

UNIVERSITY OF OSLO  
Department of Informatics

# Personal Transportation Planner

An INF3260/INF4260  
project

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# Innhold

<b>1</b>	<b>Introduction</b>	<b>4</b>
1.1	Background . . . . .	4
1.2	Public Transport Information from Trafikanten . . . . .	4
1.3	Purpose . . . . .	5
1.4	Research questions . . . . .	6
1.5	Intellectual and Personal Motivation . . . . .	6
<b>2</b>	<b>Focus users</b>	<b>7</b>
<b>3</b>	<b>Conceptual model</b>	<b>7</b>
<b>4</b>	<b>Theory</b>	<b>9</b>
<b>5</b>	<b>Presentation</b>	<b>9</b>
<b>6</b>	<b>Method</b>	<b>9</b>
6.1	Visions and Ideas and Design as creative Process . . . . .	10
6.2	Gender Aspects in technology Design . . . . .	11
6.3	Description of Domain / Problem Area . . . . .	11
6.4	Project Plan . . . . .	11
6.5	DECIDE Framework and Tasks done accordingly . . . . .	13
<b>7</b>	<b>Empirical Chapter</b>	<b>13</b>
7.1	User-test . . . . .	13
7.1.1	User 1 . . . . .	13
7.1.2	User 2 . . . . .	16
7.1.3	User 3 . . . . .	17
<b>8</b>	<b>Prototype</b>	<b>18</b>
8.1	Low-fidelity prototype . . . . .	18
8.2	High-fidelity prototype . . . . .	22
<b>9</b>	<b>Evaluation</b>	<b>22</b>
9.1	Approches to evaluation . . . . .	26
9.1.1	Usability testing . . . . .	26
9.1.2	Field studies . . . . .	26
9.1.3	Analytical reviews . . . . .	26
9.2	Evaluation framework . . . . .	27
9.2.1	Determine the goals . . . . .	27
9.2.2	Explore the questions . . . . .	27

9.2.3	Choose the evaluation approach and methods . . . . .	27
9.2.4	Identify the practical issues . . . . .	27
9.2.5	Decide how to deal with the ethical issues . . . . .	28
9.2.6	Evaluate, analyse, interpret and present the data . . . . .	28
9.2.7	Reliability . . . . .	28
9.2.8	Validity . . . . .	28
9.2.9	Biases . . . . .	28
9.2.10	Scope . . . . .	28
9.2.11	Ecological validity . . . . .	29
<b>10</b>	<b>Interpretation discussion</b>	<b>29</b>
10.1	Testing Application with findings . . . . .	29
10.2	Findings from the Interview and Questionnaire . . . . .	31
<b>11</b>	<b>Conclusion</b>	<b>31</b>
11.1	Futher work . . . . .	32
<b>12</b>	<b>Appendix</b>	<b>33</b>
12.1	Questionnaire . . . . .	33
12.2	Person 1 . . . . .	33
12.3	Person 2 . . . . .	35
12.4	Person 3 . . . . .	36
12.5	Person 4 . . . . .	38
12.6	Person 5 . . . . .	39

## Abstract

This project present a way of using Personal Transportation Planner which is a proposed web service that is supposed to make it easier to plan travel with public transport based on an existing appointment schedule. During the project time there has been conducted several tests and evaluations within the primary prototype. This prototype is meant to be a basis for future Personal Transportation Planne calendar use. The Personal Transportation Planne system covers areas such as user support, use of information data direct from Trafikkanten and the Google Calendar API. The project describes in details the development process and the result from the user participants. The Software Development life Cycle is used as methodology [11].

## Acknowledgement

We would like to deliver our gratitude and heartiest thanks to everyone who helped us in the contribution towards this project, from the inception of the wonder document to this final delivery. Especially, the feedback from Jo Herstad has been really helpful from the wonder document, and also Amaia SantaColoma's feedback from the mid-term submission. The class lectures given by our Professors Jo Herstad and Alma Culén has been really helpful throughout the span of our project. This helped us through the process from analysis to maintenance and evaluation. This is also to thanks all those who helped us in the evaluation phase of this project. We hope that all these efforts by everyone, to the outcome of every fragment of work for this project will make this a more user interactive application. Finally, all our project members have had a great time working together : this is with regards to Robert, Trond, Isir, Kim and Promila. Robert and Trond really have been the technical developers for this project. Their working of day and night has been really making this idea into a working application form. Isir and Kim has been really a core asset to this project and Promila has been making the plans and contributing equally to every aspect in this project.



Figur 1: Public transportation time schedule

## 1 Introduction

Our initial project idea was to provide users of public transport an easier way to retrieve travel information and import this travel information automatically into their daily or weekly schedule. The original idea was very wide we intended to allow user customization such that factors like cost, efficiency, comfort and the need for personal exercise would be taken into account. We also talked about the possibility of having a way to find alternate travel routes for each day, or to design a system that automatically found shops and services for the users. However we quickly narrowed the project down after the first two project meetings. The whole process revolves around the DECIDE framework and "Agile Process Development" methodology is used [10].

### 1.1 Background

People need to use public transportation, and often has to rely on manually keeping schedule and to manually retrieve information about public transport. To do both manually requires more time and attention from the user. Whenever there is a change in the traveler's schedule the user would need to manually get new information about public transport, also it is hard for the traveler to keep track of changes and delays in public transport without spending a lot of time and energy. Our assumption was that this is not very practical for the traveler, and that an automation of the retrieval of traffic information would save time and effort for the user.

### 1.2 Public Transport Information from Trafikanten

For the counties of Oslo and Akershus Trafikanten offers information about boat, bus, tram, metro and trains. Some of this information is allegedly up-

dated real time. Users have several ways of accessing public transport information from trafikanten:

- With a mobile phone using the SMS and WAP services.
- On the world wide web using Trafikantens web portal.
- Using printed time tables available at Trafikanten and other places.
- Printed tables at stops, some stops also got realtime information.
- Visiting the Trafikanten office in person.
- Calling Trafikanten on and asking a real person.

The Trafikanten web portal also factors in the time it takes to walk to, between and from stops. And allows for various forms of user control for the information provided, for example you can choose which means of transport you want and don't want to use, and how much walking you are willing to do. The trafikanten web portal is great, but it can be very time consuming to use manually especially if you need to plan more than a single trip.

### 1.3 Purpose

The main purpose of this project has been to design and evaluate Personal Transportation Planner and to look into further and extended use of applications of this kind. The secondary purpose has been to apply the theoretical knowledge of human computer interaction we have learned through this course in a practical project.

Our project has looked into a new way of extending the usability of the current Trafikanten web portal, through a web application that interact with the Trafikanten web portal on behalf of the traveler. Our service Personal Transportation Planner interacts with the Trafikanten webportal and extracts the relevant travel information from the data provided by the users schedule retrieved from Google Calendar. All the travels that need to be made are then returned to Google Calendar where it is to be presented. Our web service offers a way to plan the travels needed to get from and to every appointment in the schedule without the traveler ever having to access the Trafikanten web portal or getting other travel information from Trafikanten manually.

## 1.4 Research questions

1. Why there is a need of Personal Transportation Planner?
2. How can this be an application covering the common user requirement?
3. How can the testing and evaluation help us in developing a better software application comprising in the agile process?

## 1.5 Intellectual and Personal Motivation

**Trond Sorvoja** is currently studying at his first semester of his master degree in informatics at the University of Oslo. Trond is taking this course in human computer interaction to get a better understanding of design processes, evaluation and determining user needs.

**Kim Chi** is a bachelor student. Kim Chi Huynh Thi is taking this course in human computer interaction who is going to finish her bachelor degree in informatics and economic. Kim Chi is also interested in design processes and has also contributed in the analysis phase of the prototype.

**Promila** is a Master student in “Innovation and Entrepreneurship” In University of Oslo. She is a Bachelor in Computer Science and Diploma in Advanced Computing from Pune, India. She has also been a “Software Testing Engineer” and leading her team Lionbridge Technologies, Mumbai, India. Thus her past experience also helped in the process of analysis, evaluation and planning. She has also taken a course in Qualitative Research Methods INF5220, which contributed a lot in the research method and process in our project. She herself takes T-bane everytime and finds a need to have an efficient form of getting the information she needs faster and easier. She also uses google calendar and thus the need for PTP will serve her own need of Calendar and Trafikantan data in one with added facilities of optimized travel information.

**Isir** is a bachelor student, she is taking this course for to reasons. 1) To get better knowledge about design process and 2) To understand Human and their behavior, thats why she is studying psychology. Her main aim is to understand Human and how to fulfill their needs.

**Robert** is a bachelor student following the general Informatics bachelor program. Since 1996 he has been working in the computer industry as a

system engineer and later as a web-programmer. Information technology and the Internet has always been his core interests. During the years Robert has created many websites, both as an employee and as self employed. Through this work HCI has always been an important issue. In the future Robert hope to work with advanced information technology and Information Design. Here appliance of topic maps and how to create useful interaction with them is one of his main interests. Robert lives in Ski and uses train and t-bane go get to the university. He is also a father and self- employed thus the need for a system that makes scheduling his daily transportation needs efficient.

## 2 Focus users

**Pupils / Students** - This can be students from any area from research to school student. Under this “Group1” category of users we have tried to focus to the ones who use google Calendar with Trafikantan. This is due to the kind of application we are having so as to have a link between the requirement and fulfilling of these requirement.

**Working professionals** - This type of users come in our “Group2” category of users. This can be any type of working professionals, who owns or do not own a car but the ones who defienitely travel by train, bus etc.. This has to be accompanied by their usage of google calendar. We have discussed about have more types of e-calendar, but this can be done in our further work area.

**General** - This can consist any type of users who uses Tafikantan and google Calendar. This can be a housewife to anyone who explicitly does not come under our above mentioned categories.

## 3 Conceptual model

Users does quickly develop a mental model of how a system is supposed to work. This mental model can be accurate and inaccurate to various degrees. Designers of a software sytem must ensure that the mental model the users becomes as accurate as possible. This is done by developing a conceptual model of the system. A conceptual model needs to be so explicit as possible and could be aided by using daily life metaphores that the users have an working understanding of.



“According to Norman a good conceptual model allows the users to predict the effects of their actions” (Norman,1988,p13) In other words the conceptual model is a conceptual framework in which the system is presented. The main metaphore in our conceptual model is looking up travel times in a time schedule and writing down the information needed to be able to make these travels in a calendar or daily planer.

The concepts:

- Time schedule for public transport
- Calendars
- Pen or pencil

The approach we used when creating the conceptual model of Personal Transportation Planer was to build upon the the users existing knowledge of using a calendar. The use of calendars and calendar planers are common knowledge and part of the background knowledge of most of the population in Norway. We assumed that most have this specific knowledge atleast after the age of 12. Many products and spesificly electronic and computer based schedules already builds on this background knowledge and understaning of calendar use.

Personal Transportation Planer requires and builds functioanlity of Calendar software. It was assumed that the users would already be using some sort of Calendar software or would learn how to use some sort of Calendar software before using the personal transportation planer. The concept was that the user would plan his or hers schedule in the calendar software and that the Personal Transportation Planer would then automatically parse the schedule and request travel information from a online source and then return the information to the calendar software where the result would be presented. Since the Personal Transportation Planer was intended not to make the user deal with any complex tasks, it should be easier for the user to adapt his or hers mental model based on his or hers existing mental model of the electronic calendar the user already knows how to use.

There are a large number of electroic calendars that are in common use, some of those are Google Calendar, Windows Calendar, Yahoo! Calendar, iCal and Outlook Calendar. The project group has had a focus on Google Calendar, but this has not affected the conceptual model of the system. Personal Production Planer should in a production stage be able to use or be adopted to use all common calendars and be adopotable to use with any online travel planer.

The conceptional model of Personal Transportation Planer does not require that the users have any existing knowledge of using online travel planers or even requires the users to know how to use a time table.

## 4 Theory

We based our study of users, by having "Qualitative Research Methodology"[7]. Our study from interviews and questionnaire was to find out about what are user requirements before and after the prototype was developed. All this was possible in the analysis phase. Analysis in the beginning was to clear our specification requirements assuming an ideal user's requirement. This was then accompanied by Questionnaires prepared and implemented on certain scale of users, which made possible for us to have an idea if our project vision can be met. Many people use some sort of calendar, planner or schedule to organize their everyday tasks, and we had assumed that our target users are familiar with interacting with a calendar. We also had an assumption that our users have the computer literacy to use and interact with well known applications like e.g. Microsoft Outlook, Google Calendar.

## 5 Presentation

The application is such that we need the user to test it having the resources like computer and internet connection. Some of the Questionnaire was taken in the University Campus and the Interviews took place in the respective homes of our members. This was to have a better ambience and silence environment to have as much information we can collect from the user study. This has been a very good experience by us and our interviewees. There was a possibility of taking such interview in a lab sort of environment but since it was just the first prototype this was needed. We have this approach under discussion by our members, so that we can consider this for further work. This will be especially useful to do defined testing (eg. Compatibility testing)

## 6 Method

We have initially uses "Questionnaire" with 5 people. This was basically to know if our Project area can serve its purpose. This was then followed by the next set of "Questionnaire" with 3 more people. The second questionnaire was done after the development of the Application was done. Thia was

useful because, this made sure if we can make more modifications to the enhancement of our application. We followed the “Formative and Summative Evaluation” techniques. As per our Software Development Life Cycle Process where in the testing phase we planned to take 3 more “Interviews” in the form of closed question format. Here we came up with 10 questions to be replied by our interviewee so as to get an enhanced evaluation. “Alpha Testing” was done by all our members and thus the “Beta Testing” was done by our interviewees. Our Application is an evolving application so we are basically doing “Action Research”, its an iterative method. Since we are following the Agile Process the process will take lot of user involvement to get the better application.

## 6.1 Visions and Ideas and Design as creative Process

The design process and the design product are influenced by the situation and context. The process of creating an artefacts includes a series of stages on the road from an idea to a finished artifact. A common view is that design processes involve the making of visions, sketches , and specifications, seen as levels of abstraction and detailed work on, in parallel during the design processes the vision may need re-vision after some sketching work the specification may need some extra sketching. Visions of system usage, the new way of doing things, the change, are constructed in negotiations between people with various roles, responsibilities , and power between people from different design and use organizations.

The design consists of the follow characteristics: Design as product We are surrounded by artifact designers with the aim to support human activity . I find it useful to characterise artifacts by their:

**Function** their usefulness with respect to human activity

**Meaning** their symbolic value within a particular culture and society and

**Communication** how function and meaning are presented in form and structure.

The meaning of an artifacts can be found if we interpret its form as a sign within a particular culture. In Western societies consumers choose between a range of very similar products that do approximatly the same thing , but give different cultural signals. The resason for choosing one brand rather than another has more to do with the cultural meaning of the artifact than with its functionality.

## 6.2 Gender Aspects in technology Design

There are interesting insights to be gained from looking for gender in design of technology. In a gendered society gender would be a significant characteristic of how we experience and act in the world. Gender aspects of technology are particularly visible when we study the relations between design and use. Design of gendered technology reinforces a gendered culture which is the basis for designing gendered technology. Bringing gender issues to design may contribute to a more open attitude within technical cultures towards different ways of thinking about computers and software as well as towards different evaluation criteria for what makes a system.

## 6.3 Description of Domain / Problem Area

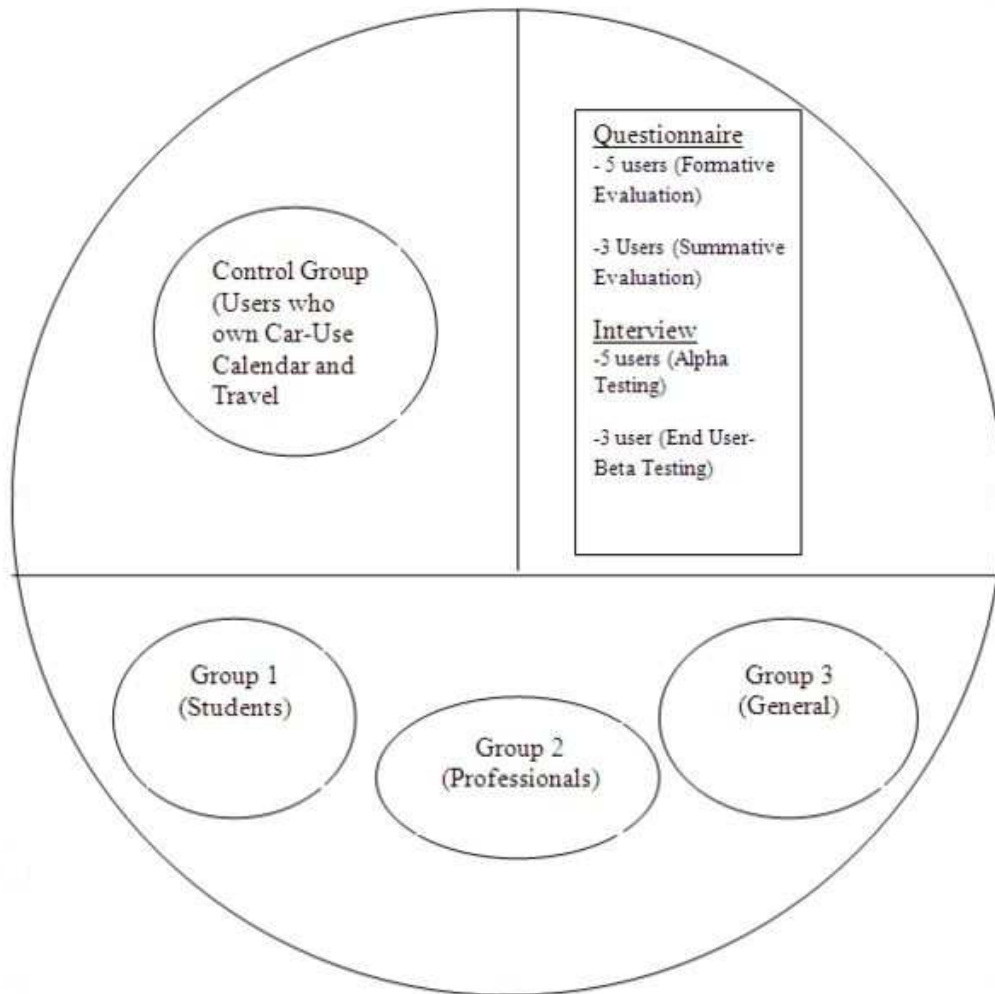
Our domain is concerned with the online Calendar and Trafikantan information. This is a wide area of domain. We have tried to gather the user data from the google calendar and taken the required information for the Traffic information data from the Trafikantan. The domain users are sub-divided into groups so as to gather data about how can we further enhance it. This needs enough data collection and analysis, which also comes in the further evolving iterative process.

We have the first sub type of group containing the “Student Users” as “Group1”, then we have “Group2” as the “Professionals”, this is thus been accompanied with “Group3”, which is the general users. This general type of users can be anyone from housewife to the ones who does not come in the category of the specified above mentioned groups. We also have “Control Group”, this is a type of users who owns Car and very rarely uses transportation and are computer literate yet prefer using conventional Calendars.

We have many limited constraints, this can be mainly for the users who are not computer literate or the ones who are above a certain age and are used to the conventional methods. This is also limited for the blind users, there can be some additional approach we can place in the suggestion of our further work. This application is also restricted to the users who are in our “Control User” area. These are the users who very rarely use Trafikantan and can use e-Calendar but prefer to what they are used to, say the conventional “Notebook Calendar”.

## 6.4 Project Plan

See table 1



Figur 2: Focus users

## 6.5 DECIDE Framework and Tasks done accordingly

See table 2

The project has been planned as per the SDLC (Software Development Life Cycle) method and we have used Agile Process which is an iterative method, therefore there a lot of further work involved and we have just prepared the first version of this application. We have strictly followed the DECIDE framework which gave us guidelines to work and this helped us to make this research successful. The below template is a summary of process and tasks involved using the DECIDE framework. We have had meetings every once a week so as to keep in track of the actions and tasks. It was during this span where we started with the through determining of goals, then with the subsequent meetings we had brainstormed in group so as to gather efficient questions for our Questionnaire. This was further maintained by choosing the method (Questionnaire and Interview) and identification of practical issues were taken care of with the data we gathered from these methods. We also formed a template to be used in our interview process so as to take care of the ethical issues and finally we evaluated, analysed, interpreted, the data we collected from this approach.

## 7 Empirical Chapter

### 7.1 User-test

The Questionnaire and Interview was very helpful while we proceeded further. The initial Questionnaire gave us thought about how to proceed and thus after the implementation we took more Questionnaire and Interviews so as to make our Prototype feasible with the user requirement. The template for the given Empirical chapter gives a summary of the data we gathered during the “Interviews”. The raw data from in the tabular form of the “Questionnaire” is present in the Appendix.

#### 7.1.1 User 1

1. How do you find the overall Graphical user interface of the application?

*It is very simple to understand but some graphical images would make it look more better understandable.*

2. Do you find it easy to get acquainted with the user friendliness of the application?

*Yes, but the names of the functionalities can be made shorter.*

<b>Phases</b>		<b>Milestone</b> (1-10 Weeks) Meetings every week	<b>Members In- volved</b>
	Questionnaire(5)		Kim
Specification			All
	Questionnaire (3)		Promla
Design			All
Implementation (Development)		5 weeks (App- rox.)	Robert, Trond
Testing			All
	Alpha Test (5)		All
	Beta Testing (3)		Promila, Robert
Maintenance	Further Work	Further Work	Further Work

Tabell 1: Project Plan

<b>No.</b>	<b>Decide Framework</b>	<b>Tasks</b>
1	Determining goals	Analysis
2	Explore Questions	Brainstorm Questions by all
3	Choose Evaluation approach and methods	Questionnaire & Interview
4	Identify the practical issues	How can the information be helpful in the Application
5	Decide how to deal with ethi- cal issues	Agreement signed by inter- viewee for data security
6	Evaluate, analyse, interpret, and present the data	Testing (Alpha and Beta Test- ing)

Tabell 2: DECIDE Framework and Tasks done accordingly

3. Do you have any suggestions for any new functionality in it as per your ease, if yes, can you explain how do you want it?

*A help page may serve better for an end user, if he has any difficulties.*

4. What would you say about the overall application?

*Overall application is very interesting but if the functionalities were placed in the tabular format, it would have been more user friendly.*

5. How do you find the interaction with this application?

*The first page itself explains everything but as an end user I like the page to have a drop down menu, this can make the page look compact yet containing all the functionalities.*

6. What would you say about the navigation of the functions?

*It is serving its purpose.*

7. What would you say about the Calendar and Trafikanten data being on a same application?

*I think this is something I need as a person using T-bane frequently.*

8. If you think it will help you make your travel efficient, how will this help you plan your personal transportation?

*I don't have a car so I use bus, and T-bane very frequently for my communication, I think this will give me both the Calendar and Trafikanten data in one platform.*

9. Is the functionality names giving its purpose if not what names would you suggest?

*“What do you need?”, “What do you get?”, “What will happen?” can be reframed as “Requirement”, “Result”, and “Outcome” respectively.*

Do you think we should explain more on how to go about the application for the user so that he will understand better how to use this application, if so what would you suggest us to add ... (what kind of data ... explain your need area...)

*I think a help page for the user can give all the basic needed information for a user.*



### 7.1.2 User 2

1. How do you find the overall Graphical user interface of the application?

*It is too much of text in one page.*

2. Do you find it easy to get acquainted with the user friendliness of the application?

*It is user friendly.*

3. Do you have any suggestions for any new functionality in it as per your ease, if yes, can you explain how do you want it?

*A functionality which can summarize on how to go about it, in few lines can make it more simpler for a user.*

4. What would you say about the overall application?

*Its user friendly and helpful for people like me.*

5. How do you find the interaction with this application?

*Some images or graphics can make it look more user interactive.*

6. What would you say about the navigation of the functions?

*Navigation is simple but a link which can explain in simple words of how to go about it can make it more easier.*

7. What would you say about the Calendar and Trafikanten data being on a same application?

*Its wonderful, I use google Calendar and Trafikanten so it's the one for me.*

8. If you think it will help you make your travel efficient, how will this help you plan your personal transportation?

*It will make me save extra overhead time for finding new destination, also saving my walking time.*

9. Is the functionality names giving its purpose if not what names would you suggest?

*Yes, it can be with less text.*

Do you think we should explain more on how to go about the application for the user so that he will understand better how to use this application, if so what would you suggest us to add ... (what kind of data ... explain your need area...)

*In few words if there is an explanation of how to use this application may be more simpler and less efforts to know the details.*

### 7.1.3 User 3

1. How do you find the overall Graphical user interface of the application?

*Fine, clean and one gets the overview. Good that the pages have the same layout, and that information is on the same spot on the page for every page.*

2. Do you find it easy to get acquainted with the user friendliness of the application?

*Yes, since it is so clean.*

3. Do you have any suggestions for any new functionality in it as per your ease, if yes, can you explain how do you want it?

*The application should show the user all requirements on top of the first page. It should explain where you should place the address for every appointment in the calendar. There could be shown a list of your appointment so that you could select which appointments you want to be calculated. Also one should be able to define a period of time from which to calculate the transportation.*

4. What would you say about the overall application?

*Its a useful problem definition.*

5. How do you find the interaction with this application?

*Fine.*

6. What would you say about the navigation of the functions?

*It should be a home-link, and also a cancel or back link.*

7. What would you say about the Calendar and Trafikanten data being on a same application?

*Useful*

8. If you think it will help you make your travel efficient, how will this help you plan your personal transportation?

*I don't need to go to Trafikanten for every appointment, so I would save some time.*

9. Is the functionality names giving its purpose if not what names would you suggest?

*Yes.*

Do you think we should explain more on how to go about the application for the user so that he will understand better how to use this application, if so what would you suggest us to add ... (what kind of data ... explain your need area...)

*Its pretty self-explaining. It should be explained that PTP is short for Personal Transportation Planner.*

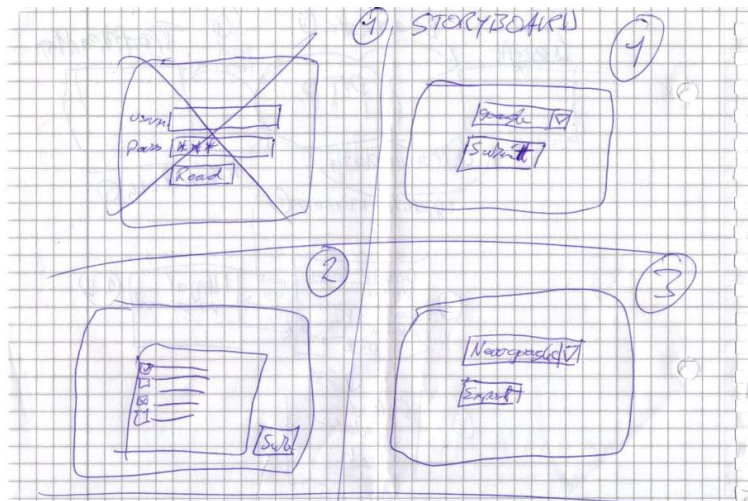
## 8 Prototype

We give a definition between prototype and prototyping. A prototype is a working model of parts of an information system, which emphasizes specific aspects of that system. We define prototyping as approach for establishing a systems requirements definition which is characterized by a high degree of iteration by a very high degree of user participation in the developments process and by an extensive use of prototypes. There are kinds of classes of prototyping. The kind of prototyping that concentrates on modelling the user interface of a system is generally called userinterface prototyping. If some real functionality is added to the prototype the term functional prototyping is sometimes used. A second approach classifies prototyping according to the timing of the development process. Exploratory prototyping aims at discovering the user requirements. Experimental prototyping takes place in the technical design phase. The third kinds of prototyping is evolutionary prototyping involves evolving a prototype into the final product. An alternative approach called throwaway prototyping uses the prototypes as stepping stones towards the final design. The prototypes are thrown away and the final products from scratch. If an evolutionary prototyping approach is to be taken, the prototypes should be subjects to rigorous testing along the way, for throw away prototyping such testing is not necessary. Above all this we are concerned with the evolutionary prototype as this is the same model which will be enhanced during the span of its evolution.

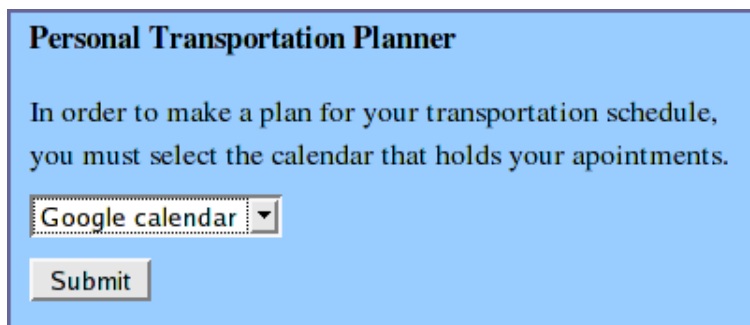
Two types of prototypes was created for the project.

### 8.1 Low-fidelity prototype

The first one was a low-fidelity prototype assembling a storyboard. Since the sketches shows user interfaces, this prototype both shows some conceptual



Figur 3: Prototype 1



Figur 4: Storyboard 1

**Personal Transportation Planner**

Select the calendar from which to create the transportation schedule.

Private

School

Work

Wife

Figur 5: Storyboard 2

**Personal Transportation Planner**

Where would you like us to store your transportation schedule?

Figur 6: Storyboard 3



Figur 7: Storyboard 4

design and physical design.

The storyboard showed three screen sketches of the user interface that the user would see when using the system. The functions showed by the prototype is sequential, and it shows what the user will do, not what the system will do. The prototype was created in HTML, without any functionality, just showing the elements from which the user could interact. This again was screen dumped for the purpose of showing them in our reports. This was easy to produce, was quick, and we could easily iterate through several throwaway prototypes like this until we all agreed on it.

This prototype was meant to be used by our self when we discussed what the system should do and how it should appear for the user. This way some of the conceptual designs of the project was also made visible. The main purpose of the systems user interface is to let the user provide information to our system so that it can calculate the information the user wants. The data that is produced by the system is not displayed. It is sent to a target system selected by the user.

A prototype showing the conceptual design might have been appropriate even before we created the first low-fidelity prototype. However the group felt confident that all understood the concepts.

## 8.2 High-fidelity prototype

The second prototype was high-fidelity prototype made in the environment that would be used in the final system. The prototype assembled the user interfaces from the initial prototype, showing more features and information to the user. The prototype was capable of collecting information from the user and use them to access information and produce the information the user asks for. To be able to accomplish this a vertical approach was used. Only a narrow set of alternatives was displayed to the user.

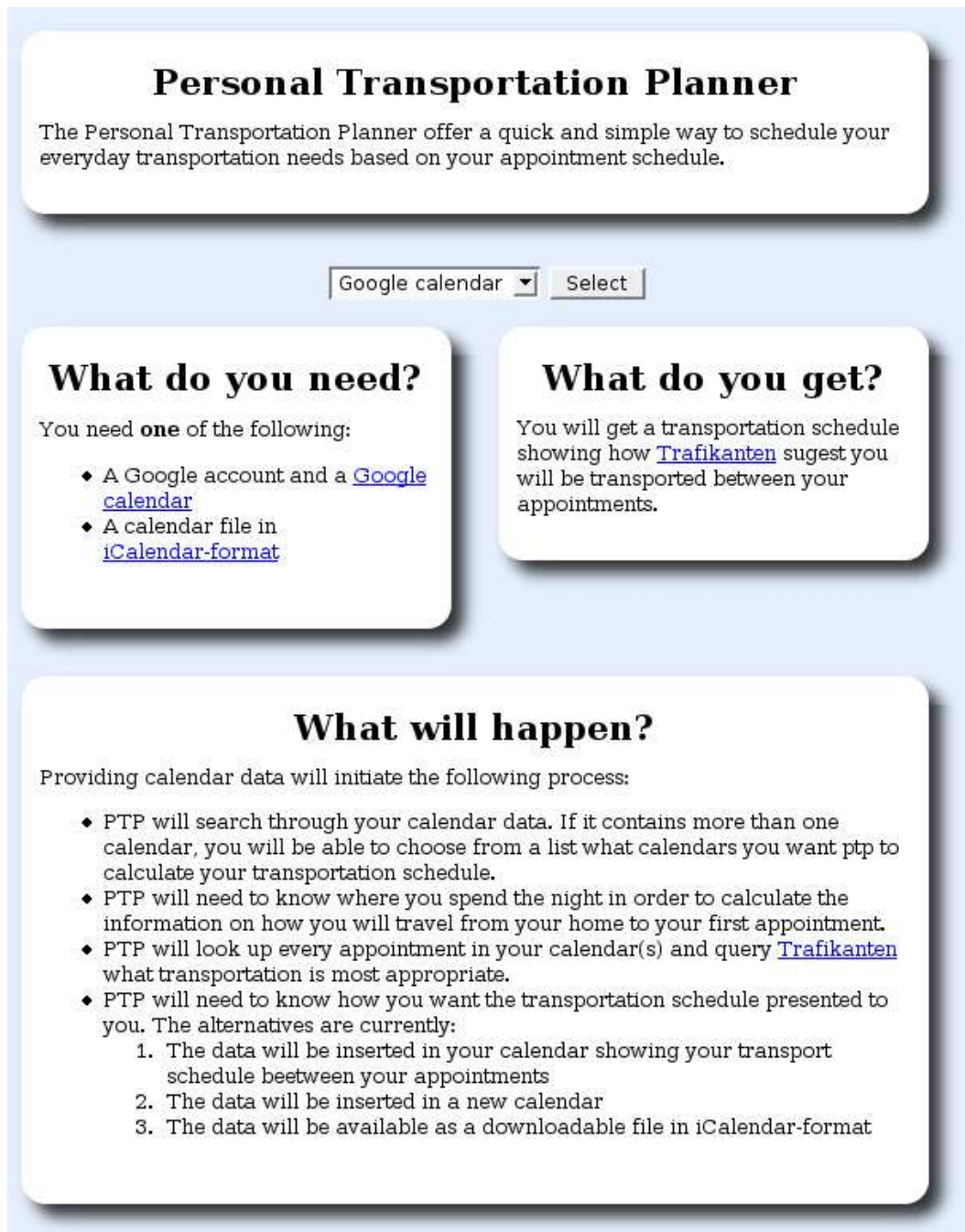
This is a typical evolutionary prototype, that could grow to be a full blown system later. With this we could consider what interaction types was mos appropriate and also what kind of technology this would demand.

Our “Prototype” screenshots are as follows. The below is the first main page of our web application. This allows users to select the required given functionalities as seen in the snapshot. Since this is an evolving prototype, there will be lot of modifications done in every subsequent iterations. We have just completed our first iteration.

See figure 8, 9 and 10.

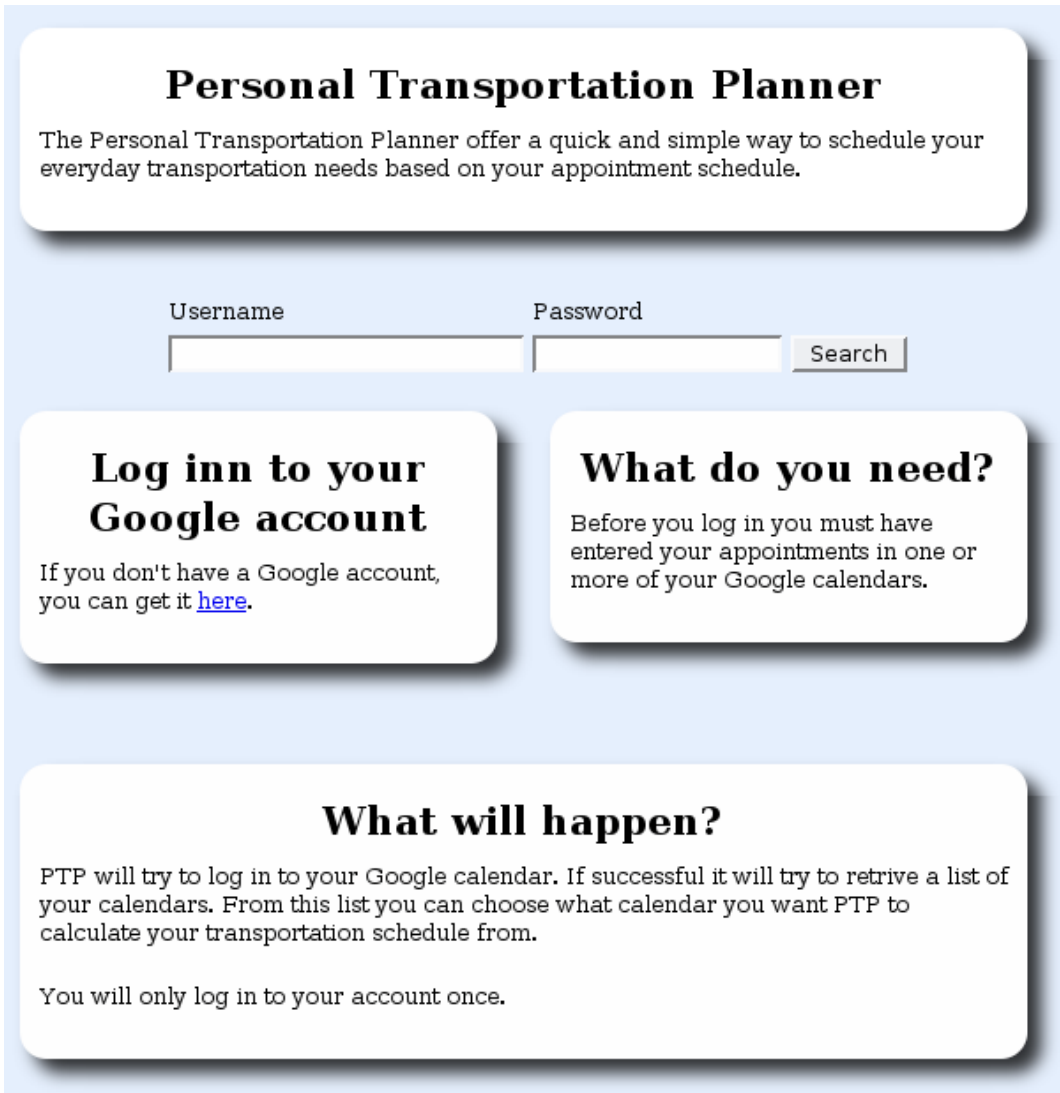
## 9 Evaluation

Evaluation of the interface design was a crucial part of the interface design [8]. There were "Questionnaire"and "Interviews"conducted so as to know if it complies to the user need [9]. During the span of our project life cycle process we have done “Formative Evaluation” and “Summative Evaluation”. Formative evaluation was done before the design of our application. This was done in a very crude primary state so as to know if this can be really useful for the intended users. This was done initially in the form of Questionnaire using 5 users. Summative evaluation was then consequently done after the implementaion process so as to calculate our acheived requirement. This was also done using Questionnaire form using 5 more users. This was a study to find out if our initial basic defined goals are acheived or not. After the development, testing was followed and we have had initial testing at our end (Alpha Testing). We all were involved in that. Since this was to the prototype we came with only specific number of defects but we could gain some more suggestions from our end users after our Interviewing was done using 3 more users. This was more like a testing done using “Pilot users”. This was done more in the “Beta Testing” phase. These were just the very initial step after the initial prototype was ready, thus this will go on as the iteration keep increasing.



Figur 8: Prototype screenshot 1





Figur 9: Prototype screenshot 2

## Personal Transportation Planner

The Personal Transportation Planner offer a quick and simple way to schedule your everyday transportation needs based on your appointment schedule.

- UiO oppgaver
- Blarder
- DevAssis
- Felles
- Halvard
- Robert Strind
- UiO høst 2007
- UiO viktig

Select

### Select calendars

Select the calendars from which PTP will calculate your transportation schedule.

### What do you need?

PTP will only calculate appointments that have defined a correct adress.

### What will happen?

PTP will try to log in to your Google calendar. If successful it will try to retrieve a list of your calendars. From this list you can choose what calendar you want PTP to calculate your transportation schedule from.

You will only log in to your account once.

Figur 10: Prototype screenshot 3

Evaluation is an integrated part of design. The purpose of evaluation is to discover if a product or service appeals to the intended end users. Since designers and developers often does not have a good intuitive insight into the psychology, background knowledge, needs and desires of the intended end users evaluation is needed to be able to adapt the design in order to make the product or service more useful and user friendly for the intended users.

## **9.1 Approches to evaluation**

Evaluation can be done using various methologies, some requires more time and user involvement than others. There are typically three different approches to evaluation and these approches can be combined.

### **9.1.1 Usability testing**

Usability testing messures how well intended users preform using the product or service. Usability testing involves recording and messuring what the users do. It could be how fast they are able to perform a task, and how they go about performing the task if there are multiple ways of getting the task done. The results of a usability test is typically easy to quantify and analyse statistically. In our case we did by note taking, as the information to note down was not too technical therefore this was useful in our case.

### **9.1.2 Field studies**

Field studies are done in a natural setting where the product or service is intended to be used. The goal is to get an understanding of what people do and how the product or service can enhance their performance. It is often used to find design requirements, find ways to use new technology in this setting or to evaluate the way existing technology is being used. Data is typically collected to interviews and observation. Visual and audio recording are useful during field studies, but we did it by note taking.

### **9.1.3 Analytical reviews**

An analytical review is either an heuristic evaluation or the use of theoretical models to predict how well the intended users will use the product or service. Heuristic evaluations is done by experts using rules of thumb, guidelines and standards to identify potential problems with a proposed design. Models are typically used for comparing efficacy of various designs of a product or service, e.g. to minimize the walking needed to be done in a control room or warehouse or minimize the number of keystrokes needed to get tasks done on

a computer system. In our process we did this by knowing the requirement of the intended users from the inception till the final prototype testing.

## **9.2 Evaluation framework**

The DECIDE framework is often used during evaluations. This framework consists of six items or checkpoints that are connected.

### **9.2.1 Determine the goals**

It is critical to identify the goals of the evaluation. To identify the goal several factors needs to be included. Who wants the evaluation, and what will they do with it? Different parties might have different motivations for having an evaluation done. This was incorporated in our “Analysis phase” of first iteration of Agile methodology which we have used.

### **9.2.2 Explore the questions**

In order to fullfill the goals it is important to articulate what questions the evaluation should answer. Each question can in turn be divided into more detailed sub questions and this could be repeated until the level of detail is adecvate to have the ansers needed to fullfill the goals set for the evaluation. This was done by brainstorming questions by all our members.

### **9.2.3 Choose the evaluation approch and methods**

There are a number of differnet approched that can be taken to investigate the questions that need to be answered inorder to meet the goals of the evaluations. Time and money is often a limiting factor and can result in that the questions and the goals must be reevaluated. We used “Questionnaire” and “Interviews”.

### **9.2.4 Identify the practical issues**

Practical issues must be identified since they will affect how efficently different evaluation methods can be used. Limiting factors and bedget issues, communication problems and the access to people and resources. This was done while the data was gathered by questionnaire and interviews from the analysis phase to deployment phase as per the SDLC model.

### **9.2.5 Decide how to deal with the ethical issues**

Etical issues involves privacy, consent and many aspects regards to the user data. We have made the interview user Agreement template, which we used while the interview was taken.

### **9.2.6 Evaluate, analyse, interpret and present the data**

It is important to identify what data is needed to answer the questions, and how this data should be processed. It is also important to know if the methods used will provide the right data, if the data is reliable and trustworthy, and to identify the scope of the data. The Empirical Chapter gives more details on this. We have also added our raw data from the interveiw which is in the Appendix section.

### **9.2.7 Reliability**

The reliability is how concistent the methods are to produce the same results on various occations under the same circumstances. Is it possible to reproduce the same results if the methods are used by a different evaluator? We have also focussed on this issue by taken 3 interviews. We have more interviews to conduct in our further work.

### **9.2.8 Validity**

This covers how well the methods are to produce the data needed. We tried to do this by “Pilot user” selection and asking questions to them.

### **9.2.9 Biases**

Evaluators can affect the results recorded, for example by discarding data that does not seem important, or to weight down data that are not deemed to be important. We took care of this as per our requirements.

### **9.2.10 Scope**

Scope is how general the findings of an evaluation are. Could the data collected ensuring the evaluation fo a web site be used to draw general conclusions about web site usability? We tested our scope by having pilot users.

### 9.2.11 Ecological validity

Concerns how the environment in which the evaluations influences or distorts the results. When studying the use of mobile phones on Svalbard, the results will possibly be affected by the fact that it is very cold there. In our case this was not that important as our project is web based, although we have limitations which we have discussed in the “Problem Area” section.

## 10 Interpretation discussion

With the Questionnaire and Interview, we found out that there were more Students and Working professionals using the trafikanten. Although the data generated will not be enough to come up with one condition as we need extensive research to find out a general outcome. It was also seen from our evaluation techniques that people either use conventional “Notebook Calendar” or some rarely uses e-Calendar. There were also some who uses google-Calendar, therefore our application can be useful to him/her. Most of our evaluation and testing enforces us to do lot of enhancements in the current application. This Agile iterative process also complies that we need as much information we can gain from the end user as needed. This will make our application better in every iteration.

Questionnaire has been very useful from the inception till the deployment phase so as to create a system for the users. We have collected and reviewed these data and have framed these in the Diagramatic format (See the figure attached for the sub-division of our focussed groups in Description of the Domain section). From our interview we also gained some information where one of the “Pilot User” was insisting on a help functionality which can state in a summarized form of how to proceed for a new user. Another suggestion was noted where the user expects more graphics. All these details can be find explicitly in the “Defect/ Enhancement Report” created by our team members.

### 10.1 Testing Application with findings

Tabell 3: Testing Application with findings

<b>Id</b>	<b>Summary</b>	<b>Steps to Reproduce</b>
DE01	Skips the home page after clicking back button. (Functional)	1. Log in 2. Select Calendar 3. If Google Calendar, Login username and password 4. Select ur Name after the system locates you 5. Shows data 6. Click back button 7. Skips the home page after clicking back button
DE02	Log inn to your Google account. (Functional)	1. Log in 2. Select Calendar 3. If Google Calendar selected, goto "Log inn to your Google account" option 4. Click on the link 5. Link not working
DE03	Lack of information on the requirements to the user in the main page. (GUI)	1. Requirements to the user should be displayed on the first page.
DE04	Missing navigation. (Functional)	1. Page navigation is missing. There should be a 'back' and 'home' button.
DE05	A Help Functionality is required. (Suggestion)	1. A help functionality which can say the summary of how to proceed can add better approach for a new user
DE06	All the functionality if placed in the form of tabs will make GUI look more user friendly. (Suggestion)	1. The functionalities are spread over the main page, this makes the main page look too filled, if they are changed to tabs can serve its purpose better.
contiuned on next page		

contiuned from previous page		
Id	Summary	Steps to Reproduce
DE07	More Graphi- cal images will have a better look and feel. (Suggestion)	1. The main page has no graphics, some graphics will make it look more interactive.

In the Testing process we came up with certain defects and some enhancements/ modification sugeestiona. Due to the limitation of time we cannot pursue this for the final Report submission but there is lot of further work invovled in this. We have placed all the defects and suggestions in one temp-  
late containing all the required details so as to have one report containing the  
evaluation process. As the testing was done to just the initial Prototype not  
much of defects could be detected but we are still in process of developing  
and there is a probabality of “n number of defects”. This was done as part of  
the Alpha testing phase in “Alpha Testing”. We have also placed in as much  
sugestions we could gain from our “Beta Testing” from the ned user. There  
this Template contains concise details of our evaluation work.

## 10.2 Findings from the Interview and Questionnaire

The initial Questionnaire lead us to design and implement this application.  
We had further Interview which helped us get more detail on how we can  
further work to improve our software application. As per our discussion we  
had prepare “Focus Groups” and “Control Group”. We had tried to sub divide  
the focus group as “Students”, “Professionals”, and “General”. This helped  
us gathering data as per the division. The “Control Group” contains the  
individuals who have cars but sometimes uses trafikanten. We have collected  
the information regarding the suggestions we got from the end users in the  
Appendix and as an Empirical Chapter which can be implemented in the  
further work.

## 11 Conclusion

We are following “Agile Process”, therefore its evolving. We need lot of user  
involvement so as to get better with every iterations. The application we  
have developed has the feature of Calendar and Trafikanten where we can  
get the information of our traffic information as per our Calendar defined  
data. We have worked with “Questionnaire” and “Interview” techniques and



it has been succesful to understand the user both at the developer's level and the end user's level. There is lot of further work involved in this as it is still evolving. This is a process which needs extensive user requirement so as to give the user what they expect and need. Due to the limitation of time, the evaluation of this application was limited and we have tried our best to give an interpretation of what we obtained from these evaluation techniques. We have strictly follwed DECIDE framework and this has been really very helpful to us to keep track of our whole process. Although we tried to combine the DECIDE framework with our SDLC (Software Development Life Cycle) approach to make the best out of both.

### 11.1 Futher work

This project has been a successful start and we could therefore develop a working "Prototype" in its initial state with the specified general requirements as per our group members consent. We tested our application where all our five members were actively involved and we created a "Defect Report" to get the centaralized open defects to be fixed. After our "Evaluation" with the end users we have had a certain more functionalities to enhance. As there is a lot of further work involved many new evolving functionalities are to be complimented. Throughout our iterative process we need testing and evaluation. There may some modifications with the current functionality names aimed to make it more functional. We also got many suggestions like needing for a "Help" tab which can overall state how this works. We also noted that the graphical user interface can be made more interactively. This is an iterative process and there is lot of further work to be done. We have had thorough discussions with our members about more functionalities as per the requirement by our users need to focussed, analysed and implimented.

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## 12 Appendix

### 12.1 Questionnaire

#### 12.2 Person 1

1. Are you a student? If not what work you do?

*No, IT professional*

2. If you own a car how often do u use it?

*Ya, don't have license.*

3. Do you use Calendar often if yes what type of?

*No*

4. How do you plan your schedule?  
*Just work to home so not really need*
5. What do you do during delays or mishaps?  
*Delays if not more than 15 mins I prefer waiting*
6. How do you prefer your Personal transport planner as, in mobile, in computer?  
*If I use, then both is good*
7. How do you feel about storing personal information on the internet?  
*Unless it is personal its ok*
8. Do you plan your daily travels?  
*Not Really*
9. Have you heard about other planners, if yes where : internet, friend, school, others?  
*Office, Microsoft Office*
10. What is the frequency of using a calendar?  
*Don't really need it now*
11. Where do you access your calendar (on web etc.)?  
*NA*
12. How much time you spend in using Calendar each time?  
*NA*
13. What is the time span of a delay and getting to know about the delay?  
*5 mins- 1 mins*
14. Have you used a personal planner before? If yes how would you prefer it to be?  
*NA*
15. If you like certain feature of it, which ones?  
*NA*
16. What is that main functionality you like the most in a Calendar?  
*NA*

17. Which kind of transportation you use the most, Bus, Train, Tram, Car?

*Bus, Train*

18. Do You travel frequently?

*Not very frequently.*

### **12.3 Person 2**

1. Are you a student? If not what work you do?

*Ya, Student*

2. If you own a car how often do u use it?

*My husband drives the car.*

3. Do you use Calendar often if yes what type of?

*No*

4. How do you plan your schedule?

*There is no hectic appointments as such so I don't need it.*

5. What do you do during delays or mishaps?

*If feasible I wait for the next train.*

6. How do you prefer your Personal transport planner as, in mobile, in computer?

*Computer is fine.*

7. How do you feel about storing personal information on the internet?

*I would not prefer storing personal info on net.*

8. Do you plan your daily travels?

*No, as I just go for 3 days class a week so don't really have to plan.*

9. Have you heard about other planners, if yes where : internet, friend, school, others?

*NA*

10. What is the frequency of using a calendar?

*NA*

11. Where do you access your calendar (on web etc.)?  
*NA*
12. How much time you spend in using Calendar each time?  
*NA*
13. What is the time span of a delay and getting to know about the delay?  
*2-5 mins*
14. Have you used a personal planner before? If yes how would you prefer it to be?  
*No.*
15. If you like certain feature of it, which ones?  
*NA*
16. What is that main functionality you like the most in a Calendar?  
*NA*
17. Which kind of transportation you use the most, Bus, Train, Tram, Car?  
*T-bane*
18. Do You travel frequently?  
*Not really.*

#### **12.4 Person 3**

1. Are you a student? If not what work you do?  
*No, Doctor.*
2. If you own a car how often do u use it?  
*Ya, all the time.*
3. Do you use Calendar often if yes what type of?  
*Ya, Notebook Calendar.*
4. How do you plan your schedule?  
*I have every appointment and schedule in my Calendar.*

5. What do you do during delays or mishaps?  
*NA*
6. How do you prefer your Personal transport planner as, in mobile, in computer?  
*I am used to my Calendar.*
7. How do you feel about storing personal information on the internet?  
*I would not prefer that.*
8. Do you plan your daily travels?  
*Ya*
9. Have you heard about other planners, if yes where : internet, friend, school, others?  
*Ya, Microsoft Outlook.*
10. What is the frequency of using a calendar?  
*Daily.*
11. Where do you access your calendar (on web etc.)?  
*Notebook.*
12. How much time you spend in using Calendar each time?  
*Not much.*
13. What is the time span of a delay and getting to know about the delay?  
*NA*
14. Have you used a personal planner before? If yes how would you prefer it to be?  
*I use my notebook calendar often.*
15. If you like certain feature of it, which ones?  
*The conventional one.*
16. What is that main functionality you like the most in a Calendar?  
*NA.*
17. Which kind of transportation you use the most, Bus, Train, Tram, Car?  
*Car*

18. Do You travel frequently?

*Ya*

## 12.5 Person 4

1. Are you a student? If not what work you do?

*No*

2. If you own a car how often do u use it?

*I don't own a car*

3. Do you use Calendar often if yes what type of?

*Yes norman*

4. How do you plan your schedule?

*By entering in my dairy book*

5. What do you do during delays or mishaps?

*I try to find other ways,I become very angry*

6. How do you prefer your Personal transport planner as, in mobile, in computer?

*In mobile*

7. How do you feel about storing personal information on the internet?

*Not very secure*

8. Do you plan your daily travels?

*Yes*

9. Have you heard about other planners, if yes where : internet, friend, school, others?

*No*

10. What is the frequency of using a calendar?

*Always Everyday*

11. Where do you access your calendar (on web etc.)?

*On my phone*

12. How much time you spend in using Calendar each time?  
*Very few minutes*
13. What is the time span of a delay and getting to know about the delay?  
*5 minutes*
14. Have you used a personal planner before? If yes how would you prefer it to be?  
*No*
15. If you like certain feature of it, which ones?  
*NA*
16. What is that main functionality you like the most in a Calendar?  
*Repeat function*
17. Which kind of transportation you use the most, Bus, Train, Tram, Car?  
*Bus, T-bane*
18. Do You travel frequently?  
*Yes Everyday*

## **12.6 Person 5**

1. Are you a student? If not what work you do?  
*No, Artist*
2. If you own a car how often do u use it?  
*NA*
3. Do you use Calendar often if yes what type of?  
*Yes, paper (day planner)*
4. How do you plan your schedule?  
*NA*
5. What do you do during delays or mishaps?  
*Wait and become angry*



6. How do you prefer your Personal transport planner as, in mobile, in computer?  
*No*
7. How do you feel about storing personal information on the internet?  
*No*
8. Do you plan your daily travels?  
*Often*
9. Have you heard about other planners, if yes where : internet, friend, school, others?  
*Calendar, Internet*
10. What is the frequency of using a calendar?  
*(no answer)*
11. Where do you access your calendar (on web etc.)?  
*(no answer)*
12. How much time you spend in using Calendar each time?  
*(no answer)*
13. What is the time span of a delay and getting to know about the delay?  
*(no answer)*
14. Have you used a personal planner before? If yes how would you prefer it to be?  
*(no answer)*
15. If you like certain feature of it, which ones?  
*(no answer)*
16. What is that main functionality you like the most in a Calendar?  
*(no answer)*
17. Which kind of transportation you use the most, Bus, Train, Tram, Car?  
*(T.bane), bicycles and walk*
18. Do You travel frequently?  
*No*