“How might we create a better user experience for first-time users of Ruter, the public transport system in Oslo?”

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24/11/2015
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1. Introduction

This project was done in cooperation with Designit and they gave us the task of analyzing the current user journey for users of the public transport system in Oslo (Ruter), uncover challenges and thereafter design the happiest path ever for these users. The scope and focus of our project are first time users and tourists in Oslo. In this project we have not only focused on interaction between users and a technological system, but the whole journey from looking for information at home until the user are done traveling in Oslo. This is a long journey with many touch points, requiring deep insights in the user behavior and needs. The result of our research is a new ticket system that we believe will improve the experience of Ruter’s users.

Our project group consists of Astrid E. Bang, Einar A. Gasmann and Kristoffer V. Nygård. Einar and Kristoffer have both a B.Sc. in IT- and project-management from the University College of Trondheim and are currently studying a M.Sc. in innovation and entrepreneurship at the University of Oslo. From these studies they have broad knowledge and experience in user-centered design. Astrid has a M.Sc. in informatics from the University of Oslo.

Designit is a global strategic design firm with more than 300 employees. They combine design, business and technology to solve problems, improve lives and create new business growth. They focus on a human-centered and holistic approach, and design product-service experiences enabled by technology. In our project they have given us a clear overview over the whole process, relevant and good feedback and taught us useful methods for our research.

As mentioned above, Ruter are the public transport provider in Oslo. They are accountable for more than 50% of the Norwegian public transport, and Oslo and Akershus is the fastest growing metropolitan area in Europe. Only in 2014 it was made 319 million journeys by public transport in Oslo and Akershus\(^1\). Recently they upgraded their ticket system by moving from paper tickets to smart tickets. Because of this change they have encountered much critique from their customers who long for more visible information.

Together, we design a smarter future for everyone.

- Designit

\(^1\) About Ruter - [https://ruter.no/om-ruter/selskapsinformasjon/](https://ruter.no/om-ruter/selskapsinformasjon/)
2. Goal and vision

2.1 Our goal
Our goal for this project is to create a better user experience for first-time users of Ruter. We also want to make public transport the first choice when deciding between transportation alternatives.

2.2 Target group
The target group for this project is first-time users of public transport in Oslo, which consist of tourists and people who are sometimes in Oslo but might prefer to take a cab instead of traveling with Ruter.

2.3 Project overview
The process of finding the best solution is no straight line. In service design there are many aspects to think of and it is important to iterate when new information occur. Figure 1 below shows how our process of nine weeks turned out.

![Figure 1 - Project overview](image)

3. Data collection and analysis
We had no preconceived ideas of the problem we were going to solve. The problem emerged from the data collected in the insights period. To gain insight and understand what problems users of the public transportation system might encounter, we used observation, shadow interviews, unstructured interviews and we studied existing solutions.

3.1 Literature
**Travel Experience Cards: Capturing User Experiences in Public Transportation**
Alma L. Culén, Maja van der Velden and Jo Herstad
Relevancy: Medium

Summary:
This paper is about capturing user experiences in public transportation through a Travel Experiences Card (TEC) set. The card set addresses all stages of the travel with public transportation, from
planning the trip to arrival to destination. The purpose of the tool is to provide data on user experience in initial phases of new service design. In order to start understanding how to use the cards and what they can expect to learn from the use, they decided to choose a small set of experiences and focus instead on the use of cards as a tool for working with selected user experiences effectively. They chose three important experiences for users of public transportation: safety, joys and arriving on time. They have worked with two tools for using the tickets. The first TEC tool is based on the forced association concept, and is carried out in relation to every card representing a segment of the journey. The second TEC tool they called the focus event. A specific, significant event from a person’s life, related to the use of public transportation, is placed in the focus of discussion. Using those experiences in workshops gave them useful data for eliciting rich responses from their participants, and for understanding the ecology of experiences.

**Information visibility in public transportation smart card ticket systems**
Maja van der Velden & Alma Leora
Relevancy: High

Summary:
The focus of this paper is the role of information visibility in public transportation ticket systems. The authors have chosen the case of Ruter (public transport provider in Oslo), and their change from paper tickets to smart card tickets. The new smart card tickets received high amounts of critique from the users, and the paper argues that it is because of the loss of information visibility. They identified three basic ticket information needs for public transportation users, which are highly relevant for our research because we are looking into new ticket designs. The needs are: the type of ticket, the value of the ticket, and the duration of the ticket. They also identified other needs that they did not add significantly to their argument, but might do to ours. Those needs are: the price of one trip, and overview or log of implemented trips, and an overview of past travel expenses.

**Consumer experiences with electronic tickets and ticketing apps for public transportation**
Dag Slettemeås, SIFO
Relevancy: Medium

Summary: Yearly, SIFO conduct a survey to measure the current consumer situation. This paper is a note on one of those surveys where they look at the consumer's experience with the new electronic ticket systems in Norway. They have a significant group of respondents (N=1012), which are also a well distributed group. The survey gives answers to the number of e-ticket users, their experience with the functionality of the new system (also compared to former systems), any errors or security issues that users might feel, and the use of mobile tickets.

**Measuring Public Transport Satisfaction from User Surveys**
Rana Imam
Relevancy: High

Summary:
Customer satisfaction has been considered one of the most important factors in any industry or service due to its direct relation to customer retention. This paper focuses on the user satisfaction with the public transportation system in the city Amman. A user survey was developed to explore the satisfaction of bus users, minibus users and jitney users. Transport planners and decision makers could utilize the results and findings of this study, to focus on the attributes that are important for...
public transport users. The outcomes also direct the attention of transit authorities and operators towards the attributes that scored low in satisfaction, consequently requiring improvement. It is necessary to increase user satisfaction through improving the public transport system in Amman, in order to maintain existing users and attract new passengers. These improvements will make the city more sustainable and reduce the use of private cars in the future.

3.2 Insights

We wanted to gain a deep insight into the problems of using public transport in Oslo, so we chose to do several experiments - observations and shadowing interviews of users, interviews of employees at both Ruter’s office and Visit Oslo, as well as searching the web.

3.2.1 Observations

The process started with Ethnographic inspired methods and techniques. Learning by observing. Firstly, by observing touch-points and the behavior and comments of users. We did not interact with the users, we were just the fly-on-the-wall, listened to comments and observed their behavior.

Lessons learned

- Limited choice of languages when buying a ticket from ticket machine
- Many choices make it confusing when buying a ticket
- Uncertain about validating ticket
- Missing feedback whether ticket is validated

3.2.2 Shadowing interviews

We worked in pairs of two, one observed and asked questions, while the other transcribed the conversation and observations. Starting out at Oslo S or Blindern, we met travellers and asked if we could accompany them on their trip. During the trip we followed them and observed if they had any problems. At the end of the trip we would ask them in detail to clarify on what we had observed and in general asked if they experienced any problems with Ruter. The session was documented in a standard schema listing goals, biggest challenges and shortcuts. Shortcuts being anything they did outside the system to help them in their journey.

1 See appendix 1 for a list of observations
A shadow interview on the public transport in Oslo - we followed the customer on the bus from Oslo S to the Viking Museum at Bygdøy.

Lessons learned
- Customers do not know where Ruter customer office is located
- No Ruter helpdesk or signs when exiting Oslo S
- No assistance in choosing the cheapest alternative
- Discomfort when exiting tram and platform is crowded
- Preference for clean stations
- Discomfort when having to stand on tram in the rush-hours
- Desire for more T-bane stops all over the city

3.2.3 Other sources of information

In addition to the observations and interviews, we talked to the employees at Visit Oslo, Securitas at Oslo S, at Ruter (front-desk and shift-manager) other tourists and we contacted Ruter my e-mail. This information confirmed several challenges that we had discovered from our former research. The biggest challenges were the lack of visible information for the user, and the problem of understanding the whole system. In addition, Visit Oslo informed us that many tourist found it odd that no one checks your ticket when you enter the transport. Also, some would like more visible information about the difference in prices on and off the transport, because it is more expensive to buy a ticket on board.

3.2.4 Existing solutions

Ruter

The current solution works in a way that you either have to buy a prepaid ticket, for a specified period of time (1 hour, 24 hours, 7 days, 30 days or 365 days), or a pay-as-you-go solution, where you fill up a ticket with a specified amount to use. The pay-as-you-go solution can only be used for single tickets.
Searching the web

What about other solutions? We had a look abroad at providers of public transport. However, it proved time-consuming to evaluate existing solutions. Our focus was to find users problems, and that is not apparent on analyzing the web sites. But we could compare the web sites and the ticket-system.

**London - OYSTERVER CARD**

**Features**
- Shop online for Oystercard
- Chat help
- Top-up amount

**Strengths**
- Easy sign-up
- Easy user-administration
- Well documented site with videos to explain concept

**Weaknesses**
- Scope of project has not given time for in-depth study.

**New York - Metrocard**

**Features**
- Shop online for Metropass
- 1-10 days pass

**Strengths**
- Non observed.

**Weaknesses**
- Web site has a lot of information

By looking into what other existing solutions offer, we could find inspiration to our solution. Our main findings here were the possibility to buy tickets online and videos that explain the concept of the solution.
3.2 Ideation

3.2.1 Personas

The scope of the project was initially defined as first-time users and tourists. For practical reasons, the definition of “first-time” user has been exchanged for the “infrequent” user and tourists. We did discover that tourists have the additional need to visit tourist attractions and enter museums. The Oslo Pass is an alternative to the Ruter card.

Furthermore, our interviews uncovered that tourists do not use their cell-phone because it is expensive and that the Ruter-App does not work for foreign bankcards.

3.2.2 Customer Journey

To gain an understanding of the problems users experience with the current touch points, as well as giving us ideas for possible solutions a customer journey was mapped. We went through each step in the journey, from before a user enters the subway to exiting the subway station, and for each touchpoint we listed goals, challenges and experiences. These were based on our findings and assumptions from the insights phase.

In order to figure out which touch-points we should take into consideration, we chose to work with a set of cards with different touchpoints (Culén et.al., 2014). We did not use the cards on users, but more in a brainstorming session within the group.

![Customer journey map. Goals, Challenges and Experience for each step in the customer journey.](image)

Figure 2: Customer journey map. Goals, Challenges and Experience for each step in the customer journey.
3.2.3 Brainstorming

We landed on 5 issues we considered the most critical for the user. We went through the key issues and for each issue we brainstormed possible solutions.

![Figure 3: Problems we brainstormed possible solutions.](image)

4. Prototype

4.1 Our solution

When deciding what solutions we were going to prototype, we had to consider the user experience. What would give a good experience? We found that the most reoccurring problem when using Ruter’s services was which ticket to buy. Several of our interviewed users took their time to calculate the cheapest alternative (Single Ruter ticket, Day Pass, 7 day ticket or Oslo pass). When interviewing both Visit Oslo and Ruter’s office, they confirmed that this is the biggest problem for tourists and first time users. We wanted to see if we could help the user buying the ticket that gives them most value for the money. We want to make the users satisfied and reassured that they did in fact reach the cheapest alternative.

A new concept based on providing the user with the cheapest alternative. The best deal is calculated based on the actual amount of travel, and the user has full control of billing.
Figure 4: Visualizing the concept Use-First-Pay-After. Green ring: user-initiated. Red ring: service-provider.

To test the concept we chose to prototype a touch screen, to be integrated in current solution, a new FLEXI Travel Card and a webpage for users to get an overview of the total amount of journeys, amount spent and amount saved. It is highly valued by users to have information about their travel card (van der Velden & Culén, 2013).

4.2 Low fidelity prototype

4.2.1 FLEXI travel card

We prototyped with different images and text on cards and used them as props during our staged interview. They need to be tested further with users.

Picture 3: Prototyping the Travel card. Testing with different images and text on card to remind the user that the ticket needs to be validated before using the service.
4.2.2 Touch screen for ticket machine

We wanted to test how we could make a good solution for buying the FLEXI travel card. We made a low fidelity prototype by making some simple wireframes.

![Paper prototype of a touchscreen for buying a FLEXI travel ticket.](image)

It was important for us that this interface was as simple as it could get, because we noticed that navigating through the existing unfamiliar system was a big hassle for many users. Therefore, on this prototype we added only four screens: a welcome screen with information about the service, a budget-screen to give the user more control over what they spend, a screen for payment type (credit/debit card or pay-pal) and then they pay. Each screen holds only what we saw necessary for best possible user experience.

4.2.3 Testing

We tested this prototype with six users who were friends and family. The users filled out a simple survey. Our tutors from Designit also evaluated it.

After the testing of this prototype we found that it was not that self-explanatory as we thought. First, we understood that the information about the whole process was necessary to explain at once they come to the ticket machine; they need to understand how it works before they move further. Next, we got feedback on the budget screen. Most people did not understand the necessity with that and it only brought forth confusion. Even after we explained why it was there. We therefore decided to remove it from the solution.
4.3 High fidelity prototype

4.3.1 Touchscreen for ticket machine

![Image of high-fidelity prototype]

Figure 5: High-fidelity prototype as a result of input from user-testing the paper prototype.

After the initial testing of the low fidelity prototype we developed a more describing solution, but still with very few screens and options. The main difference here is the use of images and icons. The fact that users themselves could navigate on the high fidelity prototype might have had an impact on their understanding of the system.

4.2.3 Testing

In order to test this prototype, we would upload the solution to a website, which we would use an iPad to access. Further we would measure how long time a user spend to complete a purchase on our system, compared to the current system. We have not completed this test, since we have prioritized to test the solution as a whole.
4.3.2 Webpage for journey overview

This is a prototype of a webpage where users could get a full overview of their journeys, how much they have spent, and how much they have saved. It is also possible to end journeys when you want, and get charged at that point of time. To enter this web page, users would have to either use a qr-code they would find on their ticket, or enter the number-code they have on their ticket.

As with the touchscreen, we have not been able to test this prototype in depth, since we preferred to test the system as a whole.

4.3.3 Solution testing

We needed to get feedback on the following:

- Do people understand what the new product is?
- Do people see the value of it in their life?
- Do people understand how to use it?

Staging a Ruter desk, we engaged with passing students. The concept was explained using examples. It proved a successful way to initiate a deeper discussion on the pros and cons of the concept. Several users shared their experiences with Oyster card in London and came with suggestions for improvements. At the end of each conversation we had a mini-survey. After 2 hours, and talking with 15-20 users the same answers started repeating themselves. See appendix for a sum up of the results.
There is bias in that it was the members of the group who carried out the interviews. Those who were interviewed might of felt compelled to talk positive of the idea. The idea was presented in a positive manner.

Next step
To further test our prototype we would have made a complete test of the whole system. One way of doing that is to let the user buy a 7-day ticket from us. Then the user travels for seven days and notes every time s/he uses public transport. When the period is done we can analyze the trip and see whether a cheaper alternative is possible. We should also interview the user to check if it improved the user experience.

4.4 Further development

In their paper, van der Velden and Culén (2013) look at the importance of visible information for the user and three needs related to this information. The information needs are: type of ticket, value of ticket and duration of ticket. In our solution, we want to meet these needs. We propose different solutions to those needs and further development.

We could display variable information on the card, where the user can see when s/he started using the card and how much is used. The design of the card itself should fulfill the need of knowing the type of ticket. To do this we could use electronic ink, which changes every time a user scans their card.

By increasing the size of the screen on card readers, we could give the user additional information about their card every time they travel. Our research has shown that the screens today are too small, wrongly placed and show the information for a very limited time.

The solution could also include other transport providers, such as Bysykkel and NSB, to make the transportation system more seamless.
4.5 Limitations

When conducting user research and testing, some concerns and questions occurred. The one that most people asked was why we chose not to have prepaid cards. We chose that solution because we believed it made the buying process easier. Further research and testing could show that this is a functionality that should be implemented. It might be as an alternative. The most frequent concern we discovered was the connection between payment card and travel card. If we later decide to implement pre paid card, this concern would be eliminated. But we also decided to ask some of our users if this was a problem for them, and the results showed that 74% did not see it as an issue.

Another limitation (or decrease in usability) is the need of registering the card every time a user enters a mean of transport. This might be a hassle for some (maybe more experienced users), thus we would like to keep the old solutions for those who like it better. In the end, this solution is supposed to increase the user experience of first time users.

5. Evaluation

We have designed, prototyped and tested based on problems we have observed. Have we chosen the right problem? We have been able to talk to many different users and other stakeholder, which has given us a great insight on how this system works and the problems that occur in this system.

Our experience with Designit has proven to be very good. They have met us with open arms, given clear tasks for us to do and provided relevant feedback for our deliveries.

The task defined and knowledge required did at times seem overwhelming. And because of the large task we were given by Designit, with no clear problem, we had to focus more on data gathering and exploration of challenges, rather than developing prototypes for a given problem. We feel that we chose the right problem based on the data we gathered and the insights we got.

The involvement of Ruter in this study has been limited. Ideally stakeholders and actors should be involved in the process. Since we are radically changing Ruter’s ticket system, feedback from them is essential. We need more knowledge on the desired customer experience, from the organizations point of view.

We could have included workshops into the design process, where we would gather different users. In that way we would get more opinions in shorter time and we could discuss design decisions. The full potential of using personas, customer journeys and scenarios would be apparent. We need to work together with users on sketching out the happiest path ever.

We wanted to test the users satisfaction of the current system, and further on find the biggest problems. According to Rana Imam (2014), “It is necessary to increase user satisfaction through improving the public transport system [...], in order to maintain existing users and attract new passengers. These improvements will make the city more sustainable and reduce the use of private cars in the future.” So by increasing the satisfaction and usability, we believe that we would get existing customers to use public transport even more, as well as attracting new customers.
6. References


Appendix

A.1 Discoveries from Observations

<table>
<thead>
<tr>
<th>Observation</th>
<th>Lessons learned/Questions raised</th>
</tr>
</thead>
<tbody>
<tr>
<td>A polish couple buying tickets from the ticket machine. The lady was making</td>
<td>The machine is only in Norwegian and English. If you do not understand either, it is difficult.</td>
</tr>
<tr>
<td>selections on the display, while the man was telling her in Polish what to</td>
<td>Why did the couple not choose two tickets at once? Is it difficult to understand the interface?</td>
</tr>
<tr>
<td>press. Having succeeded in purchasing one ticket, they went through the</td>
<td></td>
</tr>
<tr>
<td>operation a second time.</td>
<td></td>
</tr>
<tr>
<td>An elderly man passed the ticket validator, swiped his card and leaned</td>
<td>For tall people and those with impaired sight, it is difficult to know if your ticket has been</td>
</tr>
<tr>
<td>forward to come close up to the display.</td>
<td>validated.</td>
</tr>
<tr>
<td>A young girl inserted “Ruter-card”, used the touchscreen, inserted</td>
<td>Young users have no problems using the Ticket machine.</td>
</tr>
<tr>
<td>bankcard. No apparent problems.</td>
<td></td>
</tr>
<tr>
<td>A man is at the machine to buy a ticket, there is a queue, and soon the</td>
<td>The solution is time-consuming to buy a ticket. Passengers risk having to enter subway without</td>
</tr>
<tr>
<td>T-bane is coming. He excuses himself to a lady who is waiting her turn.</td>
<td>a ticket or have to wait for the next subway.</td>
</tr>
<tr>
<td>He says “what is cumbersome is if I do something wrong I have to start all over again”</td>
<td></td>
</tr>
</tbody>
</table>
## A. 2 Issues & solutions

<table>
<thead>
<tr>
<th>How to help the user to...</th>
<th>Solution</th>
</tr>
</thead>
</table>
| … find the cheapest ticket alternative | Use first, pay after + enter budget  
Skjerm med valg, Info ved validering  
Avslutt (billetmaskin, nettside, kontor, smartphone) |
| … buy a ticket | Better interface in combination with “use first, pay after”  
Registrer kredittkort i automat  
Automat skriver ut reisekort, Brukeren scanner kortet hver gang hen skal bruke kollektivtransport, Brukeren leverer kortet tilbake i automaten, og får en oversikt over sitt bruk, og blir belastet det brukte beløpet (som automatisk blir billigste alternativ) |
| … know which bus/tram/metro to take? | Touch screens  
Store touch skjermer på viktige knutepunkter (f.eks. Oslo S og Nationaltheateret)  
Skjermene inneholder et kart hvor man kan klikke eller søke etter destinations (samme som google maps) Brukeren velger det beste alternativet og får skrevet ut en oppsummering over sin reise |
| … understand how to use their ticket | Information/illustration on ticket  
Skrive/tegne informasjon på kortet(see to første punkt) om hvordan det skal brukes, Mer informasjon på buss/trikk |
| … find the right platform | Top attractions  
En liste med største/mest brukte attraksjoner på bussskuret |

## A. 3 Results of survey on the concept of FLEXI Travel

![Survey Results](image)

Ville du ha betenkeligheter med å bruke FLEXI kortet?

- Ja: 21,3%
- Nei: 73,7%
- Uenig: 5%
<table>
<thead>
<tr>
<th><strong>Hvorfor vil du ha betenkligheter med å bruke systemet:</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Litt mye depositum. Lurt å kunne velge depositum for kun to uker.</td>
</tr>
<tr>
<td>Kort fra utlandet må åpnes for å brukes i Norge. Sperres igjen etter at de har reist hjem. Må trekke beløpet før det sperres</td>
</tr>
<tr>
<td>Ville helst betale manuelt og ha kontroll over prosessen</td>
</tr>
<tr>
<td>It is difficult for a foreigner to register an account in Norway. Told him that this system was working for most cards in the world, then he liked it.</td>
</tr>
<tr>
<td>I don't think this card is better. I use a monthly card, and that works great for me.</td>
</tr>
<tr>
<td>Vil ha automat for å gjøre opp på flyplassen.</td>
</tr>
</tbody>
</table>