actions	Vocalization
0:15	Walking to the turn stiles	"Its not so much I will say though"
1:30	Takes card out of backpack	
1:34	Swipes card	
1:36	Pole gives message , tries 2 times then looks at the screen and then another 2 times	
1:47	Responds to the question "what would you do now?"	"I would go to the next turnstile
2:00	Tries again and it still gives an error message.	"Than I will go again to the other pole."
2:05	Looks around and walks straight towards the first service desks she sees.	"And now I would look for somebody At the information desk"
2:15	Close to the service desks she noticed it is closed.	"I see that it is closed now I would go try outside if somebody would be there."
2:28	Walking outside	"And then if there is also no body I would go to the train anyway and ask the conductor"
2:40	Respond question : "why do you want to go to humans instead of machines"	Question misinterpreted "I would still travel because I can travel for free"
2:57	Repeating question	"I don't know what else I should do." I would let somebody else check in at the gates and let them tell a conductor that it's not functioning"

How did you the experience the process, from holding the card till the end?
What did you feel at the time?
I'm not satisfied with the ov chipcard that you have to check in all the time everywhere

Have you experienced something similar before?
I come from Vlaardingen and most of the gates are defect there is a big cross and if you go to a conductor you say that you can't check in and then you don't have proof except for the people around you.

Last question. In an ideal situation, how would you like this problem to be solved?

With the Ov chipcard there is nothing , for example with the service desk they need somebody there.
So I would want to have always one person next to it that will help you with checking on or problems.

Participant 2,
23 year-old boy
testing gate with blocked card at Schiedam location

Time	Actions	Vocalization
0:10	Walking to the turnstiles and explanation.	
0:36	Takes wallet out of pants and flips it half open when touching the gates .	
0:37	Error message beeps he reacts straight away.	"And now it doesn't work"
0:43	He quickly turns around and looks for approval, "what would you do next?	
0:47	Takes card out of wallet and puts it on the machine	"I would take the card out and try again"
0:54	Tries again and it still gives an error message.	"Than I will go again to the other pole."
1:02	Hey tries 2 more times and reacts:	"I found it mainly annoying that it doesn't work because I don't know the problem"
1:17	He tries again	"With my own ov chipcard I can't be broken because I have a sleeve over it"
1:30	What would you do next?	"Hoping one gate is open or on a train station with poles it will work"
2:02	Respond question : "In 2 years time there will be only gates so what would you do then?'	"I don't know, than I would look up for somebody a conductor for example."
2:07	Why a conductor?	"I don't know , It's the first thing popping up in my mind"

How did you the experience the process, from holding the card till the end?
What did you feel at the time?
I found it annoying I have to arrange something now while that is totally useless

Have you experienced something similar before?
No not really because the gates are most of the time open.
And then when I would get checked in the train I will tell them that they have to make it right

Last question. In an ideal situation, how would you like this problem to be solved?
Short term I would go to a information desktop help me. In the long-term just delete the whole system.
Sorry I have to go….

Participant 3,
22 year-old girl, student

testing gate with blocked card at Schiedam location

Time	Actions	Vocalization
0:22	Walking to the turn stiles	
1:06	Takes card out of her handbag.	"And now I will check in"
1:15	Puts the wallet against the machine, tries two times and still gives error message	"Now I will try a different pole"
1:28	Pole gives message , tries 2 times looks back.	"Now I see that it is not working."
1:29	Responds to the question "what would you do now?"	
2:36	Looks around to the service desk.	"I would go to a service desk but know there is nobody at the service desk and also don't see anybody around me that can help me ."
2:05	What do you think is wrong with the card?	"Maybe its blocked, for example the travel product hasn't been activated "
2:20	How can you know that for sure?.	"Well than I need somebody who tells me what is going on, but I don't see this person?" "then I will first get a ticket and then jump through a gate that is open and tell the conductor" I will not pay a ticket when its not my fault"
2:28	Discussion with girlfriend	"Why would you buy a ticket if you can travel for free?" "Maybe its my own fault I don't have a clue, that's why I want somebody to look at it first"
3:24	Respond question : "So you would first rather doubt yourself "	"So when I see other people getting through the gates and it's not the gates that are broken then I start doubting myself."

How did you the experience the process, from holding the card till the end?
What did you feel at the time?
I lost my OV in the train, so the next day I had to get a ticket.

Have you experienced something similar before?
I come from Vlaardingen and most of the gates are defect there is a big cross and if you go to a conductor you say that you can't check in and then you don't have proof except for the people around you.

Last question. In an ideal situation, how would you like this problem to be solved?
That you have an information point at all the check in points so you can always ask somebody.
Somebody who has knowledge , because if I have a student ov chipcard what could be there wrong.

Participant 4,
19 year-old construction worker
testing gate with blocked card at Schiedam location

Time	Actions	Vocalization
0:22	Explanation of the test	
0:57	He explains his action which gate he would choose.	"The signs show that I can pass through, that's shows some accessibility."
0:59	He checks in, recognizes an error, en tries again multiple times while looking at the screen.	"Ohh that's annoying, I have seen this already multiple times, you have to try now 8000 times, I think it's useless. "
1:28	After trying ten times, he flips the card around and looks at the other side.	"I think that there is some damages on the backside that might be the reason why it's not working properly. And the card itself looks still nice and flexible not bended."
1:29	He tries again 2 times.	"I think it might be the reader , but not really because he still reads something, so I think it must be the card that there is something wrong with."
1:58	My next step would be to go to the service desk. Pointing to the neary service desk.	"Ohh but there is nobody at the desk and that's not helpful for travellers with such a problem, so than we should go to the NS desk."
3:22	Waiting at the line in front of the service desk.	"well it could also been that I had to try a different gate first?"
3:31	Respond question "why did you then wanted to go first to the service desk?"	"I never really had this kind of problem therefore I was going to quickly to a service desk, but actually the gates should just have worked!"
4:15	Asking at the service desk about the problem and that he doesn't know what's wrong.	NS lady "*I don't get anything on my screen is this a tryout card?* " Mark "*No it's a functioning card*"
5:03	Participants sees the problem on screen	"Ohhh its blocked" NS "what I'm doing right now is to get some information out of the card , but I can't do that with this one. No the best thing to do is, when it's a student card to make contact with DUO."
5:30		"Ok and how do I as a student now travel? Not you got nothing you should by a ticket...... (can't hear)" Just call duo they know the most.

Could you tell what is happening what is wrong with the card?
There is something wrong,   he might be blocked and I have to contact duo and tell them my card doesn't work properly.

How did you the experience the process, from holding the card till the end?
What did you feel at the time?

…..(can't hear) She can't really do anything or fix my card she is not a repair service that fixes it. I had no clue what I had to do? What should I do now? I don't have a lot of money and if this card has a malfunction and It hasn't been used for long, than that doesn't feel good, it's not handy. And I know from experience that to get a new card is quite a process and the most important is to get a new card, to get your money back is not the most important thing, as long as you get quickly get a new card. And I don't know how long that will be with duo but ok , it's important that you have a working card

Why do you buy a ticket?
I only use Chipcard for the tram and I don't use it for the train because I sometimes forget to check out. Than you lose a lot of money. And that's stupid because you do it yourself but still. Its sensitive machinery you can make a small error.

You feel that you make the mistake?
Yeah in the end it's you.

Last question. In an ideal situation, how would you like this problem to be solved?
I would try to get a new card. I would try again another gate, see if that works. And then I would really buy a blank ov-chipcard. Or just a ticket for the train. Or a ticket for the train that at least you can keep on moving and then that you can repair this card.

Participant 5,
23 year-old boy, student
testing gate with blocked card at Schiedam location

Time	Actions	Vocalization
0:05	Explanation of the test	
0:25	He Runs towards the gates checks in but crashes into the door because they wouldn't open. - surprised	
0:31	Second time he takes a step back and now looks at the screen before he checks in.	"Should I jump over it"
0:37	He still tries again	"I think the gate is broken, so I would go to the next one"
0:46	He checks in at a different gates	"I think know that there is a system malfunction, because I tried multiple ones and they all don't seem to work".
1:05	He looks around , pointing to the nearby service desk.	"My next step would be to go to one of these information points. And if that wouldn't work than I would still going to travel and explain that I couldn't check in"
1:20	Walking towards the service desk. Showing the card at the counter.	"Hello, I couldn't check in with my ov" NS lady "Ok let me take a look' Guy "Nice picture he?"
1:50	NS Lady scans the card	Ns Lady" Hmm this card is blocked" Guy "what is the reason?" NS Lady that is hard to recognize, He doesn't show me anything more than that it's blocked. " Guy "So that means I can't travel now today?" Nope that's right

		you have to contact DUO and the letter you got from them shows how to contact them"

Could you tell what is happening what is wrong with the card?
The card is blocked and that I can't travel with it, now I Have to contact duo.

How did you the experience the process, from holding the card till the end?
What did you feel at the time?
Frustrating definitely when I need to get quickly a train

Did it help you talking with the NS service point?
Not really, because I would have missed the train and needed to buy a ticket. So it doesn't help

Last question. In an ideal situation, how would you like this problem to be solved?
Well because you have a student ov chipcard would be best if you just shown you card and that you can walk through easily .

Participant 6,
24 year-old boy, student
testing poles with broken card at The Hague station

Time	Actions	Vocalization
0:00	introduction + instructions	
0:05	eye contact with Mark, standing still; smiling a little bit	"Like I would do normally…"
0:8		*"Yes, how you do normally, and so..please, show us what you would do"*
0:15	he put the card in his pocket and his hand too. He is walking towards the station, showing the screen	"OK..yes, so, normally I just not look when the train goes. I gave that up. I normally go to the station and see which train is coming."
0:31		"Now we are going to platform 6. A train to Amsterdam, I hope"
0:42		"On the corner there is a screen which shows the times of trains"
1:02		"Let me see,platform 6, Amsterdam…Ok, so 8 minutes and it will be here. It's OK, we can get a cup of coffee."
2:03	he shows the card – in the air	"Now just I will flip the…"
2:05		*"OK, just swip it"*
2:06	He touch the card to the poll, than turn away around the card, then again; little	

	smiling; and turn it again – holding the card still and flip and hold and try again	
2:14		"Uh, F*ck.."
2:33		*"Just tell us what you would do"*
2:19	he is explaining to Mark and pointing with the card	"yeah, yeah, yeah…It's not working. It sucks, especially because our train is here in 2 minutes. What I would do is looking for a conductor, tell him that it's broken, so it's not working"
2:35		*"OK, but now he is not right here"*
2:38		"No, so I would go to the service"
2:45		*"OK, so shall we go there?"*
4:45	he is walking towards the servicedesk	"OK"
5:55		"It's F*ck"
4:36	Speaking with service desk	
5:21	he received a phone number from the servicedesk	*"OK, so…"*
5:21	he is holding a card with a phone number in his hand	"*So what's happen now?*" – Johan
5:26		"yeah..*Do you want to call also?*"
5:28		*"yeah, yeah, yeah"*
5:29		*"Good"* - Johan
6:32		*"You can get a phone to call them"*
5:33	he is starting to dial the number	"I get mine"
5:35		"so…"
5:49	he is lifting the phone + looking around; checking the paper with the number	
6:07	he is scratching his nose; smiling	"robot.."
6:24	staring	"*What are you hearing?* " – Johan

6:28		*"Still a robot?"*
6:29	he nod once	"Yeah"
6:31	he put the phone down and choose a number	"OK,…At this point I have to choose like….eeeh…. a number for checking in"
6:49	pick up the phone again; and down and up again; smiling	"I couldn't check in"
6:59		"All right"
7:03		"Just a robot"
7:05	he nod once	*"Just a robot?"*
7:13	staring with open mouth; whispering	"What?"
7:15	put the phone down	"I just wanna say that my card was stolen, so it's not gonna cost me any money"
7:20		*"They say that? or you knew it?"*
7:22	little smile; pick up the phone	"I know that. What? I know that"
	he is nodding	*"So now you gonna say, that the card was stolen instead of broken"*
7:30	he is laughing ; then he put the phone down; and pick up again	"Yeah…and I won't have to pay for a new one,….. yeah"
7:40	he is looking at Johan	*"Cause you experienced that before?"* - Johan
7:41	he watch back to Mark; pointed him and laugh	"Yeah, I heard from a friend. From you, actually."
7:45	boys are laughing; he put the phone down	*"Maybe don't do that because you have to say my name, and maybe they gonna block my card…hihi"*
7:50	he is explaining to Mark and Johan as well with some eye-contact with both	"I was just ringing. They didn't pick up. But normally I would be like…I would just say that it has been stolen. Then you don't have to pay extra and they send one immediately and it's safe all the hassle "
8:07		*"But now you missed the train."*
8:10	he is spreading his arms and laugh + explain	"Yeah…F*ck…hahaha. So usually I would call them like sitting in the train…I would go back and take the train"
8:19		*"Yeah"*

8:22		"*And you would have tried first at the conductor*"
8:25	he nod once; explain with the card	"Yeah, definitely. I would like: It's not working here, what should I do? "
8:30		"*OK*"
8:30		"Can I still go to Amsterdam, because I have a card"
8:31		"*Yeah*"
8:33		"*When did the train leave?*" – Johan
8:35	he is looking at Johan	"like 8 minutes"
8:35		"*8 minutes. So it's still there. Can we tsy to talk with the conductor*?" – Johan
8:39	he is walking back to platform 6	"*Yeah, let's see that*"
		"*Because now we have time left over*"
8:54	he tried the card again in one poll while walking back to platform 6;laughing; then, running back to platform 6	
9:34	walking on platform + looking around	"I think it just left"
9:35		"*Yeah, I think so*"
9:40	walk to the other train; looking for the conductor	"Maybe we can try on another train"
10:20		"*We can start the interview*" - Johan
		"*Yeah, because we have some interview questions*"….
	INTERVIEW!!!!! – down	
11:50	asking the conductors	
13:10		"*So what happen now?*" - Johan
13:13	he stars to explain to Johan; looking at Mark and Johan as well.	"So, now, I tried to solve it with the conductor. What they said was: You really have to get a new card, because it's broken. Then I asked them, what's now, because I need to get to Amsterdam. And she said, OK, you can go for free. She was nice."
13:36		"*Did they say how should get a new card?*" - Johan

Time		
13:40	pointing	"EEehhh…they said not specifically…They kind of pointed me towards the…"
13:44		"*servicedesk*" - Johan
13:50		"*Did they help you to know what is the problem with your card?*"
13:53	visualization with the card, explaining to Mark	"They asked few things but they weren't very supportive. The guy asked me what was on your card? I thought he meant money. I said nothing was on it, but he meant the product. like student product…..The second question was: Did you already check in somewhere , cause you couldn't do it again, because it has to be 3 minutes delay between them. I said it was not the thing, it doesn't make a sound , blab la bla and they said, it's the fact "

Interview:

OK, so,.......... Can you tell me in short, what happened.
What happened it was.. I tried to check in with my OV-chipcard and nothing happened. I didn't hear a beep, so it means it's broken.

How did you try to realize to solve that?
So, First, I was looking for a conductor, but he wasn't there. Then I went down and then we went to the servicedesk to tell them my problem. And... yeah,.... I hoped they they would give me something...I don't know, to could catch the train now, but they just gave me a phone number.

Can you describe a little bit how did you feel during the whole process?
If it was real, I would be stressed out, because my train left and I would like : F*ck, F*ck…
I would probably run more.

You can remember what the polls said, right?
Yeah, nothing.

Nothing, that's good. Have you ever experienced like this?
Oh, yeah, I used to have a broken card, sometimes…….

Why did you decide to go to the service desk?
Well, I couldn't see any conductors, so

What about ticket machines?
Thicket machines are for selling tickets, not for solving problems with my card. Also, the service desk, they are humans; they can be reasonable, and like, listen to my problems, and maybe cut me some slack…

Participant 7,
19 year-old girl, student
testing pole with broken card at The Hague station

Time	Actions	Vocalization
0:10	Walking to the departure	"in one minute the train leaves for Amsterdam, I

	notification system to see when her train leaves.	might have to take the next one"
0:23	Walks to the platform.	
1:03	Looking for where to check in.	"Now I'm looking for where to check in with my OV-Chipcard"
1:10	Pole gives message "Probeer opnieuw"	"It isn't working."
1:23	Responds to the question "what would you do now?"	"I would just jump in the train and explain later to the man in the train that I couldn't check in. If I had to go, I would just jump in I guess."
1:50	Responds to the question "if you had a little more time what would you do?"	"I would first go to the ticket machine."
2:05	Walks to the ticket machine outside of the station.	
2:41	Swipes the card.	"It doesn't do anything at all. I think I would just buy a ticket then."

Did this fix the problem?
No, not really. The card doesn't work, so I wouldn't be able to travel now.

What would you do in the mean time?
Look for someone from the NS and explain my situation. Maybe he can use his machine to see what the problem is.

And the next step would be to find a conductor?
Yes.

How did you the experience the process, from holding the card till the end?
Well, it didn't work in the end, so you did all for nothing. You expect it to work, you check what time the train leaves and think you can still make it. Then you discover the card doesn't work, while it is supposed to work. Bummer.

What did you feel at the time?
Badly organized, badly made.

You don't know now what the problem is?
No.

Have you experienced something similar before?
Yes, once I couldn't check in and then I just explained the situation to the conductor on the train when he came by. That was when the OV-Chipcard was introduced though.

Can you still remember what the message on the pole was?
Don't board, was it? It doesn't work? A red light anyway.

Was the signal different?
There were two beeps instead of one.

Last question. In an ideal situation, how would you like this problem to be solved?

If it doesn't work, that it shows what is wrong exactly and how to solve it there on the spot, so you can still travel.

Now you would be afraid to go on board the train, because…
Now, I would've taken the risk, but if you have to travel a long distance…

I get the feeling that you want something that enables you to take that train anyway.
Yes, like some sort of proof that your card is malfunctioning. I don't know, maybe a receipt.

I was wondering, you only tried one pole. Why didn't you try a different one?
I didn't really think about that, but I don't think that would've made a difference.
I thought it was a problem with my card, not the pole.

Also the pole worked when the man before you checked in.

Participant 8,
23 year-old boy, student
testing pole with broken card at The Hague station

Time	Actions	Vocalization
1:20	Walks toward the poles.	
1:33	Swipes wallet with card inside. Looks at the screen while swiping.	
1:33	Pole gives message "Probeer opnieuw"	
1:35	Tries again, same message.	
1:37	Takes the card out of the wallet	"It usually works – when in the bus I take it out and hold [the card] in front of it."
1:40	Holds the card in front of the pole for one second. No feedback	
1:41	Takes card away, and tries to walk towards the train Smiles towards the test leader. (Understands that this is planned by our side)	"Something wrong with it I guess"
1:44	Tries the card again on a response to "It should work" from the test leader	
1:49	Thinks for a second	
1:50	Decides to go to the service desk	
2:00	As a response to "what happened now"	"It wouldn't check in so I want to make sure I don't have to pay a ticket.
2:08	Tells about expectations before the service desk	"I'll probably get informed that I'll have to pay a ticket and get a letter were I can get the money back."

2:11	Stands in the line for the bus company	"I'll have to wait here for a while. I'll explain to them that it's not checking in"
2:20	As a response to: "You already know what will happen?"	"I have already been in that situation"
2:34		"If there is a long line I'll probably just buy a ticket "
2:37		"…Or if I already was at the platform, and the train already was there, I'd probably look for a conductor. Tell them its not working – "look it's not working""
2:55		Depends on the time, but I'd probably ask them to let me go on the train without "or do I need to buy a ticket?
3:05	When reminded that he is standing in the line for the bus company.	"I have more trouble with HTS, so I'm used to standing here"
3:50	Decides to change to NS service desk	
4:45	To the service desk	"It doesn't work"
	Asks the guy at the counter	"What will I have to do?"
	Gets a telephone number and a "new card ordering" form from the service desk. Walks away.	
5:40	As a response to "What happened now?"	"He gave me this [the card] – it's broken. And [something] to order a new student card. He told me that I'd have to buy a ticket. I will only get the money from one ticket back, and it will take two weeks 'till I get a new pass.
	Slightly resigned. Turning irritated.	"I've been mad a lot of times, but I just stop it, 'cause I know they [the ones behind the service desk] can't do anything about that. It's the bureaucracy. Don't get me started about that."
6:30	He calls the number he got from NS after we gave him a phone he could use. [Note: quite leading from our side]	
7:10		"Probably I'll get a long waiting line." "It costs €1,75". "That's how it starts…"
08:00	Comes to an automatic answering	

	menu	
08:30	Gets to speak with a person.	"Hey, my name is KK. My OV-chipcard doesn't work anymore. I was just at the service desk – Now I will need to get a new card. How does that work?
9:05	After being explained the steps to get a new card.	"How do I travel in the mean time"
	Is told that it will take about three weeks.	"Why not faster?"
10:00	Gets told that he can save the receipts in the meantime and get them refunded afterwards online at "studentenreisproduct.nl"	
10-11:30	Not transcribed due to language difficulties. But it is something about the discrepant instructions he gets from the service desk and the phone service.	
11:30	He hang up the phone call	
11:31	As a reply to "Do you now know what to do?	"I would buy a ticket since I still have time." Maybe I'd go to the conductor and show him the error and ask if he could let it slide. Since I'm a student I probably have free travel anyways. Half of them will say yes, Half of them will say no. If no, I'd probably go and buy a ticket and miss my train and be very annoyed."
13:00	As a reply to "what will happen now? In two weeks…"	"In two weeks I will get my card back and start my declaration process. Which will be very tedious."
13:15		"I get cranky about the bureaucratic system"
13:35		"I want to start traveling, not do the whole process of keeping all my tickets and stuff."
13:40	About the ideal situation	"Scan the card in a machine, which reads this code or something else, then you get a new card immediately, or maybe just a temporary card. Then I don't have to do all the paperwork afterwards."
16:00	Talks about the service desk	"You somewhat already know what they will say, but you still hope that they have a nice solution."

Participant 9,
35 year-old man, does not own an OV-chipkaart
testing pole with blocked card at The Hague station

Time	Actions	Vocalization
0:00	Walks to a pole.	
0:03	Swipes card, traces the curve of the pole carefully.	"It says 'opnieuw proberen'"
0:09	Swipes again, now a bit slower.	
0:13	Swipes again, same speed as 0:09.	
0:17	Responds to the question "what do you think is wrong?"	"It didn't recognize it."
0:27	Responds to the question "what would you do now?".	"I would take the risk and get on the train. If I have an appointment in Groningen for instance, I cannot afford to be late."

Would you go to a conductor?
Yes and try to explain my situation.

Why not go downstairs to the service desk?
Because I need to be somewhere on time. If I had more time I would.

And how do you feel now?
Well I might get a 40 or 50 euro fine.

You feel a little bit stressed.
Yes, definitely.

How would you like to solve this problem in an ideal situation?
I would have two OV-chipcard.

If one does not work, you still have another one?
Yes, exactly.

Thank you.

Participant 10,
teenage girl, student
testing pole with broken card at The Hague station

Time	Actions	Vocalization
0:08	Puts the card where she normally keeps her OV-chipkaart (her wallet, which she keeps in her handbag)	
0:30	Mark is explaining the scenario to her.	
1:05	Walks to the trains.	

1:15	Responds to "you have to take this train, what would you do?"		"I'd check in"
1:44	Looks for a pole.		
1:49	Finds the pole, walks towards it while looking for her wallet in her handbag.		
1:58	She waves the card in front of the pole approximately 10 times, turns it over and waves it 2 more times.		
2:18	Responds to "what would you do next?"		"I'd go to the service desk."
2:25	Mark suggests to go there.		
2:30	Walks to the service desk.		

Would you go to a conductor?
I don't think a conductor can solve this problem.

And what about the ticket machines?
Well, they don't work properly most of the time.

Did you ever have problems with the OV-chipkaart.
Not really. Just once, while checking out. But there weren't gates, so I could still leave the station.

Time	Actions	Vocalization
3:55	Asks the person behind the desk for help.	"I have a problem with my OV-chipkaart. It is not recognized. I cannot check in."
4:37	Person says it's broken.	
5:08	Mark asks if she knows what to do now.	"No, not at all."
5:20	Person says she has to send the card to DUO.	
5:29	Mark asks her if she knows enough now.	"Yes."

Do you know what is wrong with the card?
Yes, it has a tear. So it does not work.

And you know what you should do next, because you need to take the train.
Well if it does not work: pay up.

And when you get home, you would….
I would get in contact with DUO.

Do you know their phone number now?
No.

So you need to look the number on the internet.
Yes, but I think that website is quite clear.

Would you go to the NS site?
No, the site of DUO.

Last question. If this would be an ideal situation and you would be able to solve this problem immediately, how would you think that should be like?
I would buy a train ticket.

Participant 11,
21 year-old girls, student - acquaintance
testing pole with empty card at Delft station

Time	Actions	Vocalization
1:14	tries card for the first time	"Shit! Haha, oke, ehm, wait.."
1:19	tries the card again on same pole	
1:23		"now I'm trying this other pole.. See if it works here."
1:26	tries card on different pole	"well, it does not work here either."
1:29	tries card again	(laughs a bit nervously)
1:33		"well I would.. I guess.."
1:36	tries card again	"Oh, now it says something different, now it says try again.."
1:42	tries again	"I would probably just try it again and again"
1:51	goes back to first pole and tries again.	
1:55	tries again	
1:57		Anna: "So it is not working" "No, it is really not working. So then, eh, what I would do now is wait for the train to come and just get in."
2:05		Anna: yeah? And would you go to the conductor?""
1:56		Anna:So it is not working..
2:08	tries again and put card back in her pocket	
2:10		"Or I would by a ticket, I might just buy a ticket.."
2:15		Anna: Okay, shall we go buy a ticket?
2:17	walking over to ticket machines	
2:28	sees conductor	"I could also ask the conductor maybe"
2:38		"Mister, my OV chipcard says 'Inchecken niet mogelijk'

Time		Vocalization
2:42		Conductor: "Oh, then you can just go into the train"
2:43		Yes?"
2:44		conductor: "Do you need to catch this train?"
2:45		"No, the next one"
2:46		Anna: "Okay,you do need to ask the conductor"
2:49		"yes, well, I solved it!"

Yeah, well if he had told me I could not have gotten on the train, then I would not get in. It depends on the conductor, and then I would buy a ticket. Yeah, I would ask before going into the train, also because I never saw this message before. I did see 'no credit' once, but that's a different situation.

So you did not know how else to solve it?
Yeah, it was pretty frustrating.

Because it was not working, or because you would miss your train?
Well, I had enough time to catch the train, but it gets on your nerves.

Have you experienced problems like this before?
Eeh, no. I never got this message before. Not this message, it did eeh.. well, never that you get a red screen like this.

What would be the ideal situation if you get a red light and a message like this?
Well, that you can go to the conductor and he sais, just get on board, like before. I think that pretty ideal. Yeah, the ideal situation would be of course that it works the first time. But if it does not, I think the best solution is if NS says 'Okay, this is our mistake so you can get on the train.'

Participant 12,
65 year-old woman
testing pole with empty card at Delft Station

Time	Actions	Vocalization
1:17	ries the card for the first time	
1:19	tries to give the card back to us	"In en uitchecken niet mogelijk"
1:21		Anna: "Not possible? So if you would see this message, what would you do?"
1:26		"Maybe I would try a different one.. I had this in Amsterdam, that I could not figure it out.."
1:34	tries the card at a different pole.	"Not possible"
1:37	gives the	

	card back to us	
1:38		Anna: "What could you do to figure out what is wrong with the card?"
1:43		"well, that sort of depends where I am, I have tried asking in Amsterdam but the people where not very helpful there, at the service desk."
1:54		Anna: "In what way where they not helpful?"
1:57		"Here I don't know, I have never been at the desk here, but in Amsterdam when you go inside, I already passed the check in point. So I still had to check in and I asked them where I could do so and they were not very helpful. But yeah."
2:14		Anna: "Did you manage to do it in the end?"
2:16		"yes, I went back outside and ten came back in and checked in. I do not knw if you ae interested in busses and trams, but they all have different systems. The tram in Rotterdam which I used to take, you really need to know the differnces. Because the machine there says 'Goed reis' when you check in and 'tot ziens' when you check out. 'Tot ziens' is fine with me, but 'goede reis' was kind of confusing, you feel like you are already leaving the tram. But it works fine for me,I have on card, my sister who lives here, who is coming in a minute, she bought one for me over here. And I can put money on it and wherevenr I want to go, I just have my card ready. I go to all sorts of places "
3:17		Anna: "You put the money on there yourself?"
3:30		"Yes, I do not do it automatically; I do not have a bank account here. And I have this other friend, an old Dutch friend from Australia, and I told her and she has the same kind of system, which is very convenient. They have similar system there as you have here. And if you can not use the ATM's or the ticket machines then it is really convenient. But my sister is coming"
3:51		Anna: "Could I ask you one final question? What would be the ideal situation is you get a message like this on the poles?"
4:19		Anna: "Maybe so you would know how to solve it?"
4:21		"In Amsterdam you have al these things in a row, whether you are going into the station orgoing out. And then you can just try three in a row. And then if it says that it does not work, you just go to another one. And then it works."
4:39		Anna: "You never experienced that the card would not work at all?"
4:42		"No never, I never had that. If you have enough money on your card.."
4:48		Anna: "And then you would go to the service desk?"
4:51		"Yes, then I would go there."
5:11		"Here it is pretty good, because the poles are right near the exit. But there are stations where you don't really know where they are. Then you have to look for them. At the bigger stations, especially the stations that are under construction,

		like Rotterdam. Then is is not that easy, but the idea is fantastic."

Participant 13,
31 year-old man
testing pole with empty card at Delft Station

Time	Actions	Vocalization
1:31	hecks in, gets error message 'inchecken niet mogelijk'	
1:33		"Well, I kind of expected that."
1:36	tries again	
1:38		"I'll try this other one.. "
1:39	Tries different pole, gets same message	
1:42		"No, it's not working."
1:43		Anna: "Do you have idea why it is not working?"
1:47		"Ehm.. I think it does not recognise the code or something.. The pole sends a signal, and the card reacts to the signal and sends one back, but it's not reacting. It is not recognized."
2:01		Anna: "So what could be the cause of that?"
2:05		"I guess you guys made this card like this on purpose."
2:08		Anna: "No, it is a normal card."
2:10		"So it is a real OV chipcard?"
2:11		"Yes, it is a real OV chipcard"
2:17		"Well, considering the red light I would say it is a software error.. Otherwise it would say you have no credit or something.. I would say the card is no good."
2:30		Anna: "What could you do to find out why it is no good?"
2:35		"At this moment nothing, the information systems of NS are giving no feedback at all. They never do, and I stopped asking employees because they usually know even less than I do."
2:48		Anna: "You have experienced that before?"
2:51		"Yeah, I regularly deal with delays, and my 9292ov usually knows more than the people (of NS) on the platforms."
2:58		Anna: "Have you ever experienced an error like this with your OV

Time	Actions	Vocalization
		chipcard?"
3:02		"No. I did get some notifications that I did not have enough credit, that's the only one I have seen before. "
3:12		Anna: "What did say?"
3:14		"Te laag saldo"
3:24		Anna: "So how did it feel to get this message?"
3:30		"Now, at this moment I thinks it makes sense. But if it would happen when I thought I had done everything right, I would be quite pissed. Kind of a 'Oh ja, NS' reaction."
3:45		Anna: "Do you mean it's logical that NS things do not work?"
3:48		"My overall opinion about NS en reliability and trust is really low."
3:45		Anna: "Is that from experience?"
3:47		"That's from experience yes, but I do know, this is from TransLink systems, and eeh, is this my train?"
4:10	Leaves to catch train.	

Participant 14,
26 year-old woman
testing pole with empty card at Delft Station

Time	Actions	Vocalization
0:42	Walks to pole	
1:32	Tries card for the first time.	
1:36		"Isn't there enough money on it? Because you need 10 euros minimum right?"
1:40	Tries card again, glancing at screen	
1:41		Anna: "So what would you do to check if there is enough money on it?"
1:45		"I would go inside, to the place where you can get a ticket.."
1:53		Anna: "Could you show us?"

Time	Actions	Vocalization
1:53	Walks over to ticket machine.	
2:00	Puts card on reader.	
2:04		Yeah, you need at least 10 euros, so.. But it is kind of annoying, sometimes you have 9 euros on there, and you can not check in because you do not have enough credit. I do not think it's really user friendly."
2:15		Anna: "How come you immediately knew there was not enough credit on the card?"
2:18		"Because I had this many times before"
2:21		Anna: "Did you also get the 'Inschecken niet mogelijk' message?"
2:23		"Yes, or eeh.. the other day it said something different, but I do not remember it exactly.."
2:30		Anna: "And then you also went to the ticket machine?"
2:32		"Yeah, then I just check it, see how much money is on there."
2:37		Anna: "So do you find it annoying that it does not say so straight away?"
2:40		"Yes, that is annoying, if I can see it over they, I just know I need to charge it, but on the other hand, then I need to go to the ticket machine as well, so.. But it would be easier.. I actually had one time when my chipcard was broken, and then you do not know, and you check your credit and it is enough, and then you do not kno what is wrong. So if you can see straight away that you do not have any credit and that is clear, then I would know something else is wrong if a get a different message."
3:03		Anna: "So you have experienced this before?"
3:04		"Multiple times"
3:09		Anna: "So that would be the ideal situation?"
3:10		"Yes"

Participant 15,
24 year-old boy, student
testing pole with empty card at Delft Station

Time	Actions	Vocalization
0:47	ries card for the first time, gets error message	
0:51		"Well, it's not working, but I guess that's the point of the test.."

0:55		Anna: "So what would you do now?"
0:58		"Well, eeh.. I would at least try again"
1:04	Tries for the second time, gets error message	
1:06		"I would go to the machine, see if it has enough credit.. Or otherwise the NS servicedesk.."
1:15		Anna: "So would you mind going to the machine?"
	While waiting for line in front of machine	
1:25		Anna: "Have you experienced a message like this before?"
1:28		"I do sometimes have problems checking out.. but not while checking in."
1:43		Anna: So if you get an error, you would first go to the machine?"
1:47		"yeah, I sometimes have that I forget to check in, and then you get here and check out, but you actually check in. Then it takes a while before you can check out again.. But I never got this message before."
2:05		Anna: "What kind of messages did you get?"
2:07		That I have no credit or, eh, checking out not possible or something like that..
2:12		Anna: "So it actually says 'not enough credit'?"
2:13		"Yes."
2:14		"Is that at these poles or at the gates?"
2:15		"Yes, at these poles. But at Leiden there is a difference between check in and check out poles, and if you do something wrong, you immediately lose 10 euros, so if you could tell NS this I would be very happy. I don't understand why they have different poles for this. "
2:53	Puts card on machine.	
2:59		"There is no subscription on there.."
3:06	Pushes button 'ophalen bestelling'	"You never know.. but I think it is because there is no money on the card"
3:12		Anna: "Yes, you are right, there is no credit on the card. Would you do this procedure the same if it was your own card?"

3:25		"Yeah, if I get this specific message would. Just check to see what is wrong. Or go the the NS service desk. But here you can already see there is nothing on the card."
3:40		Anna: "So what goes through your mind when you get a message like this?"
3:44		"It depends on the reason.. If m card would suddenly not work, I would really be surprised. I would want to know what is wrong with it."
3:58		"What would be the ideal situation?"
4:06		"That it gives a reason."

Participant 16
27 year-old boy, worker
testing gates with blocked card at Schiedam Station

Not transcribed due to technical errors.

Actions written down after the user test:
Message: "Try again" in loop on the same gate; did not try any other gates. Looked for the service desk. Did not see it. Went to the ticket machine, because that was the closest reasonable thing he could see. There he got the message that his card was blocked, and that he should go to the service desk. Had to go at this point, but stated that he in the ideal situation had got an explanation on why his card was blocked.
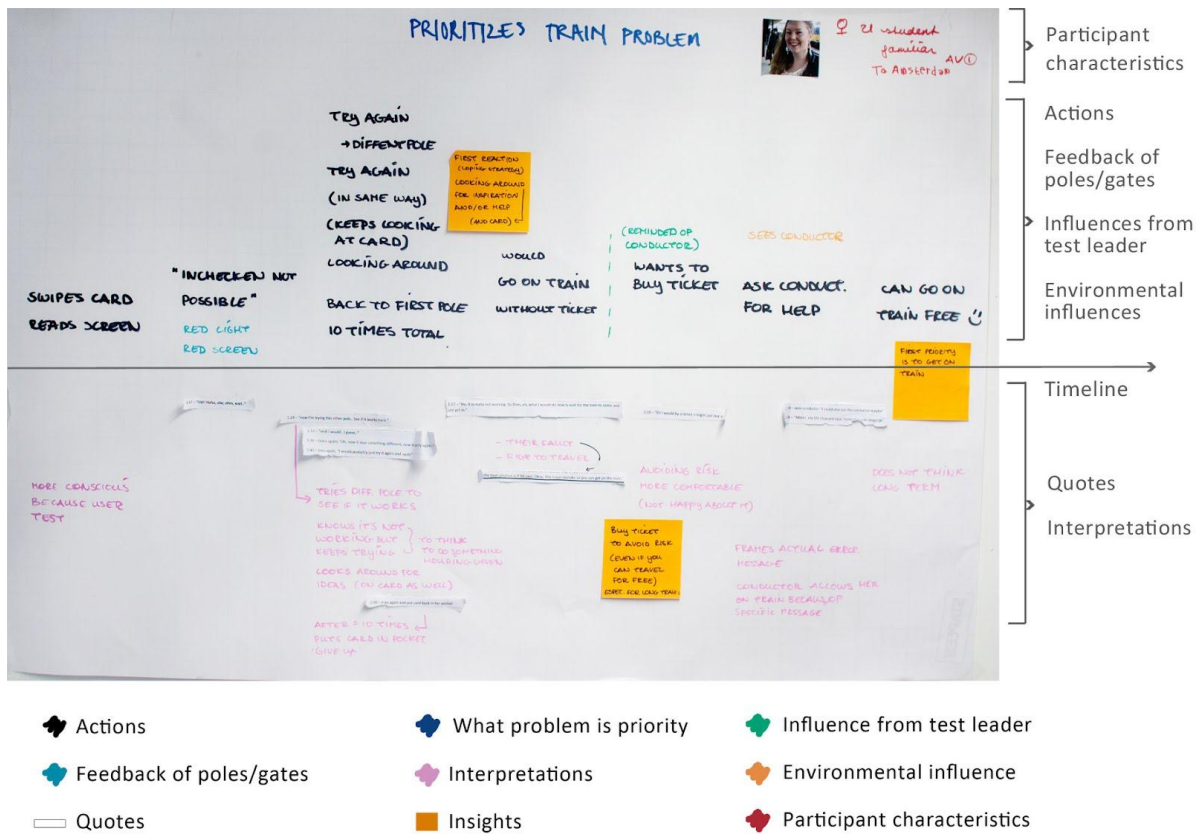
APPENDIX C - Data structuring posters

Figure 1: Example of a poster after the data structuring phase and the interpretation phase.
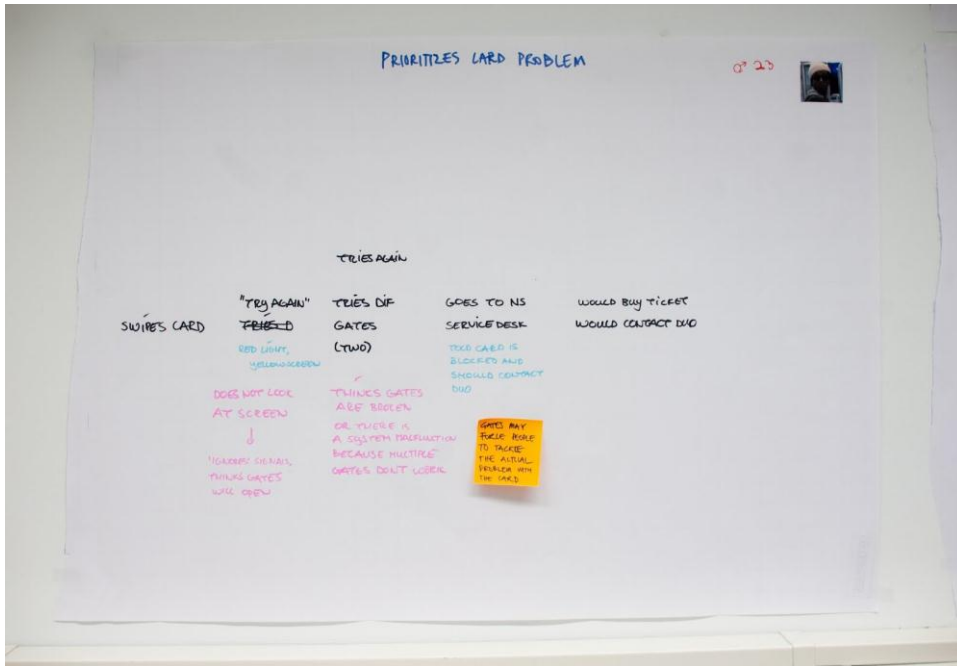
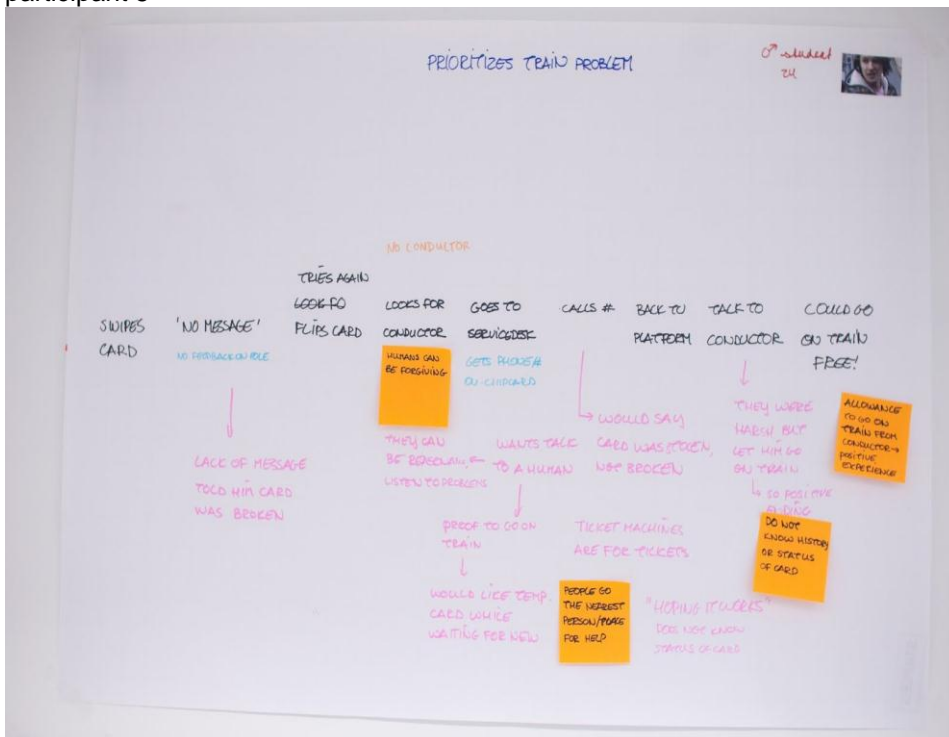participant 11

participant 3 and participant 1
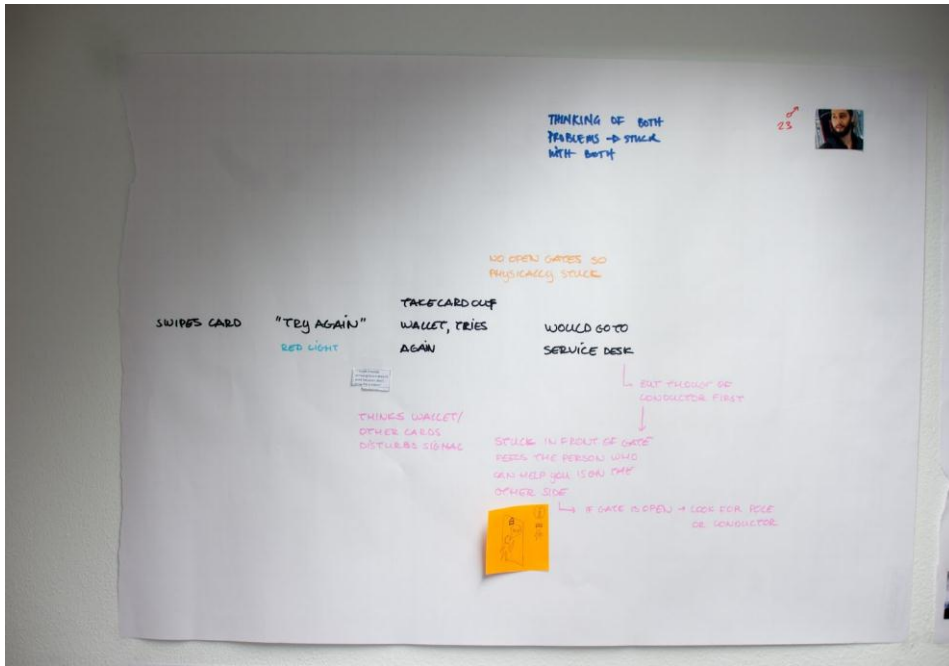
participant 2
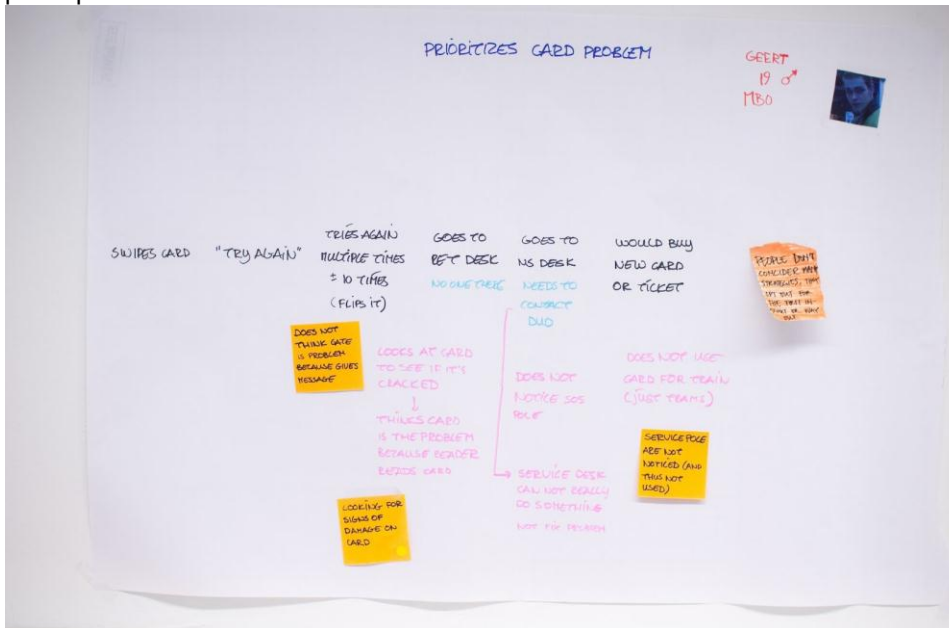
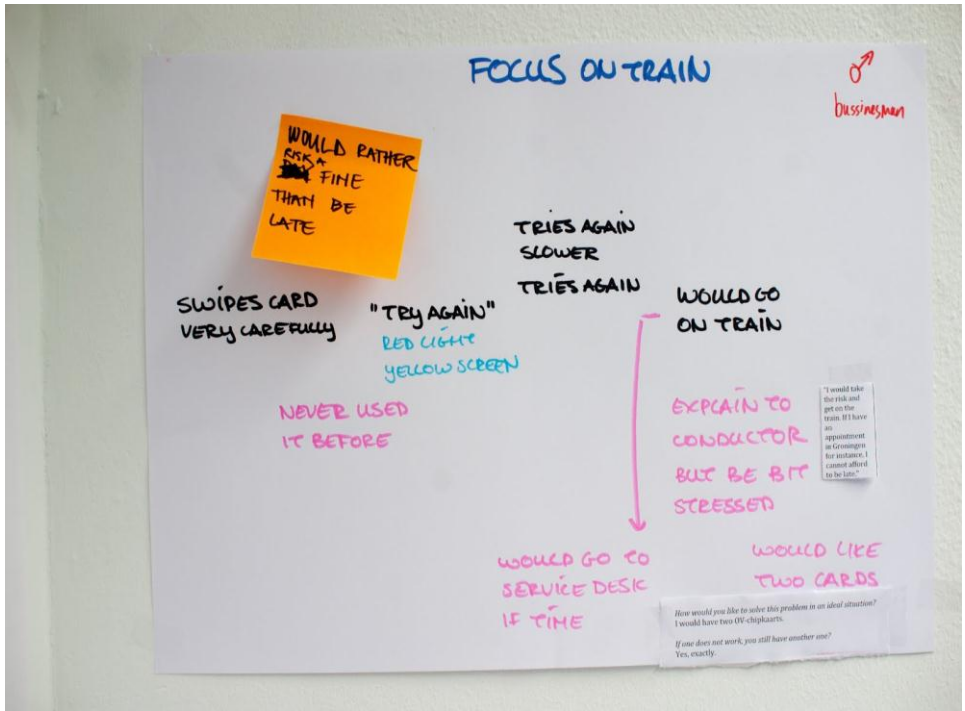

participant 4
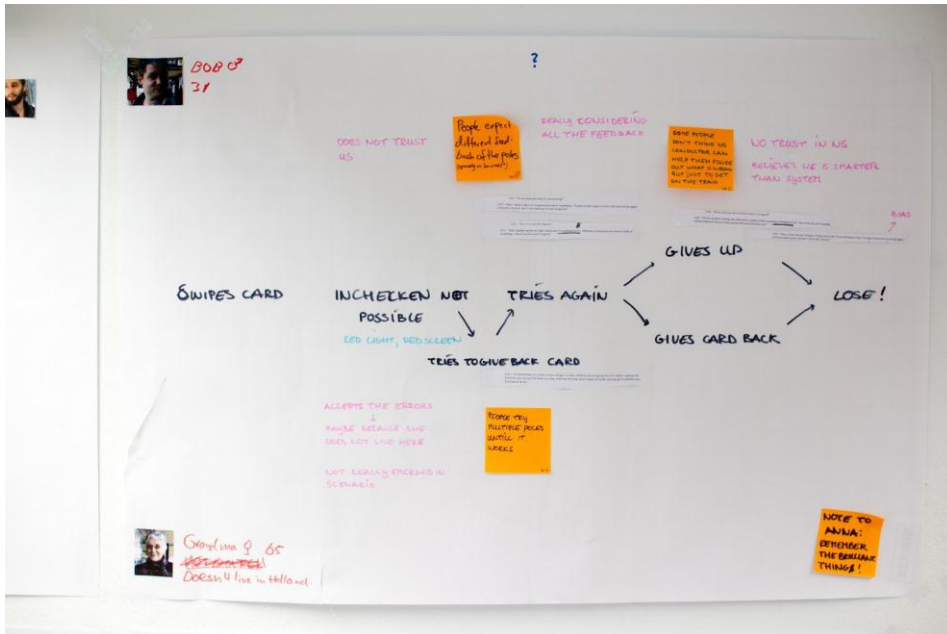
participant 5

participant 6

participant 7

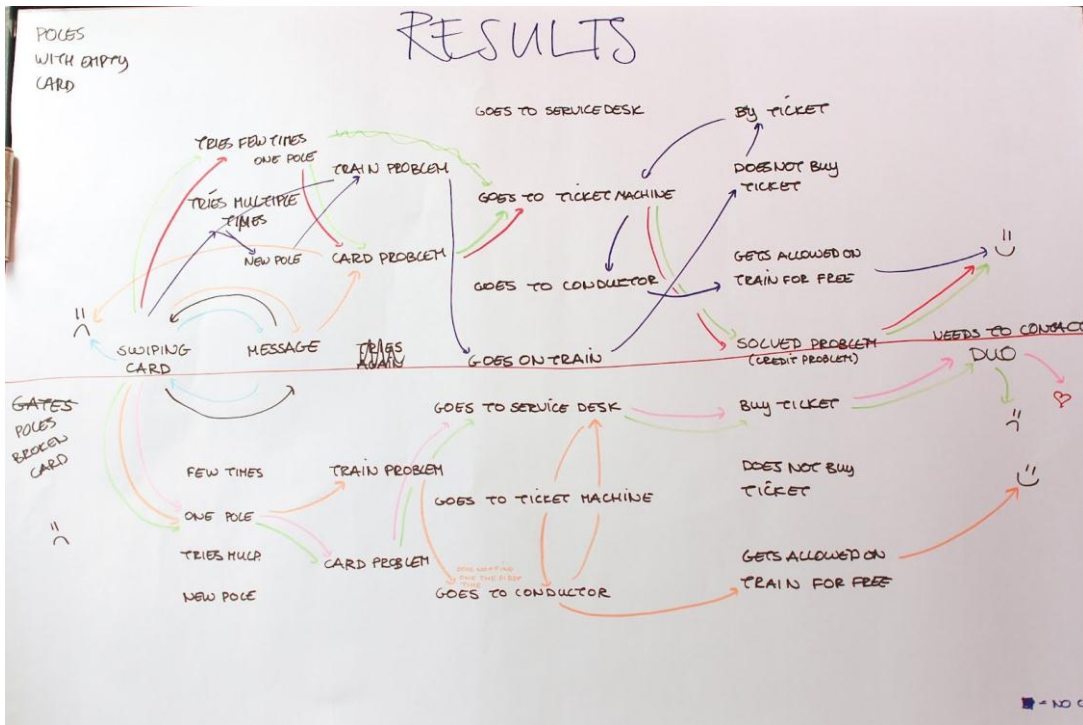
participant 8

participant 9

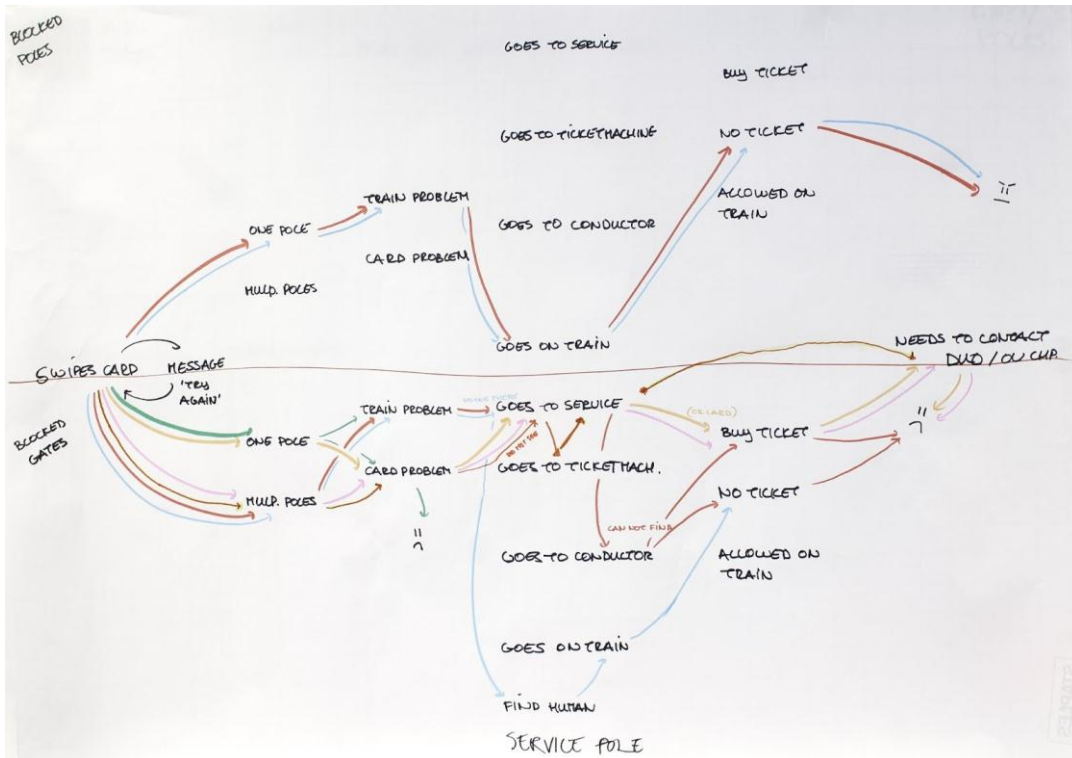participant 10

participant 13 and participant

12

participant 14 and participant 15

APPENDIX D - MAP OF USER ACTIONS

User action map 1

User action map 2

APPENDIX E - INFORMATION POLE PICTURES

participant 1

participant 2

participant 3

participant 4

participant 5