



**CHALMERS**  
UNIVERSITY OF TECHNOLOGY



UNIVERSITY OF GOTHENBURG

# **Making an Internship Management System More Usable**

## **A Usability Study for An Internship Management System**

Master's thesis in Interaction Design and Technologies

ALEXANDER CHAU NGUYEN

MENGHAN XU

Department of Computer Science and Engineering  
CHALMERS UNIVERSITY OF TECHNOLOGY  
Gothenburg, Sweden 2017

REPORT NO. 2017:9

# Making an Internship Management System More Usable

A Usability Study for an Internship Management System

ALEXANDER CHAU NGUYEN

MENGHAN XU

Department of Computer Science and Engineering  
CHALMERS UNIVERSITY OF TECHNOLOGY  
Gothenburg, Sweden 2017

Making an Internship Management System More Usable  
A Usability Study for an Internship Management System

ALEXANDER CHAU NGUYEN  
MENGHAN XU

© ALEXANDER CHAU NGUYEN, 2017.  
© MENGHAN XU, 2017.

Technical Report No. 2017:9  
Department of Computer Science and Engineering  
Chalmers University of Technology  
SE-412 96 Göteborg  
Sweden  
Telephone + 46 (0)31-772 1000

# Acknowledgements

***First of all** we would like to thank our academic supervisor Fang Chen from Chalmers University of Technology, who supported and guided us.*

***...Second,** we would like to thank our supervisor Martin Hjulström at GR, who gave us invaluable advice, and looked for users for us.*

***...Third,** all the participants who took time out of their lives to be our interviewees and test users, thank you very much!*

***...Last,** we wish to thank GR and Rasim Avdic for giving us the opportunity to participate in this wonderful project.*

Gothenburg, May 2017

Alexander Chau Nguyen & Menghan Xu

Making an Internship Management System More Usable

A Usability Study for an Internship Management System

ALEXANDER CHAU NGUYEN

MENGHAN XU

Department of Computer Science and Engineering

Chalmers University of Technology

# Abstract

*Praktikplatsen.se* is an internship management system that is used by schools, businesses and Göteborgsregionens Kommunalförbund (GR) to provide and manage internships for students of all ages. The team who handles the tool, has a support section in the system which is frequently used by many of the users. They want to reduce the amount of support errands, which is why they have requested an analysis of the system to find usability problem and design suggestions on how to improve it.

With the problem in mind, this study aims to make *Praktikplatsen.se* more usable for school administrators who experienced the most usability problems of all the users. The thesis proposes a list of problems that have been found and solutions to the them which are presented in the form of guidelines and a high-fidelity prototype shown as screenshots in this report. In order to accomplish this, the project was divided into two phases, one research and analysis part to identify the usability problems, and one design and evaluation part to develop a good solution to the problems. The first phase consisted of user research methods and data analysis to collect data. The data was then evaluated with the KJ method and experience mapping to get a list of critical usability problems. Further, the results from the first phase was used in the next phase to design solutions. The design was first made in the form of a low-fidelity prototype which was evaluated with usability testing and then re-designed into a high-fidelity prototype. Evaluation methods were used after each design step to refine and finalize the prototypes. This resulted in a design that is very close in “look and feel” as the end product.

Keywords: internship management system, usability study, user experience, human-centred design, interaction design

# Table of Contents

<b>Acknowledgements</b>	IV
<b>Abstract</b>	V
<b>Introduction</b>	1
1.1 Research aim and question	1
1.1.1 Scope	2
1.1.2 Limitations	2
<b>Background</b>	3
2.1 Internships in Sweden	3
2.2 Praktikplatsen.se	3
2.3 Stakeholders	4
2.3.1 Users of Praktikplatsen.se	4
2.3.1.1 School administrators	5
2.3.1.2 Business administrators	5
2.3.1.3 Praktikplatsen.se administrators	6
2.3.1.4 Students	6
<b>Theory</b>	8
3.1 Human-centered design	8
3.2 User experience	9
3.3 Complicated systems	10
3.4 Usability	10
3.4.1 Usability of complicated systems	12
3.5 Design of websites	13
3.5.1 Interaction design	13
3.5.2 Information architecture	16
3.5.3 Navigation design	16
<b>Methodology</b>	18
4.1 Ethnography	18
4.1.1 Interviews	18
4.1.2 Observation	19
4.2 Data analysis	19

4.3 Brainstorming	19
4.4 Affinity diagram	20
4.5 Personas	20
4.6 Experience mapping	20
4.7 Sketching	21
4.8 Prototyping	21
4.8.1 Low-fidelity prototype	21
4.8.2 High-fidelity prototype	21
4.9 Usability testing	21
4.10 Heuristic evaluation	23
4.11 Perspective-based UI inspection	24
<b>Design Process</b>	25
5.1 Phase I - Research and Analysis	25
5.1.1 Ethnography	26
5.1.2 Data analysis	26
5.1.3 Usability test	27
5.1.4 Heuristic evaluation	30
5.1.4.1 Study 1	30
5.1.4.2 Study 2	30
5.1.5 Affinity diagram	30
5.1.6 Experience mapping	31
5.2 Phase II - Design and Evaluation	33
5.2.1 Iteration 1	33
5.2.1.1 Personas	34
5.2.1.3 Brainstorming	34
5.2.1.4 Sketching	35
5.2.1.5 Low-fidelity prototyping	36
5.2.1.6 Usability test	36
5.2.2 Iteration 2	37
5.2.2.1 High-fidelity prototyping	37
5.2.2.2 Perspective-based UI inspection	38
<b>Results from user studies and data analysis</b>	39
6.1 Ethnographic study	39
6.2 Data analysis	41
6.3 Usability test	43

6.3.1 Test 1	43
6.3.2 Test 2	44
<b>Usability problems and design solutions</b>	46
7.1 Problems and solutions	46
Problem 1: Cannot find functionalities	46
Solution 1: Shortcuts	46
Solution 2: Buttons to the right	47
Problem 2: Complexity	47
Solution 1: Clear buttons and simpler workflow	47
Problem 3: Memorability	48
Solution 1: Overall timeline	49
Solution 2: Page specific timeline	49
Problem 4: Language	50
Problem 1: Menus	50
Problem 5: User interface	50
Solution 1: Help the users understand	50
Problem 6: Export/import	51
Solution 1: Saving configurations	51
Problem 7: Missing functions	52
Solution 1: Student management	52
Solution 2: Advanced search bar	52
Solution 3: Standard email functionality	53
7.2 Guidelines	53
<b>Discussion</b>	55
8.1 Research question	55
8.1.1 Generalizability	55
8.2 Application of theory	56
8.2.1 Design process	56
8.2.2 Usability	56
8.2.3 Web design	57
8.2.3.1 Interface design	57
8.2.3.2 Information architecture	57
8.2.3.3 Navigation design	57
8.2.4 The importance of user experience	58
8.2.5 Similarities with complicated systems	58

8.3 Design insights	59
8.3.1 User research	59
8.3.2 Evaluation methods	59
8.3.3 Personas	60
8.3.4 Prototyping	60
8.4 Future work	61
<b>Conclusion</b>	62
9.1 The first part of the research question	62
9.2 The second part of the research question	62
<b>References</b>	64
<b>Appendices</b>	67
Appendix A - Interview & Observation	67
Appendix B - Usability problems (and more) from interviews	69
Appendix C - Data analysis of Google analytics	78
Appendix D - List of usability problems	81
Appendix E - Test Plan - FINAL	83
Appendix F - Summary of usability test I	92
Appendix G - Heuristics evaluation results	105
Appendix H - Transcription for Perspective-based UI Inspection	112
Appendix I - Tasks for the 2nd iteration of usability test	118
Appendix J - Perspective-based UI inspection results	120
Appendix K - Current views of Praktikplatsen.se	122

# 1

# Introduction

Nowadays, finding internships or a summer jobs to enhance competitiveness before their graduation has become an increasing tendency. For university students, doing internship is a way to have a greater chance to find career in the future, but for elementary school and high school students, internship is a way to understand different divisions of social labour so that the students can find their own interest among different areas. That is, they will establish their goal of future and not completely be in the dark when choosing a major after graduation. For university students, it will not be easy to find a job via social recruitments, because a large number of companies will require working experience before a candidate apply for the job. Students will face some obstacles if they lack of real-world experience (Hurst et al., 2014).

Because of today's omnipresent technologies, a large amount of job hunting websites are available on diverse platforms. These websites gather information from different companies, and the job seekers can search jobs according to different categories, such as location and experience level. However, the job hunting websites are to a large extent for people who are over 18 years old and have behavioural competence. Elementary school and high school students who are willing to find an internship cannot find proper internships on these websites.

In this master's thesis, we will mainly focus on how to improve the usability of an internship management tool which is developed by *Praktikplatsen.se* which can also be considered as an internship management tool whose target groups are mainly elementary school students, high school students, university students and administrators because finding an internship is a mandatory part in the curriculum. There are two parts in the website which include student platform and administrator platform. In this project, the task is to improve the usability of the administrator's part.

During this thesis we have found out that internship management systems are complicated in general, which is why a small part of the report will also have focus on complicated systems and its similarities with *Praktikplatsen.se*.

There will be eight parts in this report. In the first part, we will bring out the research question and the research problem which will be answered and solved in this master's thesis. Second, the background of the master's thesis will be elaborated. Theories and methodologies that would be applied to the project will be described in the third and fourth part respectively. In the fifth chapter, a detailed time plan and design process will be presented. In the sixth chapter, the result of the project will be presented. Some design insights and issues will be discussed in the seventh part. In the last part, a conclusion will be made.

## 1.1 Research aim and question

The research problem is about finding out difficulties and problems that school administrators experience when they are using *Praktikplatsen.se*. The system can be considered as a complicated system and requires training before usage and that is why it is inevitable that some usability problems occur for a certain amount of users. When problems occur, the

support team is usually contacted which leads to higher costs for *Praktikplatsen.se*. Since there are deadlines to be met and time constraints to planning and managing, it often leads to a disturbed workflow for the user. With this problem area in mind, a research question was formed which consists of two parts:

*“How to identify usability problems in an internship management system **and** design it to increase usability for school administrators?”*

The first part of the research question is about an exploration of finding the usability problems in a complicated system like *Praktikplatsen.se*, while the second part is about how to design for, and make such a system more usable by reducing the found problems in order to ease the operational burden for the support.

### 1.1.1 Scope

This master thesis will result in a list of usability problems that exist in the current system and these problems will be summarised from the user research in the first phase. The detailed design concept will be described by high-fidelity prototypes which are aiming to solve the usability problems. Since there will be some other design details that cannot be shown in the high-fidelity prototypes, the report will also include some design guidelines that can be referred to in future development.

### 1.1.2 Limitations

Different kinds of administrators use different parts of the system, which is why this project had to be limited to certain parts of the complicated system. Students who apply for internships also see different views than the administrators, but *Praktikplatsen.se* did not want us to focus on those users since they only use a small and simple part of the system. Time and budget would not allow for an thorough analysis and design of all parts, so that is why finding out which part to focus on was the first step in the project.

School administrators is the category that was chosen and studies only concerned schools and educations in the Gothenburg area, and mostly schools with specialization in health care programs which has more internships than other programs.

In this thesis we included information architecture, but because of time limits we only focused on navigation design from that principle.

# 2

## Background

In this chapter, background of project be introduced. There will be three parts in this chapter. In the first section, how internships in Sweden works is presented. In the second section, the system of *Praktikplatsen.se* will be described. Lastly, Stakeholders and the relationship among them will be presented. Specifically, the different kinds of users of the system will be introduced.

### 2.1 Internships in Sweden

Internships are offered in many of the different educations in Sweden. In the vocational programs in high school for example; at least 15 weeks of the program has to be done at a workplace (Skolverket, 2016a) and some high schools with special apprenticeship programs, offer as much as vocational training 2-3 times a week (Katrinelundsgymnasiet, 2017). Vocational training is important to the schools and they need to give a lot of support to the students so that they can do the internships without any problems. Competent supervisors are assigned to the students and the school and its teachers has the responsibility to make sure that everything is going well. This is done through workplace visits, student feedback and continuous communication with all involved parts (Skolverket, 2016b).

### 2.2 *Praktikplatsen.se*

*Praktikplatsen.se* (See Figure 2.1) is a digital internship management system for internships and other forms of collaboration. About 12000 internships are handled every year through this tool and it is used mainly by students in elementary school, although the target groups also include different kinds of administrators, employers and higher education students. *Praktikplatsen.se* was relaunched in July 2015 and is based on an old platform.

Students use the website to submit their wish list. Administrators are in charge of matching the students with proper internships. Employers will go the website and publish new positions. The website, in this case, is an intermediary among these roles, which tries to fulfil the requirements from the users. As the system has to provide services according to different roles, it might cause some problems which make the users feel perplexed. This is also the purpose of doing this project which was mentioned in *Chapter 1.1*.

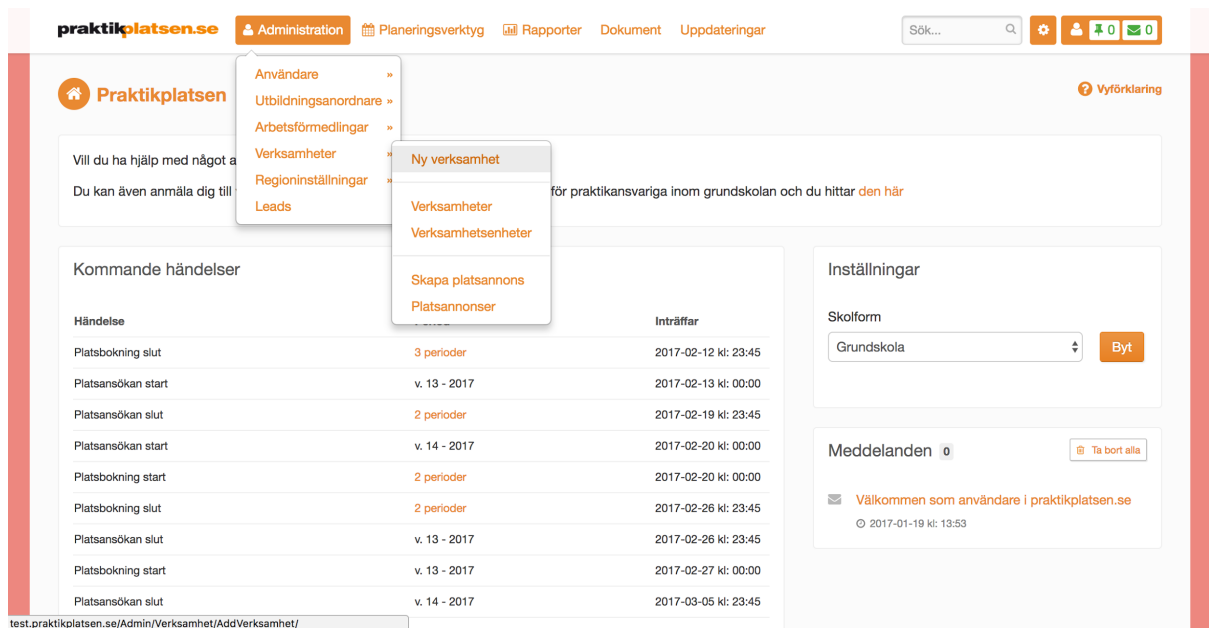


Figure 2.1. *Praktikplatsen.se*

## 2.3 Stakeholders

Stakeholders in this master's thesis include students and administrators who come from schools, companies and GR (Göteborgsregionens kommunalförbund). GR is the provider of this project as well as the producer of *Praktikplatsen.se*. Administrators are the most important part of the stakeholders in the project, since we will focus on the usability improvement of their part in the system.

School administrators coordinate among students, businesses and *Praktikplatsen.se*. They are responsible for managing students and managing internships. They are a significant part of the administrator users. *Praktikplatsen.se* administrators are coordinators between schools and businesses. They are responsible for providing the training courses, planning internship periods and support the other administrators when they meet problems. Administrators from businesses were only involved in a smaller scale, because they do not use the system to upload information frequently. Instead of which they usually call the administrators at *Praktikplatsen.se* and tell them how many students they can accept and when they will provide internships, so that the administrators can upload this information on the website. Students are also main users and uses the system as a tool. They have to find a proper internship that is suitable for them every year with this tool in order to fulfil the requirements from school. As mentioned in *Chapter 1.1.2* about limitations, the students and the student portal will not be focused on in this project. More information about different kinds of users and their different perspectives will be explained in *Chapter 2.2.1*.

As the mission was provided by GR, the result would be used mainly by them to improve praktikplatsen.se for their school administrators and also lay ground to future projects.

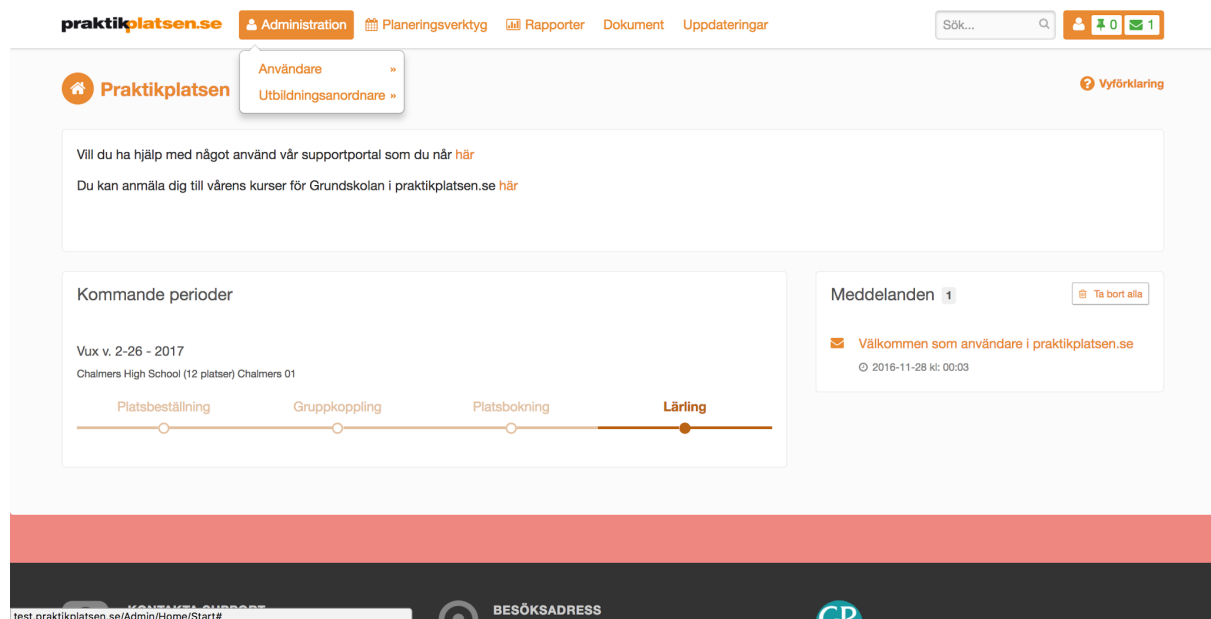
### 2.3.1 Users of Praktikplatsen.se

The system has different perspectives and is used by several kinds of administrators, all of them seeing their respective configuration of the same views. The administrator perspectives can be split into three main categories; Praktikplatsen.se administrators, business

administrators and school administrators. Separated from the administrator perspectives are the students who has a simpler interface.

### 2.3.1.1 School administrators

School administrators are mainly responsible for ordering places and managing groups, students and internship applications. They work as coordinators who coordinate among business administrators, *Praktikplatsen.se* administrators, school teachers and students. Therefore, they have limited permissions which are related to these parts. For example, in Figure 2.2, in Administration menu, they can only see the information of the users in their school and their own school information.



**Figure 2.2.** *Praktikplatsen.se* from the perspective of school administrators

### 2.3.1.2 Business administrators

Business administrators play a role in providing internship positions and updating the information of the positions. Also, they are responsible for supervising the students when the students are doing the internships and evaluating them after they finish. Therefore, these administrators have completely different permission than the school administrators. For example, in Figure 2.3, they can only see their own business information such as job advertisements and user information.

Vill du ha hjälp med något använd vår supportportal som du når [här](#)  
Du kan anmäla dig till vårens kurser för Grundskolan i praktikplatsen.se [här](#)

Perioder med erbjudna platser Mer information Erbjud platser

Period	Skolform	Program	Bokningar klara
v. 21-24 - 2017	Gymnasie/Vux	Vård och omsorgsprogrammet	2017-04-28 kl: 17:00
Barn och fritid v. 21-24 - 2017	Gymnasie/Vux	Barn och Fritidsprogrammet	2017-04-28 kl: 17:00
v. 22 Termin 2 Specialistutbildning Distrikt v. 22 - 2017	Universitet/högskola	Specialistsjuksköterskeprogramme...	2017-01-02 kl: 23:45
v. 34-37 - 2017	Gymnasie/Vux	Vård och omsorgsprogrammet	2017-06-09 kl: 17:00
v. 35-2 - 2017	Universitet/högskola	Socionomprogrammet	2017-05-03 kl: 16:00
Lärling v. 36-51 - 2017	Gymnasie/Vux	Vård och omsorgsprogrammet	2017-08-14 kl: 17:00
Termin 4 v. 36-39 - 2017	Universitet/högskola	Sjuksköterskeprogrammet	2017-08-07 kl: 12:00
Termin 3 v. 37-41 - 2017	Universitet/högskola	Sjuksköterskeprogrammet	2017-08-14 kl: 12:00

Meddelanden 69 Ta bort alla

- Information om APL-elever v. 21-24 - 2017 och Vård och omsorgsprogrammet  
© 2017-04-28 kl: 17:00
- Information om APL-elever v. 21-24 - 2017 och Vård och omsorgsprogrammet  
© 2017-04-28 kl: 17:00
- Information om APL-elever v. 21-24 - 2017 och Vård och omsorgsprogrammet  
© 2017-04-28 kl: 17:00
- Ej bokad APL-elev v. 21-24 - 2017 och Vård och omsorgsprogrammet

**Figure 2.3.** *Praktikplatsen.se* from the perspective of business administrators

### 2.3.1.3 *Praktikplatsen.se* administrators

Administrators in *Praktikplatsen.se* have full permissions of the system, because they are the coordinators who work with both business and school aspects. For example, in Figure 2.4, in the Administration menu, they can view more information than the school and business administrators and they are allowed to view as a specific user in the system.

Vill du ha hjälp med något a... du når [här](#)  
Du kan anmäla dig till våren... praktikplatsen.se [här](#)

Ej utförda arbetsuppgifter

Arbetsuppgift	Period	Deadline	Totalt antal	Antal påbörjade	Antal utförda
Dags att koppla grupper	Barn och fritid v. 21-24 - 2017	2017-05-22 kl: 00:00	2	2	0
Platsbehov Universitet/högskola	9 perioder	2017-06-19 kl: 23:59	9	9	0
Dags att koppla grupper - Yrkesthö...	LJA 2 v. 34-42 - 2017	2017-08-20 kl: 23:45	1	1	0
Dags att koppla grupper - Yrkesthö...	LJA 3 v. 35-42 - 2017	2017-08-27 kl: 23:45	1	1	0
Dags att koppla grupper - Gy/vux	2 perioder	2017-09-01 kl: 23:45	6	2	0
Dags att koppla grupper - Gy/vux	Barn och fritid v. 38-41 - 2017	2017-09-17 kl: 23:45	2	1	0
Dags att koppla grupper - Gy/vux	Barn och fritid v. 42-46 - 2017	2017-10-15 kl: 23:45	4	0	0
		2017-11-19 kl: 23:45	2	0	0

Inställningar

Skolform  
Välj skolform Byt


Meddelanden 1 Ta bort alla

- Välkommen som användare i praktikplatsen.se  
© 2017-05-05 kl: 14:42

**Figure 2.4.** *Praktikplatsen.se* from the perspective of *Praktikplatsen.se* administrators

### 2.3.1.4 Students

The interface for students is completely different from the administrators. Since they only need to apply for the internship positions in the system, they interact with an easier interface as shown in Figure 2.5. They select five positions according to their preferences to the wish list, and the school administrators will assign and book a position for them.




# Platsväljaren

Här söker du platser och sätter ihop din ansökan.

Termin 6 v. 16-21 - 2017


## Besked

Du har blivit tilldelad följande plats för Termin 6 v. 16-21 - 2017:



**Röntgensjuksköterska**  
**Röntgen Varberg, Hallands sjukhus**

Varberg



**VERKSAMHET**

**ARBETSUPPGIFTER**  
Akuta röntgenundersökningar

**BESÖKSADRESS**  
Träslövsvägen 68, 432 81 Varberg

**HEMSIDA**


**ARBETSTID**  
Dag- och kvällstid

**KLÄDSEL**  
Tillhandahålls av verksamheten.

**LUNCHMÖJLIGHETER**  
Medtag egen lunch


[Utskriftsvänlig version](#)

## Min ansökan **TERMIN 6 V. 16-21 - 2017**

- 


**Röntgensjuksköterska**  
**Röntgen Varberg, Hallands sjukhus**

Varberg 2 platser 4 sökande

[Visa detaljer](#)
- 

**Röntgensjuksköterska**  
**Radiologi Mölndal, SU/Mölndal**

Mölndal 4 platser 10 sökande

[Visa detaljer](#)
- 

**Röntgensjuksköterska**  
**Radiologi Sahlgrenska, SU/Sahlgrenska**

Göteborg 4 platser 11 sökande

[Visa detaljer](#)
-

Figure 2.5. *Praktikplatsen.se* from the perspective of students

# 3

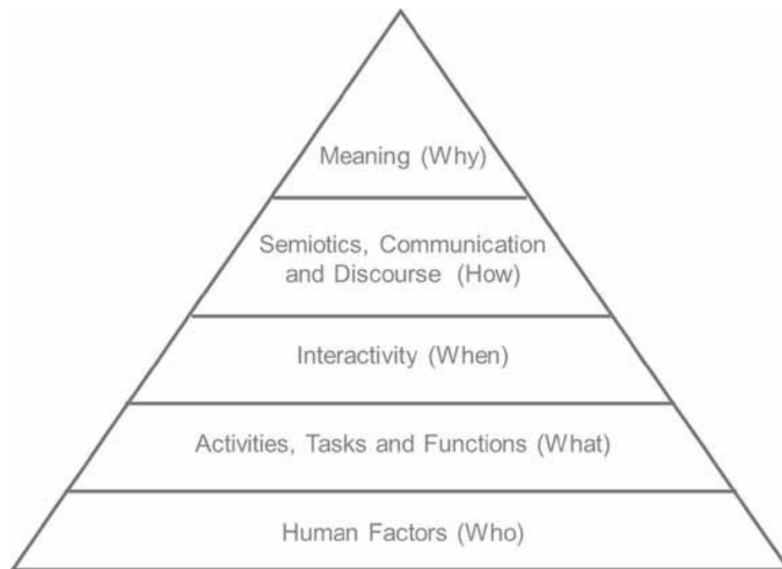
## Theory

Some relevant theories will be explained in this chapter. Since *Praktikplatsen.se* is similar to a complicated system, the theories regarding complicated system will be introduced. Further, since this project is in the area of interaction design and will improve the user experience by solving usability problems, some theories regarding human-centred design, usability, web design and user experience will be presented. Within the section of usability, what need to be considered when doing usability studies on complicated systems will also be described.

### 3.1 Human-centred design

According to ISO 9241-210 (2010), human-centred design (HCD) is an “approach to systems design and development that aims to make interactive systems more usable by focusing on the use of the system and applying human factors/ergonomics and usability knowledge and techniques”. During the design process, there will not only be designers who get involved, but also users, customers and developers, etc.. HCD is also called as user-centred design in some occasions. As users will be involved throughout the design process, HCD can be regarded as a way to put user’s perspective into software development process. In this way, as Maguire (2002) suggests, HCD is a complement rather than a replacement to software development process.

HCD pyramid (See Figure 3.1) raised by J. Giacomini (2014), which consists of a set of questions and answers which span from human factors to metaphysical meaning. These answers to the questions are supposed to build up a bridge that connects human with the product, system or service. According to this pyramid, the following questions could be asked: Who are the stakeholders; What are the goals of using the product; When do the users use the product; How do the users learn the product; Why do the users use the product. These five questions can be asked and answered by the designers themselves during the whole design process, which will be helpful to understand the users and stakeholders.



**Figure 3.1.** HCD pyramid (Giacomin, J, 2014)

Donald Norman (2005) thinks that considering users too much can lead to the lack of cohesion and add the complexity to the design. This is to some extent true because if a designer excessively consider users needs, it might cause some problems. Technologies improved rapidly these days, human have to change their behaviours to adapt themselves to the improvement of technologies. For example, people did not think of applying touchscreen to smartphone ten years ago, after which developers had to develop application that could be used on a touchscreen phone and users had to learn how to interact with touchscreens using different gestures. If designers did not think of ways to adapt new technologies but to stick to old styles, the design would have been obsolete. This is to require designers to keep the balance between technologies and human needs and let them adapt to each other when applying human-centred design approaches.

HCD is a multi-disciplinary field (Maguire, 2002). This means not only the designers need to know knowledges from different fields, but also have to involve experts from varied areas at different stages during HCD process. Designers should communicate with other stakeholders who will influence or be affected by the design (Maguire, 2002) in addition to users and developers.

## 3.2 User experience

User experience has a very broad definition and covers the user's experience in all steps of a product's life cycle, from when they see the commercial on the television to buying the product, online tracking of the shipping and even the return of the product to the store (Krug, 2014). Whilst usability focus a lot on objective user performance measures, user experience design adds something called *emotional impact* to adapt to products becoming more personal, social and intimate parts of our lives (Hartson & Pyla, 2012). When talking about emotional impact, Hartson and Pyla (2012, p. 24) connects it to "pleasure, fun, aesthetic, novelty, originality, sensation and experiential features", in other words, "the emotional impact of interaction on the user".

Emotions are an important factor of user experience, but user experience is much more than that. Garrett (2011, p. 6) describes the user experience to be “how it works”, in contrast to “what it does”. He states that the user experience is about how it works on the outside when a person comes into contact with a product or service. An example of how good user experience can outclass functionality is the iPhone contra the Blackberry. According to Hartson and Pyla (2012) the blackberry was once a market leader full packed with functionality, but then came the iPhone, a phone with less functional capabilities but with careful design with quality user experience and easy access to the little functionality it had. Hartson and Pyla states that if the user could not access functionality, then they simply did not have it. Which is why the iPhone became so successful; all of the functionality was easily accessible which also enhanced the user experience.

Preece, Rogers and Sharp (2015) points out that a user experience cannot be designed, you can only design for user experience. For example a sensual experience can not be designed, but features can be created to evoke it. Which is why many disciplines must be taken into when designing for user experience. Under the “UX umbrella” are quite a few disciplines involved, including Usability, Information Architecture, Interaction Design, Interface Design, Visual Design, and Content Management. All of these disciplines overlaps and contributes to designing for a good user experience (Krug, 2014).

### 3.3 Complicated systems

Complicated systems differ from those we typically encounter in a few ways. Redish (2007) mentions some major differences in her article. Firstly, there is an overload of information and users need to go through more information than they can deal with, and secondly, that information is often incomplete and it may be hard to find the meaningful information one is looking for. Two other authors, Norros and Savioja (2004) also mention that the number of relevant factors that designers must consider in complex systems are enormous and that those systems are dynamic in nature, which makes a high degree of potential hazard when operating them.

As complex systems usually involve many people over a long time period (Shneiderman, B. et al., 2004), the system provider often has to deal with issues such as privacy, trust and limiting the harmful effects. This will always adds complexity to the system. Therefore, the designers should consider designs both for first-time users that emphasize ease of use and timely feedback to build trust with them, and for professional users that will enable rapid performance of complex procedures (ibid.).

Increasing the user experience and usability of a complicated system requires the designers to reduce the complexity of the system. Noman (2010) suggests that to treat a complicated system as whole, because if a system is separated into pieces, it will lead to an end result with separated pieces. Garrett (2011) mentions that one design challenge of designing for complex system is finding out which parts of the system are redundant and then reducing the user’s visibility.

### 3.4 Usability

Usability refers to ensuring that systems and products are easy to learn, effective to use and enjoyable from the user’s perspective (Preece, Rogers & Sharp, 2015). There are quite a few definitions of usability, but the one that this thesis relies on is defined by Rubin and Chisnell

(2008) which states: A product or service is truly usable when “the user can do what he or she wants to do the way he or she expects to be able to do it, without hindrance, hesitation, or question” (p.4).

Krug (2014) suggests that much of usability is just common sense, although it might not be obvious until after it is pointed out. Some may use the term “user friendliness” for usability, but according to Nielsen (1993), that is an unfitting term. He states that a system does not need to be friendly when used, it just need to stay out of the way when the user is trying to get work done. The term usability is therefore preferred.

According to Nielsen (1993); if you know enough to be able to talk about a product, then you know too much to be able to tell if it’s usable or not for novice users who don’t know what you know. This is why products and services needs to undergo usability testing. Testing “reminds you that not everyone thinks the way you do” and “knows what you know” (Krug, 2104, p. 114). Krug states that the basic idea of usability testing is simply watching people use your product, while you note where they run into problems. More on usability testing can be read in the method section (See Chapter 4.3.4).

Usability is often broken down into goals or attributes (Preece, Rogers & Sharp, 2015; Krug, 2014). Mentioned in different sources, some common ones are:

1. *Effectiveness*

This is a general goal which refers to if the job gets done or not? It measures how good the product does what it is supposed to do (Preece, Rogers & Sharp, 2015; Krug, 2014). Measurements are usually done quantitatively with error rates (Rubin & Chisnell, 2008), an example of an expression is “95% percent of all users will be able to load the software correctly on the first attempt” (p. 4).

2. *Efficiency*

Efficiency has to do with time and effort (Krug, 2014). To measure efficiency, Rubin and Chisnell (2008) suggests that one should look at how quickly the user's goal can be accomplished accurately and completely. An example of an efficient design is Amazon’s one-click option which lets users make a purchase with only the click of one button (Preece, Rogers and Sharp, 2015). The user then has 30 minutes before the order is processed, and during that time the user can make any changes if needed (Amazon.com, Inc., 2017).

3. *Safety*

Safety refers to protecting the user from unwanted situations and dangerous conditions (Preece, Rogers & Sharp, 2015). There are two ways to make products safer; First, reduce the risk of pressing the wrong buttons and mistakenly activate unwanted functions and secondly, provide users with reverse/undo options should they make any errors (ibid.).

4. *Utility*

Utility refers to the functionality of a system and to which extent it is provided. Preece, Rogers and Sharp (2015) states that good utility is when the system provides enough functionality so that users can do what they want or need to do.

5. *Learnability*

People tend to dislike spending a lot of time on learning how to use a system, which is

why learnability is an important goal. It refers to how easy a user can learn how to use a system (Preece, Rogers & Sharp, 2015). Rubin and Chisnell (2008) adds that it can also include the ability to re-learn a system after periods of inactivity. They also mention that it includes both system which requires training and those without.

#### 6. *Accessibility*

Accessibility refers to making a product useful for people with disabilities. It involves those with permanent, situational and temporary disabilities (Rubin & Chisnell, 2008). By making products more accessible, Rubin and Chisnell suggests that it almost always benefits the people without disabilities, because it clarifies and simplifies a design. In fact, “making sites more useful for *the rest of us* is one of the most effective ways to make them more effective for people with disabilities” (Krug, 2014, p. 178).

### 3.4.1 Usability of complicated systems

When doing usability studies for complicated systems Redish (2007) mentions some important points which need to be considered to conduct an effective usability study;

#### 1. *Collaborate with domain experts*

Since usability experts are rarely domain experts, it is difficult to use inspection methods like cognitive walkthroughs, persona or heuristic-based evaluations to evaluate complicated systems. *Praktikplatsen.se* administrators for example, always receives training before they use the system, so without it, it is hard to conduct certain types of evaluations. This is why working with the users are critical when working with complicated systems. Redish (2007) states that they must be included throughout the whole process, from planning, to design and development.

#### 2. *Collaborate with other specialists*

In usability there are different kinds of areas or goals that one can be an expert on (See *Chapter 3.4*). There may be some specialists on effectiveness, efficiency and safety, who then must work together with specialists in utility, learnability and accessibility to ensure a successful system. Collaboration is key when working with complicated systems.

#### 3. *Get the right users*

It is critical that the participants of usability tests represents the real users, because there are a few things that could go wrong. Two major problems is getting a false positive or a false negative. The first one, a false positive is when the system does good in the usability test but when users use it, they have a lot of problems. The second one, and also the more likely scenario is to get false negatives. When getting false negatives, a lot of problems appears during the usability tests but real users won't have the same problems. To avoid these problems it's important to use domain experts as participants when doing tests and evaluation on complicated systems.

#### 4. *Getting the right scenarios*

Realistic and complex enough tasks that represent real use is critical and must be thoroughly thought of when preparing Usability tests. Domain experts can help a lot with this point.

5. *Understand the difficulty of setting goals and tasks*

When doing usability on complicated systems, goals and tasks will be at a higher level than in typical usability testing and will be much more difficult to specify. These high-level goals are likely to be vague and are also likely to change as the participants moves through the data. Because of this, it might be difficult to define a priori of what represents effectiveness or efficiency in a given scenario.

6. *Accept domain experts judgment of effectiveness and completion*

Since we are usability experts and not domain experts, we might not know the answer to a given task, which is why relying on the participant's judgement that they have arrived at a reasonable solution has to be done.

7. *Do testing of both the entire system and individual components*

Since complicated systems usually consists of many components and tools, it is possible to test them individually with typical usability tests. However it is recommended to test the components together because the desired measurements is when the users can use the systems to solve high-level problems or goals. The scenarios and work situations need to be realistic, so doing tests with both individual components and as an entire system is advised.

## 3.5 Design of websites

The process of designing websites contains much more than just its design. Benyon (2010) states that website design should follow sound design principles, have a good structure and organization of the content, and lastly, include good navigation so that people can move around the site. Below we will explain those things with three important pillars of web design which are interaction design, information architecture and lastly, navigation design.

### 3.5.1 Interaction design

According to Garrett (2011), interaction design concerns user behaviour and how a system respond and accommodates to that behaviour. He mentions that interaction design is to design software that works best for the people who use it instead of designing software that works best for the machine.

Designing interfaces is a big part of interaction design, and actually until the mid-1990's designers focused largely on making effective and efficient user interfaces for desktop pc's aimed at single users (Preece, Rogers & Sharp, 2015). When designing interfaces, it is thoroughly relevant to understand the users, their behaviour and needs. A human-centred approach where the user is in focus is emphasized as needed by Preece, Rogers and Sharp (2015). More about HCD can be read about in *Chapter 3.1*.

Tidwell (2011) has developed a set of patterns which describe human behaviour which are good to think about when designing interfaces. According to her, interfaces that support these patterns well helps users more effectively achieve their goal than interfaces that don't support them. There are 14 patterns and they are:

1. *Safe exploration*

A user should be able to try something unfamiliar, go back, and try something else, all without stress. Exploring an interface should result in any dire consequences.

2. *Instant gratification*

The user should easily be able to find introductory functionality and finish the first tasks quickly and successfully. It's gratifying to get a successful experience and immediate results in the first few seconds of using an application.

3. *Satisficing*

A user will scan the interface rapidly and pick whatever he sees first that might get him what he wants, even if it's wrong, rather than reading everything on the page methodically and decide.

4. *Changes in midstream*

The users goal may change while in the middle of using the interface. So designers should provide the opportunity for users to do that. Either in the form of connections to other pages and functionality or make it possible with re-entrance, in other words, save information and make it possible to start where the user left off.

5. *Deferred choices*

Give the user the choice to skip questions and just answer the minimum for instant gratification. An example is a registration form, where the user can fill in some information and then fill in the rest later if needed.

6. *Incremental construction*

In builder-style and creative interfaces. When building something, one doesn't usually do everything in order. It should be possible to build small pieces and the interface should be kept responsive to quick changes and saves.

7. *Habituation*

The user can develop habits after repeated use of interfaces. Be consistent across applications and think about standards.

8. *Microbreaks*

Users often have microbreaks where they have a few minutes of time between other things. During these microbreaks the user can do some activity on an interface if it is easy and fast to reach. An example is checking email during a traffic jam or in the line at the store.

9. *Spatial memory*

People often find objects and documents by remembering where they were before rather than by their names.

10. *Prospective memory*

Prospective memory is used when planning to do something in the future. For example with calendar, virtual "sticky notes" and alarms. These functions can help the user remember to finish or do something at a later time. Other simple examples are leaving windows open on the screen, bookmarking webpages and so on.

11. *Streamlined repetition*

In many interfaces, there is a need to repeat operations over and over. Help the user reduce those operations down to as simple actions as possible for a better experience. For example one keystroke or one click to do something.

#### 12. Keyboard only

Some people cannot use a mouse because of physical constraints or assistive technology only interacting with the keyboard API. Take this into consideration when designing.

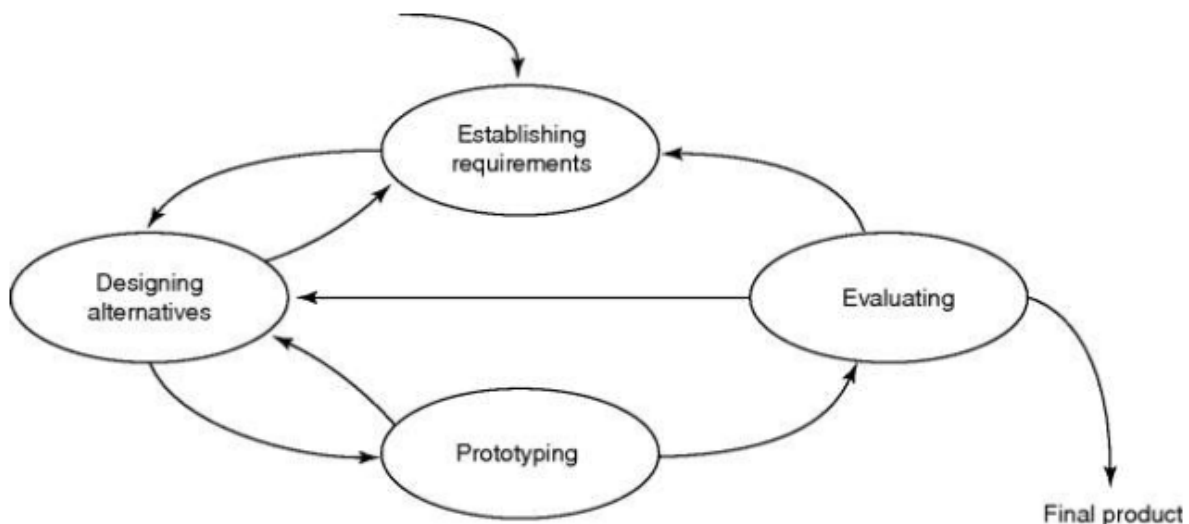
#### 13. Other people's advice

Users tend to be influenced by their peers and what they think. Not all interfaces and systems accommodates social components, some are not fit for social components and should not try, but it might enhance the user experience if applied.

#### 14. Personal recommendations

This pattern is similar to the previous one. Users are much more likely to view and try things that are recommended to them. For example it is more likely that you will watch a video that someone recommended to you than if you found it in some other way.

An interaction design process is not only about interface design. Below a simple lifecycle model by Preece, Rogers and Sharp (2015) is presented in a simplified version to give an example of how a project could look like (see Figure 3.2).



**Figure 3.2.** An interaction design process, simplified (Preece, Rogers & Sharp, 2015).

This is a basic process that is usually changed and detail is added depending on the project. It contains four basic activities which can be found in many other design principles too, like product design, graphic design or architectural design (Preece, Rogers & Sharp, 2015). The four activities described by the same authors are:

##### 1. *Establishing requirements*

To start off, we must learn who our target users are and what kind of support the system can usefully provide. These are needs that forms the products requirements. To understand the needs is done through data gathering and analysis.

##### 2. *Designing alternatives*

In this step, the ideas for meeting the requirements are brought forth. This activity can be divided into two sub-activities: conceptual design and concrete design. Conceptual design includes production of conceptual models for the product. It includes what the users can do with the product and what concepts are needed to understand the

interaction with it. Concrete design includes things like sounds, icons, colours and other details of the product. Alternatives are designed in both sub-activities.

3. *Prototyping*

After bringing out different design alternatives, trying them out by building prototypes and iterating throughout the process will become the next stage. Prototyping is a useful way when communicating with stakeholders, answering questions and supporting designer to choose between alternatives.

4. *Evaluating*

Evaluation is done to help designers to improve the product further. Feedback from users or experts will indicate if the prototype or the product is efficient, effective and safe, and also if it can satisfy the users. Many techniques are available for supporting evaluation. In this step, in order to get feedback of the prototype or product, designers need to know what to evaluate, why it is important and when to evaluate.

### 3.5.2 Information architecture

Information architecture concerns the classification of website content and how it is organized. It includes how to label the categories and items, how to present the architecture to designers and users and how to describe the website's content (Benyon, 2010). Morville and Rosenfeld (2006, p.4) defines information architecture as four things: “The structural design of shared information environments”, “The combination of organization, labelling, search, and navigation systems within web sites and intranets”, “The art and science of shaping information products and experiences to support usability and findability”, and “An emerging discipline and community of practice focused on bringing principles of design and architecture on the digital landscape”.

Information architecture provides the context for the content and can tell people what they can do at the current position (Morville & Rosenfeld, 2006). Morville and Rosenfeld (2006) also mention *top-down* and *bottom-up* information architectures which help users understand the context. They also structure information architecture components into four basic categories: *Organization Systems*, *Labelling systems*, *Navigation systems* and *Searching systems*. Good information architecture can reduce the cost of finding information, maintenance, construction and training, and also increase the value education and brand.

### 3.5.3 Navigation design

There are four ways of people seeking information (Wodtke and Govella, 2011). First, they know exactly what they are going to search and they know what to search, and this is called *Know-item search*. The second way is *Exploratory seeking*. People know what they need but they do not know what to search and they will recognize the answer to the question but they do not know if it is the correct answer, so that they have to explore more until they are satisfied. The third way is “*Don't know what I need to know*”. It means that people do not really know what they need to know so that when they are looking for one thing, they figure out that they need to know something else. The last way is called *Re-finding*, because people usually need to go back to find what they have found in the past.

Garrett (2011) mentions three goals that navigation design should accomplish. First of all, it has to provide users a means to go from one point to another on the website in a practical way to facilitate user behaviour. Second, the relationships between elements of the navigation have to be clear. User should not get confused about which choice they should make when

they have to choose the available links. Third, the relationship between navigation and the page the user is currently viewing also has to be indicated. Understanding this relationship can help the users make the best choice regarding the task or goal they are pursuing.

Also, five navigation systems are presented by Morville and Rosenfeld (2006) and Garrett (2011). Global, local and contextual navigation systems that are embedded within the website, and are wrapped and infused within the content of the system. They help the users understand where they are and where they can go. Supplementary and courtesy navigation systems are not embedded within the structure of the website. They provide information which the users will turn to when they feel frustrated with the other navigation tools or they can come to a conclusion after a quick glance.

These five navigation systems will be introduced as following:

1. *Global navigation*

It provides access to the entire system. Global navigation does not need to appear on every page of the system but users can get to anywhere in the system with global navigation.

2. *Local navigation*

It provides access to the pages that are most related to the current page. For example, if it is a strictly hierarchy architecture, local navigation will lead the user to the parent, siblings and children pages of the current page.

3. *Contextual navigation*

It is embedded within the content of the page itself. It will be necessary if the users need additional information when they are reading the text, and this can help increase the efficiency by putting the link right there and not letting them scan the whole system again.

4. *Supplementary navigation*

It provides shortcuts to the most related content which the users might not be able to access through global and local navigation.

5. *Courtesy navigation*

It provides access to the information that the users do not usually need but it is provided for the user's convenience.

# 4

## Methodology

Throughout the project, many research and design methods have been executed in order to get a methodical process. In this chapter, we will introduce a number of methods which are relevant to the project.

### 4.1 Ethnography

Ethnographic research methods can be used to gather rich data from the users. Methods included in ethnographic studies are for example observations, interviews and questionnaires (Preece, Rogers & Sharp, 2015).

#### 4.1.1 Interviews

When looking for facts, interviews are common to use. Interviews often go together with observation as a combination in field studies and is good for finding out behaviour, beliefs and attitudes on a subject (Preece, Rogers & Sharp, 2015). There are several interview types, but the ones which will be used in this project are unstructured and semi-structured interviews.

In ethnographic studies, unstructured interviews is a great way to get new insights about the interaction of users with technology. It is also a great way to explore and find out major issues in a new domain (Wilson 2014b). This type of interview is open-ended and more like a conversation which go into considerable depth rather than a question by question interview, it covers topics, rather than specific questions (Preece, Rogers & Sharp, 2015). Unstructured interview does however not mean that one should conduct it without a written plan. Wilson (2014b) suggests that one should beforehand develop an interview guide with listings of the general topics or questions and a script for the interview guide.

Interview methods are also commonly used when moderating usability studies or when briefing and debriefing during usability evaluations (Wilson 2014b; Preece, Rogers & Sharp, 2015). The type of interview that will be used for usability tests and evaluations in this project will be semi-structured interviews which is a combination of structured interviews with predefined questions and unstructured interviews with open-ended exploration (Wilson 2014b). In a semi-structured interview, Preece, Rogers and Sharp (2015) suggest that the interviewer uses a basic script with preplanned questions and then leads the interviewee to keep talking until no new relevant information is being said. The interviewer should lead the conversation but it is important to avoid phrasing question in a way that would suggest that a specific answer is expected. An example of such a question is “You seemed to like this use of colour...” (Preece, Rogers & Sharp, 2015, p. 394) which would encourage the interviewee to agree.

### 4.1.2 Observation

According to Patel and Davidson (2014), observation is a helpful way to collect information on behaviour and events in natural situations. Together with other methods like for example interviews, it produces rich and in-depth data which can be used for further studies. Observations, produce a lot of data which can be tedious to analyse and irrelevant if the observation is not planned and carried out well (Preece, Rogers & Sharp, 2015). Preece, Rogers and Sharp recommend that data gathering has a clearly stated goal and that the focus is on that goal during sessions, because so much is going on and often a lot of changing circumstances happen during observations which can make one lose focus.

There are several types of observations, such as unobtrusive and obtrusive observation and direct and indirect observation. The one that will be used in this ethnographic study is called *Direct Observation* in the field. It is a method where observations happen in a normal setting, where the designer can get the full context of why activities happen the way they do because some things are difficult to explain as a user (Preece, Rogers & Sharp, 2015).

## 4.2 Data analysis

Two sources of the data are involved in this process which include quantitative data collected by praktikplatsen.se on Google Analytics as well as qualitative data from the support portal where inquiry emails are sent when users meet problems while using the website. From Google Analytics, we will find out information such as which platform users tend to use when logging in to the website and how long they will stay on different pages. Also, from the support portal, we can read what problems users usually meet when they are using the system and what the solution is.

The data will not be used as a main source of user research but they can be supplementary information to support the ethnographic studies. For example, we take note of questions that users frequently ask when using the system. This can deepen the understanding of the system and can also be helpful when deciding the interview questions and suggesting the guidelines.

## 4.3 Brainstorming

Brainstorming can be done by an individual or a group of people (Wilson, 2013b) in order to generate ideas. The procedure of brainstorming includes: Select a group of people with different backgrounds; pose the problem and present the brainstorming technique to the group; generate ideas according to the problem without criticism and judgement; discuss and analyse the ideas. The procedure of brainstorming seems to be simple, but it is not as easy as it sounds like. Good brainstorming sessions are rare (Wilson, 2013b). There are reasons why people cannot speak their minds freely, such as shyness, cultural differences and informal relationships with the other members.

Brainstorming is usually used in the early stage of design process. When new requirements are explored and new ideas are needed, brainstorming can be done by a group of people who come from the same or different areas. Brainstorming can help to generate wild and unusual ideas; however, it can also be chaotic and mute shy people.

## 4.4 Affinity diagram

Affinity diagram is also known as KJ method, which is named after a Japanese ethnologist, Kawakita Jiro, who originated this method. There are four steps in affinity diagram, which include label making, label grouping, chart making and written/verbal explanation (Scupin, 1997). In the first step, the design group is supposed to write each idea on one note card. In the following steps, the group has to group the idea according to their intuition and assign title to each group, make a chart to reflect a certain pattern that can be found within the original note cards, and in the last step, a verbal or written explanation should be made by the whole group. (Scupin, 1997).

KJ method can achieve group consensus because it can let the group focus on one question (Martin & Hanington, 2012). During the process of KJ method, the group members are silent and everyone is given equal opportunity to express thoughts by grouping the note cards on a white board no matter whether the group member is shy or not. This ensures that everyone can “speak” at the same time which makes effective use of time (Martin & Hanington, 2012).

## 4.5 Personas

User personas are fictional characters created by the designers to represent the archetypes, which means personas should be specific description of a group of users (Reiss, 2012). It can be considered as user models which present a group of users’ behaviours, goals and also their communication (Cooper et al, 2014). As a designer, designing a product to give users big satisfaction is the goal. As users, different users have different goals when using a tool, a service or a system. How to satisfy these users is the major issue, and creating user personas is a way to solve the problem. Designers need to choose a group of users whose needs can represent a larger set of requirements to become the primary users, and then prioritize these users so the designers do not need to compromise to meet the secondary user’s needs (Cooper et al, 2014). Personas can help to set the goal of a product, and communicate the design concept with stakeholders.

Personas is a strong design tool which is a simple concept but designers have to apply this method with sophistication. It is not the same as user profiles which simply put a photograph and a list of the user’s basic information which is unrelated to the task. Instead, personas are synthesized according to a great deal of user research results.

## 4.6 Experience mapping

Different people have different life experience, however, they have one thing in common that they have critical interactions and emotions and they have to make decisions everyday (LUMA Institute, 2012). Experience map is a way to visualize what a user have been experiencing during the time when they are using a service or a product by analysing the notes transcribed from user research results. For example, from in-depth interview and ethnographic research. Designers have to extract what people are doing feeling and thinking from a user’s point of view (O’Connor, 2016).

Experience map can help to deepen the empath for users and discover the user’s pain point. It is a way to analyse the data from previous user research in the process of divergence, and it can inform subsequent design process in convergence, because it can clearly show the complexity and difficulty people have faced and struggled (LUMA Institute, 2012).

## 4.7 Sketching

According to Wilson (2010), not all people who are involved in a design process are designers, especially during the participatory design process. A sketch might be nice to have during the process, because it is quick to create and inexpensive. Wilson (ibid.) also discussed some attributes of sketching, such as timely and minimal detail. Sketches are provided when needed, and include only key features.

## 4.8 Prototyping

Prototyping is a way to visualize the design concept. A prototype can be any form of expression from a paper-based storyboard to executable digital mock-ups (Preece, Rogers and Sharp, 2015). In this section, we will introduce two prototypes that are going to be used in the thesis which include a low-fidelity prototype that is going to be created with *Balsamiq* and a high-fidelity prototype that is going to be built with *Sketch*.

### 4.8.1 Low-fidelity prototype

Creating low-fidelity prototypes is very useful in the early stages of the design process. Low-fidelity prototypes are easy, quick and cheap to build and will not cost more than enough to modify the prototypes. Low-fidelity prototypes are able to visualise the preliminary design concept and design alternatives. According to Preece, Rogers and Sharp (2015), low-fidelity prototypes are useful to evaluate multiple design concepts with a lower development cost, however in the meanwhile, design details are limited.

There are many ways for low-fidelity prototyping which include sketching, paper wireframing, storyboard, wizard of OZ and similar. Low-fidelity prototyping can be regarded as a way of concept prototyping and throwaway prototyping since the purpose of which is to explore more design alternatives instead of to be integrated to the final product (Lidwell et al, 2010 & Preece, Rogers & Sharp, 2015).

### 4.8.2 High-fidelity prototype

High-fidelity prototyping can also be called as evolutionary prototyping as Lidwell et al (2010) suggest. These prototypes are similar in look and feel rather than in functionality to the anticipated final product (Benyon & Moody, 2004). During this process, the prototypes are developed, evaluated and refined continuously until they evolve into the final product (Lidwell et al, 2010). According to Benyon & Moody (2004), there are features in high-fidelity prototypes, such as useful for detailed evaluation as aforementioned and important design document which clients must agree to before final development.

High-fidelity prototypes are similar to the final product. It means they are more expensive and time-consuming to create and it will cost more to make changes (Preece et al, 2015). Therefore, in this phase, designers will become reluctant to change things they have crafted for hours (ibid.).

## 4.9 Usability testing

“If you want a great site, you’ve got to test.” (Krug, 2014, p.114), which is why it is one of the main focus methods in this project. According to Krug, the only way to make sure that a

site works is to watch people try to use it. That is what Usability testing is; watching people use something to detect and fix things that are confusing and frustrating for them (ibid.).

Rubin and Chisnell (2008) has developed a handbook for conducting usability testing and it consists of 8 parts:

1. *Develop a test plan*

A test plan is good to make when planning for a usability test. It addresses the why, what, when, where, who, and how of your test and is the foundation of the whole process. Rubin and Chisnell suggests that the test plan should be written as soon as you know you are going to test, and then refine it as the project proceeds.

2. *Set up a testing environment*

To conduct a usability test, you need a location and space. Therefore you need to decide on if you are going to do the test in a lab or somewhere else. To decide on what is suitable for the test, there are some factors which should be considered. The test design and measures, logistics, public relations within your company, and lastly, availability of participants. These factors will help you to decide on an appropriate setting for the usability test.

3. *Find and select participants*

This step is crucial to the success of the test, because testing with people who are not close to the typical user of a product will give bad results with limited value. For best results, the selected participants should have backgrounds and abilities as close to the intended users of your product as possible. To do this a user profile needs to be set up, describing the target audience's knowledge, skills and behaviour. When that is done, an effective way to recruit people from the target audience needs to be done within your constraints of budget and time.

4. *Prepare the test material*

Materials vary from test to test, but nonetheless they should be prepared well beforehand to better structure and organize the tests. The materials will be used to collect data, satisfy legal requirements and to communicate with participants. Common materials which are usually developed for usability tests are for example, orientation scripts, questionnaires, task scenarios, debriefing topics guide amongst other things.

5. *Conduct the sessions*

The sessions can vary a lot in amount of time and participants, but the most typical one is the "one-on-one" test where the participants are individually observed and questioned by a test moderator being in the same room. The moderator will lead the session and do everything from for example, training the user or explaining the product to distributing or reading the task scenarios and later on also debrief the user.

6. *Debrief the participant and observers*

After the tasks are done, debriefing is done to review and explore a participant's actions. It is here that the problems are discussed to find out why they occurred and how to fix them. Rubin and Chisnell mentions that debriefing sessions do not need to be formal or extensive for the pieces to come together, a simple debriefing session will help you understand "motive, rationale and very subtle points of confusion" (Rubin & Chisnell, 2008, p. 229).

#### 7. *Analyse data and observations*

When all of the tests are done and the data has been collected, it needs to be analysed. A preliminary analysis is done first to quickly find the worst problems and discover larger trends and patterns. After that, a more comprehensive analysis is done to deliver all findings, the previously found and new ones that were not covered in the preliminary analysis.

#### 8. *Report findings and recommendations*

This is the last step and this is where the findings from the analysis is documented into a final report. In this report you will also with the help of fellow designers create recommendations on how to fix certain problems.

### 4.10 Heuristic evaluation

Heuristic evaluation is one of the most common inspection methods when trying to find usability problems and is often used because it has a very low cost while revealing many usability and design problems (Wilson, 2014a). The method is used by evaluating a system or interface against a list of guidelines (Wilson, 2014a; Preece, Rogers & Sharp, 2015). A list of nine heuristics was developed by Nielsen and Molich (1990) to use for evaluation which was later revised and made into ten heuristics by Nielsen (1994). The list is following:

#### 1. *Visibility of system status*

The users should be aware of what is going on and where they are in the system. That is, the system should provide enough information about system status to the users. This information could be system feedback, which should be clear, accurate and non-misleading. For example, users should be able to see the login status in the system.

#### 2. *Match between system and real world*

This means the system should use a language which the users can understand, because the system should be user-centred, and the user-friendliness is to a large extent related to how easily the user can understand the system. The reasons why users cannot understand the system can be varied. For example, it could be the users are not familiar with the terminology in the system or the users misunderstand the metaphors used in the system.

#### 3. *User control and freedom*

Users can be mistakenly doing some actions. Before making some irreversible and significant decisions, there should be enough warnings shown to the users. Also, the system should support undo and redo. They should have the freedom to exit the page as their wish.

#### 4. *Consistency and standards*

The system should follow some “general standard”. Within the system, if it means the same meaning, different words should not be used in order to keep it consistent. The users should not be confused because of the words, sentences or icons which have the same meaning.

#### 5. *Error prevention*

The system should have the ability to inform the users how to do actions in a correct way so that errors can occur less often during the working process. For example, when

setting password, the users should know what is the correct format of setting password, and the system should inform the users where is clickable and where they are supposed to input information.

6. *Recognition rather than recall*

If a system is too complicated, it usually requires the users' energy to remember how to finish a task, but this problem can to some extent can be solved by the system itself. It would be easier for the users the recognize an icon than remember an icon. In this way, understandable information on the interface and easy language of the system should be considered when designing a system.

7. *Flexibility and efficiency to use*

The system should be able to perform some tasks automatically. This can save some time and energy for the users. For example, the users should not select a value which is supposed to be default and the users should not adjust the window size when it should be automatically adjusted.

8. *Aesthetic and minimalist design*

The visual effects is an important factor that can influence the user experience. For example, old people might have some special requirements on the size and style of the font. Also, every page or dialogue should not include information that is irrelevant and rarely needed.

9. *Help users recognize, diagnose and recover from errors*

When an error occurs, the system should be able to help the users realize there is an error, learn the reason why there is an error and give the solution to the error. The system should provide accurate error message in a proper way. For example, the message should be written in a plain language and should not make the users confused.

10. *Help and documentation*

Help and documentation should be provided even though the designers think the system is perfect. The information should be easy to search and understand.

## 4.11 Perspective-based UI inspection

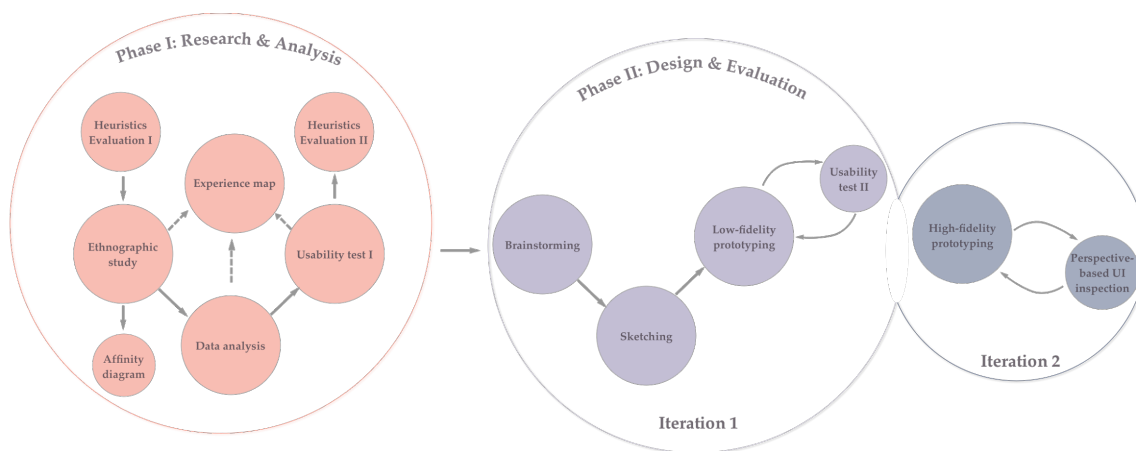
Perspective-based UI inspection is used to evaluate a product from different perspectives and is a good way to broaden the problem-finding ability (Wilson, 2014a). Different perspectives can be for example different types of users, like old, young, color blind and more. If you were to look at a product from an elderly's perspective, the issues being highlighted might be for example readability or terminology which is hard to understand by elderly (Wilson, 2014a). A list of questions or heuristics are usually developed to have something to evaluate against.

Wilson (2014a) states that the method is good to use in situations where you have limited access to users or you are lacking time to recruit users for a full-scaled study. The method can be extremely fast and is therefore optimal when the budget is low and access to users is lacking.

# 5

## Design Process

This chapter contains our planning and the different phases of the project (See Figure 5.1). Here we describe how the project was divided, what methods we used in the different phases and explicitly how everything was executed. The first part shows the general design process while the other two parts goes in-depth on the two major phases of the project and the methods used.



**Figure 5.1.** Design process

We had two phases in the design process. In the first phase we focused on research and analysis. The purpose of our research and analysis was to find out as many usability problems as possible, so we used different user research methods such as ethnographic study and heuristics evaluation. We split the second phase into two iterations where we applied the design alternatives by creating a low-fidelity prototype and did usability tests on it in order to get feedback and then we made a high fidelity prototype in the second iteration.

### 5.1 Phase I - Research and Analysis

In the first five weeks of the project, the focus laid on finding out usability problems in the system and which parts of the system to focus on. We had to find out which perspective we wanted to go with, school administrators, *Praktikplatsen.se* administrators or business administrators and to do that we started out with an ethnographic study in the form of a combination of observations and interviews. After that we used three methods to find out usability problems, the methods were: data analysis, usability testing with school administrators and then heuristic evaluation in two iterations. Lastly, when the problems had been found, we did a KJ evaluation, also called Affinity diagram to categorize the problems, to decide on which parts to prioritize.

### 5.1.1 Ethnography

To decide which parts to focus on and to learn the workflow of the users, we started out with doing an ethnographic study. The study was a combination of observation and interviews and included seven users in total, one *Praktikplatsen.se* administrator, three school administrators and three business administrators. After just one interview with an *Praktikplatsen.se* administrator, we could exclude them from the main focus, since we learned that they were all experts of the system and also the ones who handled and solved the support errands. They were also the ones who conducted training courses, which is why their workflow would not be disrupted from usability problems as much as the other users. So, after that, we met with the school and business administrators and interviewed them which resulted in a lot of qualitative data about what they did and how they experienced the system. The study showed that school administrators used the system more frequently, and they used a bigger part of the system. Even though the main purpose of the ethnographic study was not to find out usability problems, we could already see there that the school administrators experienced more serious problems than the others which is why we chose to put focus on them.

How we conducted the study was to first make up a script template which included the goals of the study, wide questions which could produce good qualitative answers and also some small guidelines on how to proceed with everything (See Appendix A). The study always took place at the user's workplace and we started every session by introducing ourselves, getting agreement for audio recordings which would be done with our phones and then asking the user to show us how they perform their daily work, thus starting the observation.

The observation session did not have clearly stated questions to be asked, but instead we asked questions depending on what they showed us and we kept them on track by using leading questions like for example “what do you do after that?”, “do you do anything else on this page?” to stay focused on the goal of the observation which was to find out the workflow of the users. Finding out the experience of the users among other stuff came afterwards in the unstructured interview.

Unstructured interviews were executed directly after an observation was done to further learn about the workflow and the other goals we had set for the sessions, which were, usability problems, pros and cons with the system, the user experience, and lastly the usage of the *Praktikplatsen.se* support. These goals were covered with open-ended questions which means that instead of many smaller questions we had few wide questions which would make the user go more in-depth on the topic at hand.

After ending a session we would partly machine transcribe the whole recording with the software *Pop Up Archive* and then correct and add the remaining information manually. Some parts were done manually because the software could usually not transcribe everything, because of accents, Swedish words and so on. The software helped shortening the transcription time a lot and was used for every recording in this and other methods used. The transcription, when done, was then combined with notes taken and resulted in a list of quotes which were related to usability problems (See Appendix B), and would act as a base for the Affinity diagram (See Chapter 5.1.5). The transcription also helped to make clear the workflow which would be used as a base for making scenarios for the usability tests (See Chapter 5.1.3).

### 5.1.2 Data analysis

The data analysis was done on two kinds of data, they were both quantitative, and both supplementary to support the findings in the ethnographic studies. The first kind of data was

found after doing an analysis and summary of the Google Analytics statistics (See Appendix C). The data showed how many sessions certain pages in the system had and with that we could determine which pages were most frequently visited and which ones were more infrequently visited. Thereafter, together with the results from the ethnographic study, we could decide on which pages to focus on and which pages to put on the low priority list. The second kind of data came from analysing 200 support errands from *Praktikplatsen.se*'s support portal. The support errands were categorised based on problem type and area in a table (See Table 1 in Chapter 6.2) and could later be used as a supplement in other methods, for example in *Chapter 5.1.3* where the data together with the ethnographic study results would support the scenario making process and decision making of which areas and which tasks to test in the usability tests.

### 5.1.3 Usability test

Usability testing was done in two periods and with two different contexts. The first one was done right after the ethnographic study and data analysis, and the goal was to find out usability problems in the unchanged system with the school administrators, while the second test was done to test the lo-fi prototype together with domain experts who are the *Praktikplatsen.se* administrators. The second test can be read about in *Chapter 5.2.1.6*. This chapter will be about the first test.

Both quantitative data and qualitative data was collected during this usability test. The goals of the test was to assess the effectiveness of the system for the users with different levels of experience, to identify obstacles when completing common task, to evaluate the common problems that appear in support errands. Therefore, different categories of daily tasks were identified through support errands, and according to these categories, the common tasks were decided. We integrated these tasks into different scenarios to provide the test users a smoother process to do the test. We were supposed to assess how easily and successfully the users can finish each task, and also we collected qualitative data which came from the verbal protocol and debriefing interviews after the test session so that we can know why they were confused and help us set priorities on potential changes to the system.

The process we followed was the one described by Rubin and Chisnell (2008) which was also mentioned in *Chapter 4.9*. The steps were:

1. *Develop a test plan*

The first thing we did was to make a test plan to know exactly how everything was going to proceed and what we needed to prepare and do (See Appendix E). The test plan was created in the beginning of the preparation process but was revisioned and filled in as we proceeded, since some of the information in the plan was decided in later steps.

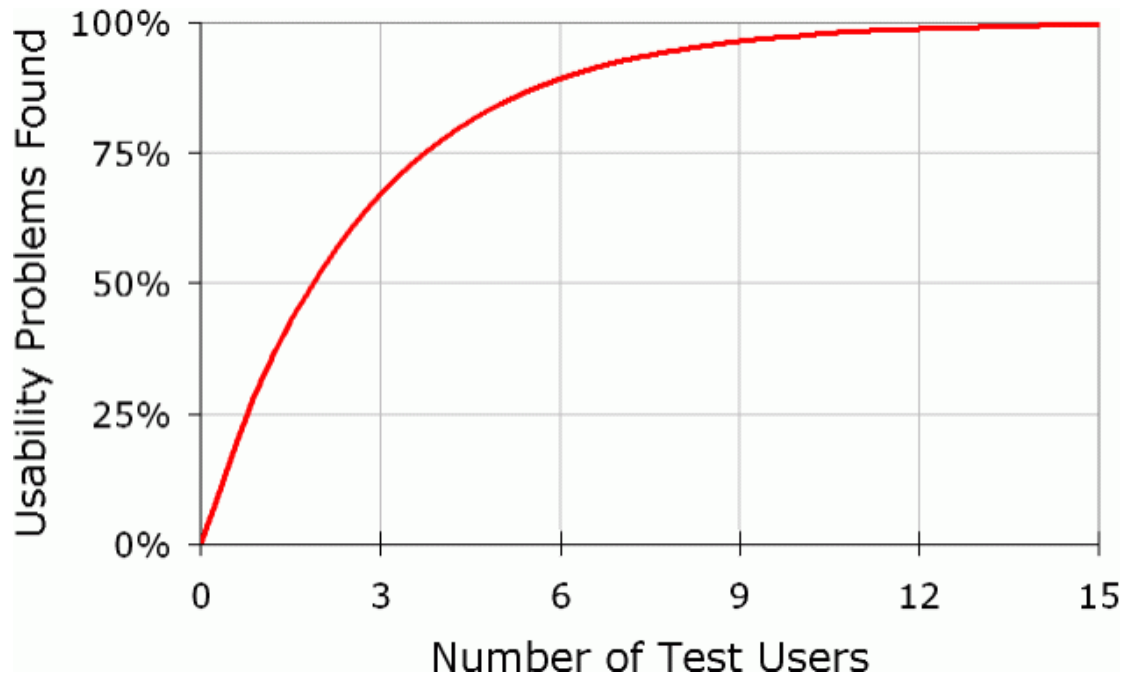
2. *Set up a testing environment*

We had more freedom and time to move around than the users, so we decided to do the tests at the user's' workplaces for their comfortability and also to have a normal context of usage.

3. *Find and select participants*

Since we already knew what kind of users we were focusing on, it was easy to get a hold of the correct type. The users' contact information was provided to us by GR so we did not have to recruit them, because it was done for us. All we had to do was to book the time for testing. The testing was done with three different users at different

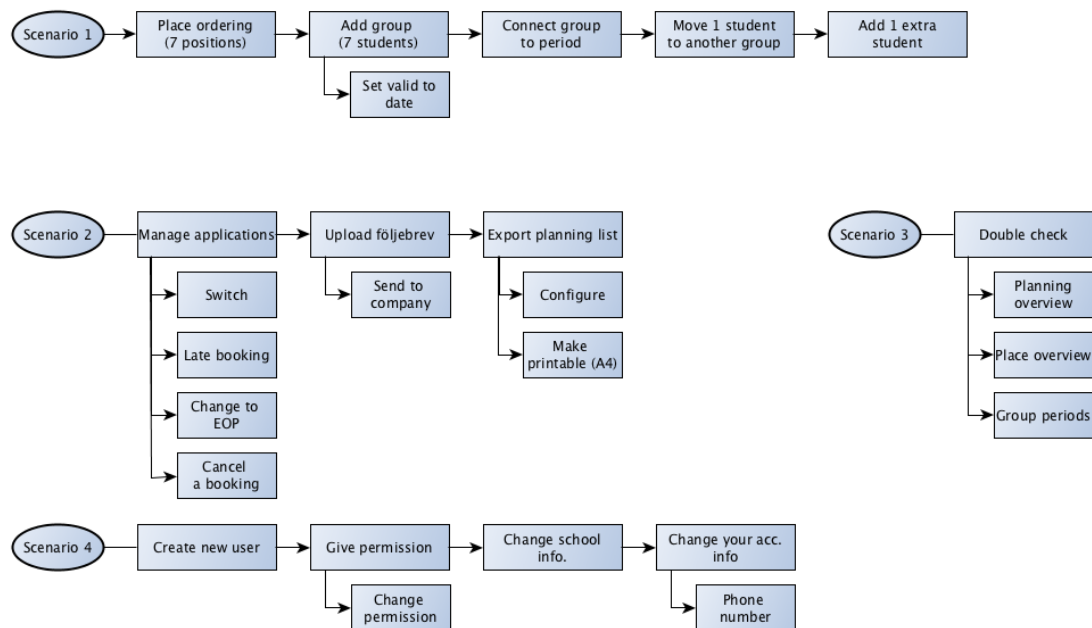
times. We originally planned to test with five school administrators but the availability of the users was not very good which made it hard for us to stick to the planning if we were to proceed in the pace we wanted, so we stopped at three. Nielsen (2017) suggests that with three users, you can find about 65% of the usability problems in a system (See Figure 5.4), so combining those 65% with the problems we found from our ethnographic study, heuristic evaluation and data analysis, we deemed it was enough.



**Figure 5.4.** Number of users needed to find Usability problems (Nielsen, 2017).

4. Prepare the test material

The first material we had to prepare was scenarios that we could use to guide the users through the system (See Figure 5.5). The scenarios were based on the information gathered from the ethnographic study and data analysis about the workflow and commonly used pages. We also considered the pages with a lot of already found problems seen in Table 1 in *Chapter 6.2*. This resulted in four different scenarios which covered almost everything a school administrator would do in the system and most of the problem areas found.



**Figure 5.5.** Scenario chart for Usability testing.

Another thing that had to be prepared was a way to record the sessions for further analysis. We considered several options with video cameras and microphones or USB programs since we initially wanted to use the users own computers, but in the end we decided on using our own MacBook laptops which had QuickTime with built-in screen recording installed. With QuickTime we could set it to record the screen and take in audio from the computer's microphone. It could also indicate where the users were clicking which was really helpful for analysis.

The last thing to prepare was the data in the systems. We were working in a test environment, so our changes and tests did not affect the real system, which is why we could create and manipulate everything in the system freely. We created fake schools with fake user accounts which had administrator permissions that the participants could work with. We also created fake students and changed some information on existing internship places so that our students could apply for them. All of the data was created or changed directly in the system except for the students which we added to an Excel file and was to be uploaded to the system by the participants as a part of the scenarios we created.

##### 5. *Conduct the sessions*

When conducting the sessions, we split the responsibilities into two tasks. One would be the moderator and lead the participant through the scenarios while asking and answering questions, trying to keep the participant focused on the tasks. The other person was the note taker and would take notes of interesting situations, reactions, answers and actions of the participant which would could later be used in the debriefing part for reviewing the session.

##### 6. *Debrief the participant and observers*

After going through all scenarios with a participant, we had a short debriefing session. In this session where we looked at all the scenarios and repeated orally what they did

and what we saw. We then asked questions based on the notes taken and let the participant answer and ask their own questions.

7. *Analyse data and observations*

When the sessions were done and all the data had been collected, we had to analyse the data and turn it into useful information. This was done in two steps: compiling then summarising (See Appendix F). In the compiling part we looked through videos and noted what kind of mistakes they did and how often they did it, and in the summarising part, we made a table counting and combining all of the problems for all users so that we could get a good overview of the usability problems found.

8. *Report findings and recommendations*

The findings are a part of the usability problems and guidelines in the result section (See Chapter 7.1 & 7.2).

### 5.1.4 Heuristic evaluation

The heuristic evaluations were done with two studies, the first one at the beginning of the project with ourselves and two other interaction designers, and the second one was done by ourselves after becoming fairly used to the system. The sessions were divided into two phases, first an inspection part and then a discussion part. The discussions resulted in lists of problems in both studies (See Appendix G) and we chose some of the problems we thought were critical and added it to the list of problems. (See Appendix D).

#### 5.1.4.1 Study 1

The first evaluation was done at the very start of the project and was done by four interaction designers including us, and it was done randomly in all parts, following no scenarios or tasks. We did this inspection to get an initial feeling of the system and to find any obvious usability problems that could occur to anyone using *Praktikplatsen.se*. The inspection was a simple one and all we did was to compare the different processes in the system to the heuristic in *Chapter 4.10*.

#### 5.1.4.2 Study 2

The second evaluation was a lot more in-depth and complicated than the first one. We still used the same heuristics, but this time we used the same scenarios as the usability tests (See Chapter 5.1.3) which covered most parts of the system that a school administrator would use. By going through the system ourselves with the scenarios, we could confirm the found problems the users experienced in the usability tests but also find problems which the normal user would not think about.

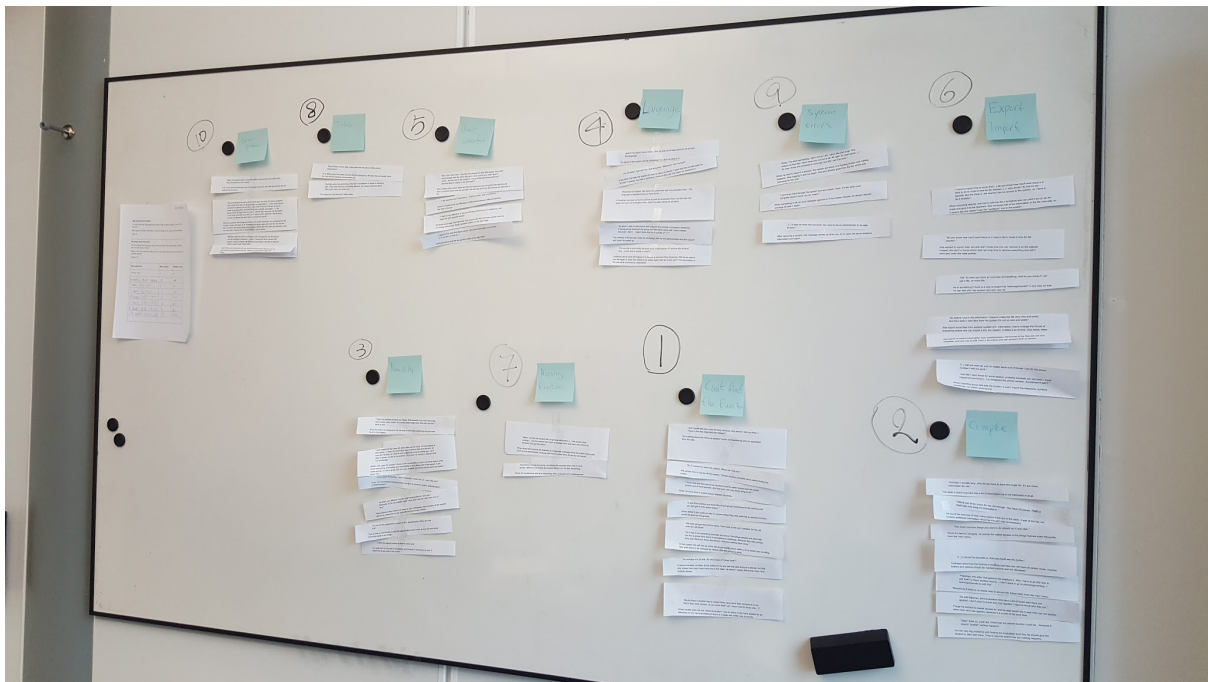
### 5.1.5 Affinity diagram

For the affinity diagram (See Figure 5.6), we used the quotes and problems found in the ethnographic study (See Chapter 5.1.1) to find out problem types, to make a priority order of the different types and to know what to focus on for Phase II (See Chapter 5.2). The session started by individually and quietly categorising all of the quotes. The different categories were then named and some of the quotes were relocated to fit into the different categories. The categories were then named after different problem types or areas such as “cannot find the function” or “system errors”. These categories were then ranked after a few criteria which where; “how serious is the problem?”, “will we be able to give a good solution to it?” and “how much does it disrupt the workflow?”. The final result of the affinity diagram was a

color-coded list of problem types in the order to prioritise them in. Red was for the must-fix problems, yellow was for the medium-serious problems and green was for the problems which was non-serious or we could not give a solution to. The list was formed like below:

1. Cannot find functionalities (Red)
2. Complexity (Red)
3. Memorability (Red)
4. Language (Yellow)
5. User interface (Yellow)
6. Export/import (Yellow)
7. Missing functions (Yellow)
8. Titles (Green)
9. System errors (Green)
10. Other problems (Green)

The red and yellow problem types are used as a base to show our final results in the *Usability problems and design solution* chapter (See Chapter 7). The different areas will be explained in detail there, except for the green ones, which were about titles for users, technical errors and error messages, and lastly, other problems like out-of-date information.



**Figure 5.6.** Affinity diagram on a whiteboard.

### 5.1.6 Experience mapping

Experience mapping is a way to visualise what the users do and how they feel when interacting with a product. The materials for making an experience map came from the ethnographic study and data analysis.

We first put the transcripts into a table (See Appendix H). The table consisted of four parts, which included the transcript and information extraction of what they were doing, feeling and

thinking. After that, the workflow become clearer and more detailed information of user experience was more clarified by sorting out behaviours and feelings. The behaviours were corresponding with some feelings from different people (See Figure 5.7).

In the figure, the yellow colour means behaviour. The green colour represents the positive feeling while doing the behaviour and red colour is about their negative feeling. As shown in the map, it was very rare that people show some positive feelings when they were interacting with the website and their negative emotions tended to be confusion and frustration. Also, we summarised the objectives for a series of behaviours which is represented in purple in the figure.

The blue colour shows each stage that the users will be at during the interaction with the system. The stages were categorised as following, according to the scenarios and problem areas in the usability test:

- Managing places: Includes the views where the users handles place orders.
- Managing groups: Covers the views where the handling of groups are done.
- Managing applications: Covers the view that where the users handles the internships and applications of their students.
- Managing users: Includes the views of creating a new user and managing the user's personal information and permissions.
- Viewing: Includes the views of placement list, planned period overview, place overview where the users can look through different kinds of data. The users can export data from the overviews.

For example, at the stage of managing application (blue), if the users want to add a group (purple), they have put in information first and then upload the student file (yellow). They feel frustrated because it is time-consuming to upload multiple groups (red) and there is no positive feeling (green).



wireframes were created in *Balsamiq*. Finally, the low-fidelity prototypes were tested with domain experts, and feedbacks were gathered to improve them.

### 5.2.1.1 Personas

Personas can be used to describe a group of users and what their needs are (See Chapter 4.5). On the basis of the users research results, we found out that the users fall into four groups, which include new user, old user, frequent user and infrequent user. However, old users can be infrequent users, which make them lack of familiarity to the system. Likewise, if new users who receive training courses in the beginning and keep using the system everyday, they can get the hang of the system in a short time. Therefore, two personas were created according to aforementioned features. One of them is a new and frequent user, the other one is an old but infrequent user (See Figure 5.8). The personas not only described a picture of how people work in different user groups but was also a visualisation of the user needs that we gathered by using the user research methods.

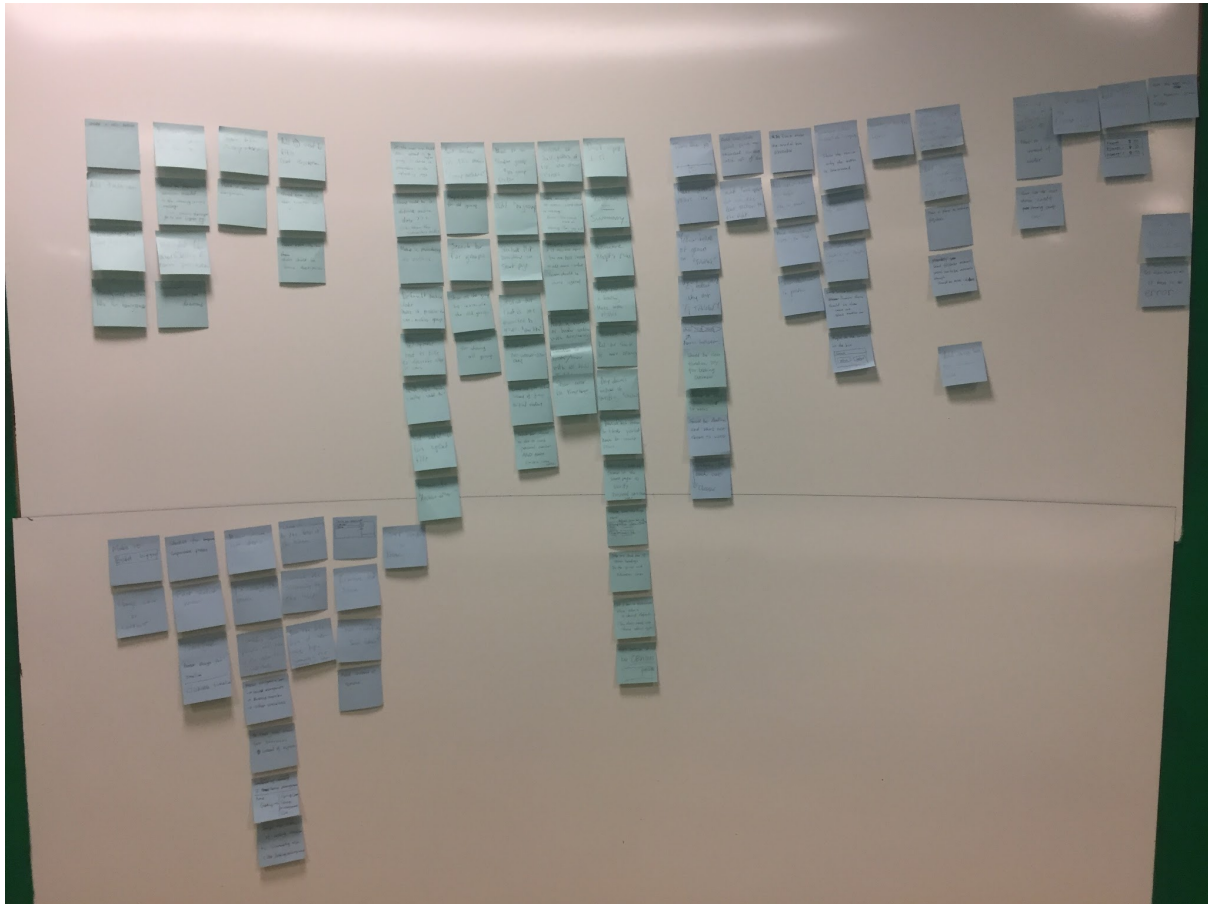


**Figure 5.8.** Users personas (Freepik, 2017)

### 5.2.1.3 Brainstorming

Brainstorming was done after personas. The purpose of the brainstorming session was to come up with ideas which could solve the usability problems and improve the usability of the system. Therefore, the list was used as inspirations for brainstorming. The ideas were generated according to each category on the list.

There were two sessions in this step. First, we wrote down ideas for one category individually within a time limit. Second, we discussed the ideas with neither criticism nor praise and put them on the whiteboard, and they were sorted according to each category. After that, we moved on to the next category until we finished brainstorming for the last category (See Figure 5.9).



**Figure 5.9.** Brainstorming session

#### 5.2.1.4 Sketching

Sketches were made in order to visualise the initial ideas that we had come up with in the brainstorming session. The same with brainstorming, this session was also done category by category. The sketches were made in parallel so that thoughts would not be interfered. Both good and bad aspects of each other's sketches were discussed thoroughly in order to select the essential parts from each sketch, or come up with new ideas together.

Many design choices were made in this step. In the process of managing group, the flow of uploading a group was simplified and optimized. In managing places, the flow of ordering places was made smoother, such as some redundant steps were reduced or combined with other steps. In managing applications, the features of timeline were discussed and we decided on using number to show the step-by-step concept of managing applications. In viewing, the detail of how to make the timeline clickable was settled and how other functions on the start pages should be like was carefully considered. All of these would lead to low-fidelity prototypes which was be created in the next stage.

### 5.2.1.5 Low-fidelity prototyping

The low-fidelity prototype was created in *Balsamiq* (see Figure 5.10), which is a really convenient tool for creating wireframes with a great amount of handy components. In this step, what the interface would look like in reality came into consideration, even if it would just be black and white wireframes. The real size of the window and the font size were considered because they would affect the layout of the interface. Many other factors were under consideration as well. For example, consistency, the flow of adding, editing and removing.

Low-fidelity prototyping could be regarded as a summary of what we had done in the previous stages. From analysing the website and collecting user feedbacks to coming up with ideas, all the results were integrated into the low-fidelity prototype, which lead to the agreement between the designers and the stakeholders so that we all were on the same page.

Praktikplatsen

http://test.praktikplatsen.se

Praktikplatsen.se Administration Planeringsverktyg Rapporter Dokument Uppdateringar search

Praktikplatsen > Grupphantering: Läs in ny elevfil Vyrörklaring

Ladda upp fil Filinformation Koppla kolumner Koppla enheter och grupper Kontrollera

**Ange vad filen innehåller**

Skolform \*  
Gymnasie/Vux

☒ Första raden innehåller kolumnrubriker

Exempel:

Namn	Personnummer	Adress
Anna Andersson	XXXXXX-YYYY	Gatan 1
Anders Svensson	ZZZZZZ-AAAA	Gatan 2
Anna Svensson	AAAAAAAABBBB	Gatan 3

**Vad vill du läsa in till**

☒ Jag vill skapa nya grupper  
☐ Jag vill läsa in till befintliga grupper

Tillbaka Nästa steg

Figure 5.10. Low-fidelity prototype made in *Balsamiq*

### 5.2.1.6 Usability test

The second usability test was done with the domain experts who are currently working at *Praktikplatsen.se* as administrators. The reason why we chose to test with domain experts was because they have more knowledge of the system than the regular users, since the system is complicated. *Praktikplatsen.se* administrators are the staff who work with support errands and provide training courses, so they know what problems the regular users would generally meet. In this way, they could be critical towards the new design and provide positive or negative feedback that could be considered in the next iteration.

Different from the first usability test (See Chapter 5.1.3), we did not adopt scenarios to go through the whole test. Instead, we designed different tasks for each process (See Appendix I)

and a goal for each task. For example, in managing users information we designed tasks as below:

- Go through the process of adding a user and giving permission
  - Add user
  - Give permission
  - Edit permission
  - Save permission
  - Remove permission

The purpose of the task was to test whether the user could find the functions and to find out whether the process was logical and smooth. The users were asked to “think aloud”. That is, they were required to talk about what they were thinking and feeling at the moment. After going through all the tasks, some follow-up questions were asked in order to get some additional information. Also, the usability tests were recorded by *QuickTime* during each usability test, we transcribed it to the form of text after that.

The domain experts gave us more professional suggestions on different process, for example, they suggested to use better names for the steps in booking management. They gave valuable feedback on the shortcuts, which they thought had too much information in it and looked like a big menu. They had insightful ideas on how the system should work according to their years experience of working on the system and interacting with the school administrators, but overall impression on the low-fidelity prototype was positive.

## 5.2.2 Iteration 2

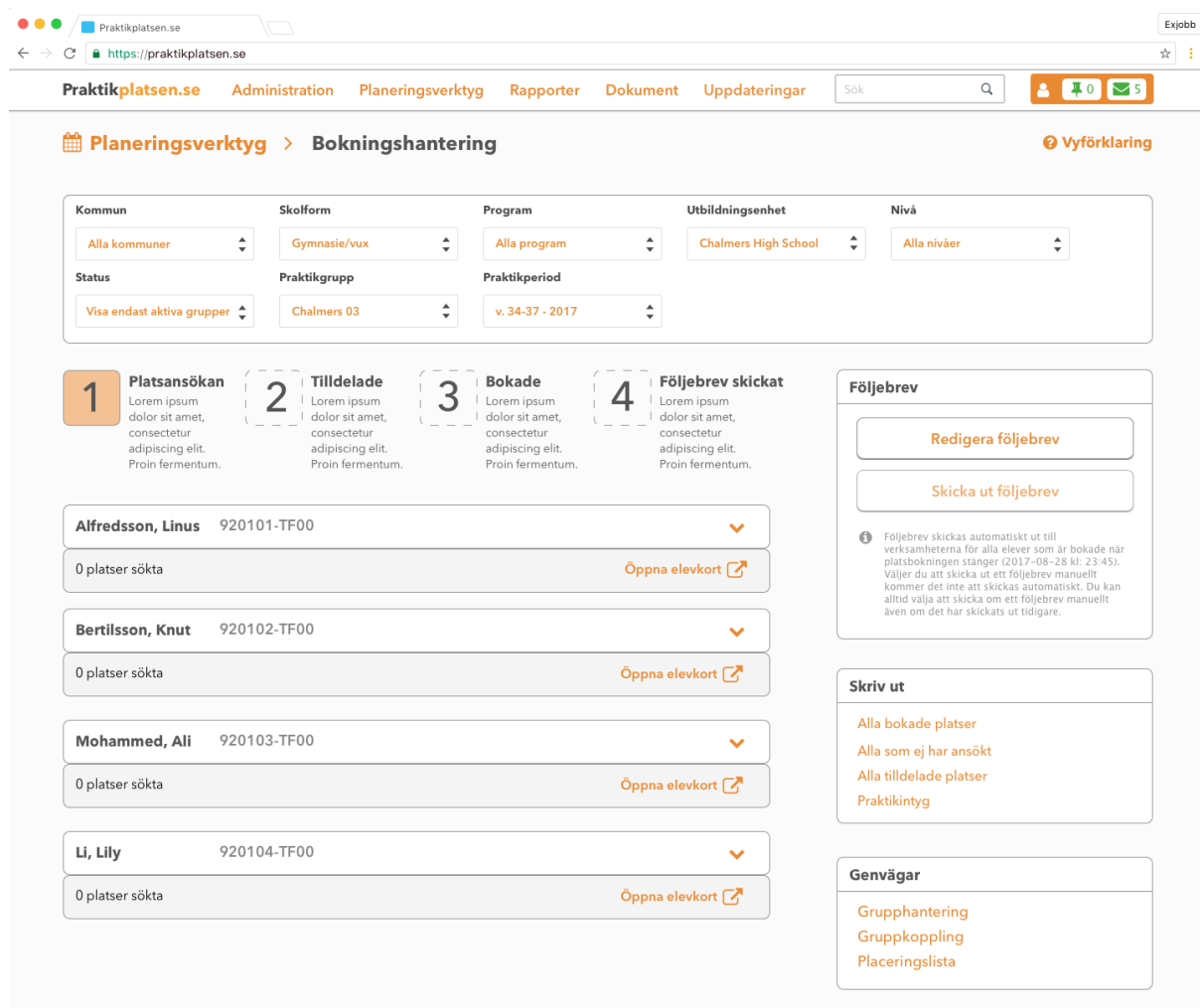
The second iteration started with making a high-fidelity prototype in *Sketch* and ended with doing a perspective-based UI inspection to evaluate the prototype. The inspection was conducted based on the personas we created in the previous step and heuristics suggested by Nielsen (1994). After this, more improvements were applied on the high-fidelity prototype.

### 5.2.2.1 High-fidelity prototyping

The high-fidelity prototype was created in *Sketch* (See Figure 5.11), the whole process took a week. In this step, more design details were considered. Not only window size and font size were considered, but also the alignment and the balance of the interface. The prototype was made according to each process. In each process, it was designed with clickable interactions, and the interactions were made in *InVision* so that it could be shown to the stakeholders.

High-fidelity prototyping is a method that can visualise more design details, so aesthetic comes into consideration. Colour-coded information can be shown. For example, red colour shows alarming information and yellow colour represents warning information. The result from hi-fi prototyping is as close to the real product as possible, and this can reduce misunderstandings when communicating with the stakeholders.

The result from high-fidelity prototyping will be discussed in detail in *Chapter 7.1*.



**Figure 5.11.** High-fidelity prototyping

### 5.2.2.2 Perspective-based UI inspection

A perspective-based UI inspection was done after creating the high-fidelity prototype in order to improve and perfect the current prototype in a higher degree. We made use of the personas we created in the previous step (See Chapter 5.2.1.1) in order to inspect the UI from the perspectives of each persona based on the 10 heuristics suggested by Nielsen (1994).

For each persona, there was different focus on heuristics. For example, from the perspective of Karen who is a new user but works with the system every day, her focus would be more on the flexibility and efficiency of use, and aesthetic and minimalist design, while for Chris who is not a very frequent user, the focus would be more on the match between the system and real world and recognition rather than recall. We summarised the problems found from each perspective to a list (see Appendix J).

As aforementioned in *Chapter 4.11*, this method is good use when the budget is low and there is lack of time. Due to the time limit, we could not recruit real users to do another round of usability test. Therefore, we used this method from the perspectives of the personas to find problems so that we could get results quickly and efficiently.

# 6

## Results from user studies and data analysis

In this chapter, we will present the results from the user studies and data analysis in the thesis. The first part of this chapter is the results from ethnographic study which will be presented in accordance with the structure of affinity diagram. The second part is about the analysis of the 200 support errands as well as Google Analytics. The last part, we will describe the results from usability tests, which include the usability test in the first phase and the usability test on the low-fidelity prototype.

### 6.1 Ethnographic study

From the ethnographic study that we did with 7 users, we extracted a certain amount of quotes which were connected to workflow and problems. The amount of problems and complexity of the workflow made us choose to focus on School administrators. So here we will only present some of the data from their studies. The full study for all administrators can be found in Appendix B.

There were in total 3 school administrators. User 1 and 2 are admins for adult educations and handles their internships while user 3 is the internship responsible for an elementary school. Even though different education levels, the system works mostly the same for all of the school administrators. The results will be presented according to the categories of affinity diagram we made after the study and one quote and one explanation will be presented in each category below.

#### 1. Cannot find functionalities (Red)

*"I know that last time two of my students want to switch places and the whole system sort of went berserk. And that was very very tricky thing to do."*

The user did not know how to switch places between students, and he had to get help from the administrators at *Praktikplatsen.se* so that they can help him finish the task.

This category is about the user complained it is hard to find the functions. Although there is a function in the system, but they might not use it everyday. They had to click around to find one function. This cost time and energy to do.

#### 2. Complexity (Red)

*"And then I wonder why...why do we have to have this huge list. It's too much information for me."*

The table in place overview had a lot of information he was not interested in at all. He wondered why the table was so huge.

Complexity is a big problem of the system. The system being too complicated causes other problems such as memorability and “Cannot find functionalities”. Too much information requires the user spend more time learning the system and this to some extent will increase the support cost.

### 3. Memorability (Red)

*“So that's very different. And as I said the big problem is I don't use it frequently so I'm not updated. Yeah I know what I want but I don't know how to do it.”*

The user felt insecure about what to do since he used it infrequently. He did not follow all the updates and so on. It seemed like he just went with the trial and error method.

The complexity of the system increase the cost of memorability, especially when the user does not use the system frequently. Every time when the user restarts to use the system, they will have to spend more time on the system and recalling what they have learned before. This makes the system less efficient and effective.

### 4. Language (Yellow)

*“Well if I've done it some times, I find my way but it takes time for me to learn the language”*

The user did not understand what the terms meant in the system. It took time for them to learn the language.

The terms in the system could be confusing if the users are not used to it. Some of terms are written in a way that only developers can understand, and some of the terms are so similar that can get confused.

### 5. User interface (Yellow)

*“I am colour-blind and I think this is... could be better. Just a contrast or...”*

One user is colour blind and he had difficulties to differentiate between different elements, such as links in the text.

The problem of the user interface is not very significant. It is just that we have to consider more people with disabilities when designing the system.

### 6. Export/import (Yellow)

*“Do you know how much work there is in here to do to make it nice for the teacher. ”*

She wanted to export data, but she didn't know that she can remove it on the website. Instead, she did it in Excel which took her long time to remove everything she didn't want and make the table prettier.

This category is about import and exporting data from the system to excel or pdf. It is included in the workflow of some administrators to do this.

### 7. Missing functions (Yellow)

*“When I do that the student will not get any information. [...] the system does nothing [...] so that means that I have to contact every and each one of them to tell them ‘you got this place’”*

When doing late booking the students do not get any messages from the system which adds work for the administrator, because she had to contact them all one by one herself.

This category is about the system does not include some of the functions due to some reason. This should be improved under the consideration of all the stakeholders.

8. Titles (Green)

*“None of these names really matters because they have another person helping them.”*

He is talking about the contact persons that are displayed on the lists, they are usually never the ones that the students communicate with.

The category is about the titles given to some supervisors or responsible persons. They are misleading and is often incorrect to what they actually do in reality.

9. System errors (Green)

*“Scary. I’ve done something I didn’t know I did. I don’t like that at all. This makes me feel like I don’t have any control at all. All right. So she’s gone. [...] So now I know she probably is removed, but still I can’t be sure.”*

When he tried to remove a student, the system got stuck on a loading screen and nothing happened. After logging in and out again, she was already gone from the list. which was confusing for the user.

This category is about the errors generated by the system which does not have to do with the interface or the design of the system.

10. Other problems (Green)

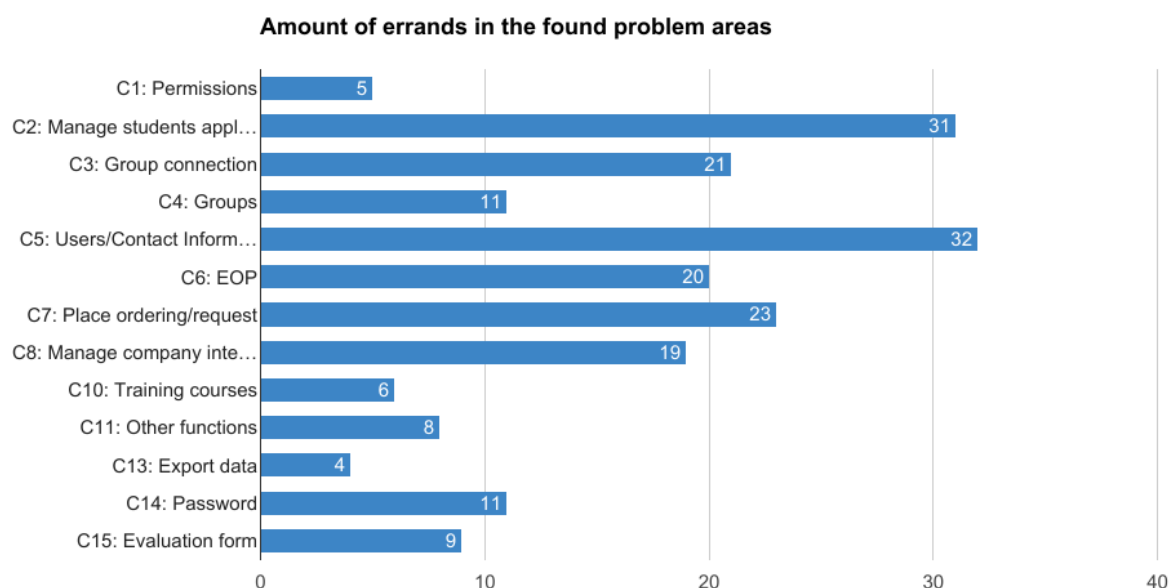
*“What I’ve noticed is that in hospitals elderly cares and they don’t really update their information on the website.”*

A lot of out-of-date information that is not relevant anymore, due to the fact that they are not updated by the users.

This category is about other problems that we cannot not really solve through design but have to communicate with other stakeholders.

## 6.2 Data analysis

From the 200 support errands from the support portal we could find different categories which the errands could be divided into. There were 15 categories in total and by putting the different errands into the categories we could see which category had the most problems (see Table 1). Many of the problem areas are connected to certain views, so by looking at the data found, we could see which ones had more problems. The problems found from the ethnographic study could also be put into these categories and we could then combine the result and see how much and how serious each problem area was. The same data was also used as a supplemental in the usability tests to make scenarios.



**Table 1.** Problem areas and the amount of errands.

As seen in the table, the categories with the most problems found were Users/contact information and Manage students applications. Which made it clear to us that we had to include these parts among others, when doing usability tests.

The other part of the data analysis was from Google analytics which showed us what pages were most frequently visited. The results can be seen in Table 2 below and more detailed data can be seen in Appendix C.

Sida	Sessioner	% av trafiken	Avhoppsfrek
<a href="#">/Elev/ChangeLosenordFirstTime</a>	2,1 tn	10.0%	9.00%
<a href="#">/Historik</a>	1,8 tn	8.67%	13.2%
<a href="#">/Admin/BokningsOversikt/DisplayBokningsOversikt/</a>	1,8 tn	8.38%	18.1%
<a href="#">/Admin/Platsmall/ShowPlatsInformation/</a>	1,1 tn	5.30%	52.4%
<a href="#">/Admin/BokningsOversikt/AddBooking/</a>	980	4.66%	36.1%
<a href="#">/Admin/Home/Start/</a>	980	4.66%	25.7%
<a href="#">/Admin/PlatsOversikt/Index/</a>	947	4.50%	12.1%
<a href="#">/Admin/Foretagsenhet/DisplayForetagsenheter/</a>	876	4.17%	17.4%
<a href="#">/Admin/PlaneringsOversikt/Index/</a>	856	4.07%	12.4%
<a href="#">/Admin/Platsannonser/Index/</a>	836	3.98%	24.0%
<a href="#">/Admin/Plats/ShowFoljebrev/</a>	823	3.91%	41.9%
<a href="#">/Admin/Anvandare/ChangeProfile/</a>	792	3.77%	13.1%
<a href="#">/Admin/Dokument/DisplayDokument/</a>	728	3.46%	18.8%
<a href="#">/Admin/ErbjudPlatser/ErbjudPlatserModal/</a>	537	2.55%	22.9%

**Table 2.** Data from Google Analytics showing which pages are more frequently visited.

As one can see in the table. */Admin/BokningsOversikt/DisplayBokningsOversikt/* has the most visits of the admin pages. This page is connected to the category “Manage student applications” from the analysis of the support errands and together, this data confirms that it is a view we have to focus on since it is most frequently visited and also has one of the highest amount of problems.

The data from the data analysis together with the ethnographic study would later on form the scenarios seen in Chapter 5.1.3 (see Figure 5.5) and would also lead to developing the categories in the experience mapping in Chapter 5.1.6 which were used as a base for finding most of the problems. The categories were:

- Managing places
- Managing groups
- Managing applications
- Managing users
- Viewing

## 6.3 Usability test

As mentioned before, two usability tests were conducted. The first one was done with regular users while the second one was run with users who have expert knowledge of the system. Each test took approximately one hour, which included a short introduction of the session, a short interview of the user’s background, running the tasks and then a post-test debriefing.

### 6.3.1 Test 1

Due to the time limit, the first usability test was conducted with 3 school administrators. The features of the users included experienced user, inexperienced user, elementary school administrator, high school administrator and vocational school administrator. They were required to do tasks according to each scenario that we designed according to the results of ethnographic study and data analysis. Each scenario has its corresponding views in the system.

We collected both quantitative and qualitative data in this test. Quantitative data included:

- Errors made in a task
- Count of “negative comments or mannerisms”
- Count of asking for assistance/support
- Count of visits to the document
- All incorrect selections
- Incorrect menu choices
- Incorrect icons selected

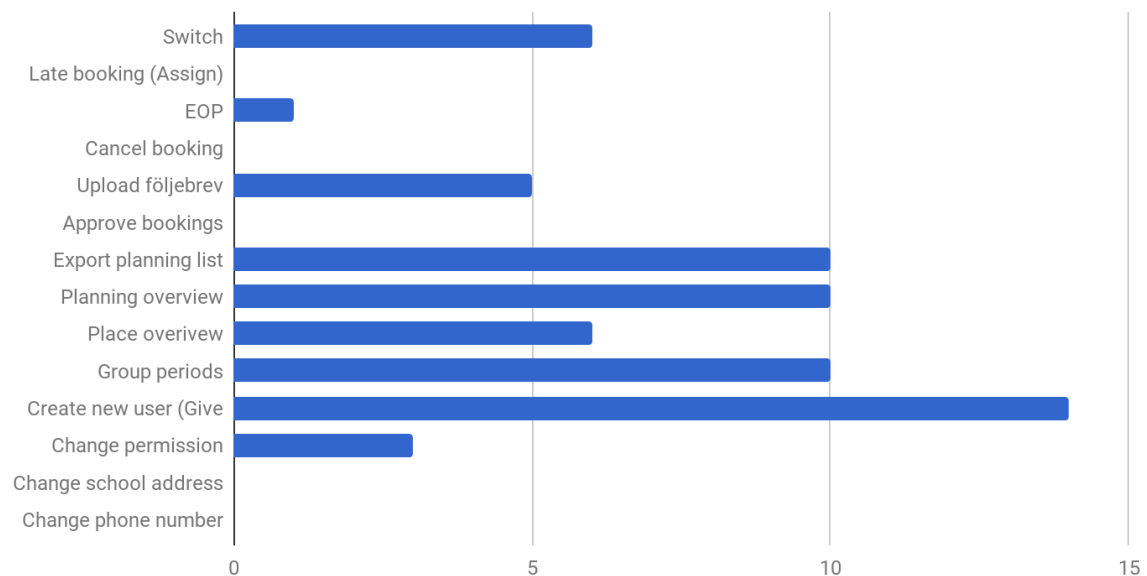
Qualitative data included:

- Appropriateness of site’s functions to users’ tasks
- Ease of use overall

- Usefulness of terms and labelling

We watched the videos which were recorded during the test and summarised the data according to the video afterwards. The table below (See Table 3) shows the count of the errors which the users made in each scenario in the first usability test. The number indicates which area the users tended to make mistakes, and according to the user's behaviour we can know the reason of the mistakes and how we can improve.

Errors made in the first usability test



**Table 3.** Error made in the first usability test.

In this table, we can see that user tended to make mistakes in *Create new user* session and in the some sessions such as *Late booking (Assign)* and *Cancel booking*, they did not make errors at all. These results gave us focus to the next step of low fidelity prototyping.

### 6.3.2 Test 2

In the second usability test, we conducted the test with five administrators at GR, all of them are expert users of *Praktikplatsen.se*. They are responsible for coordinating between the school administrators and business administrators. Some of them work with the elementary school aspect and some of them work with high school or vocational school administrators. The different focuses of each user helped us form a holistic impression of the low-fidelity prototype.

The purpose of this test was to find out problems of our low-fidelity prototype which was made on *Balsamiq* so that the users could not do a lot on the prototype. Due to this reason, we collected only qualitative data in this test, such as the positive and negative feedback and suggestions from an expert's perspective. The tasks were decided according to the stages in the experience map. Feedback from the expert users regarding the changes were overall positive. We got suggestions in terms of wording, the amount of shortcuts and the flow of uploading the students, and we applied this in the next step of high-fidelity prototyping. The results from this test could be compared to the one you would get from a qualitative

interview, which is why we did not do any measurements in this step. Instead we listened to their feedback and applied it to our prototype.

# 7

## Usability problems and design solutions

The results consist of two parts, usability problems with design solutions and design guidelines. The results cover different problem areas found from the affinity diagram (See Chapter 5.1.5) and exists in many of the different views. The usability problems were divided into categories (See Chapter 5.1.6) and with the problem areas in mind we came up with solutions that would cover most problems. The problems that were not included in the final design were given guidelines in the second part of this chapter.

### 7.1 Problems and solutions

A lot of usability problems were found but only the most crucial ones which disrupted the workflow were added to a list of critical problems (See Appendix D). The purpose of the list was to show the current situation of the system and to highlight the different areas which has critical problems experienced by the users. The list is used as a base for the final design and guidelines (See Chapter 7.2). The problems were found through **Experience diagramming** based on data analysis and ethnographic studies (See Chapter 5.1.6) and **Heuristic evaluation** (See Chapter 5.1.4). The problems found were specific to certain views but the solutions apply to the different problem categories listed further in this chapter. Screenshots of the different views in the original system can be found in Appendix K.

#### Problem 1: Cannot find functionalities

The first and most prioritised problem was that users could not find how to do different things in the system. Either because they did not know which page to go to or that they just didn't know that the function existed. Although the the system provide enough functionality to the users, if they cannot find it, it will not increase the effectiveness of the system as aforementioned in *Chapter 3.4*. Because of this, we added shortcuts to some views and we also added and re-arranged buttons in some places.

#### Solution 1: Shortcuts

Shortcuts were added to views that were used a lot and had empty space on the right side (See Figure 7.1). This was to make it easier to know where to go next or previous and where the functionalities one might need in the current process could be. This solution solved the problem of having to go through all of the main menu items just to find out where things are.

**Figure 7.1.** Shortcuts (Genvägar) to the right

## Solution 2: Buttons to the right

Buttons were moved to the right in almost every place, so that the process would be to make choices first and then press the action button to the right. An example of that can be seen below in Figure 7.2 where the users' can order the amount of internship places for their students. The add (Lägg till) button used to be a long bar in the middle and the edit (Redigera) and remove (Ta bort) buttons did not exist before. Instead to edit you had to add another order with partly the same information, and to remove, you had to click on the order number and change it to zero. This made the functionalities quite hidden and we have solved that in this way, putting buttons to the right.

**Figure 7.2.** Place ordering box.

## Problem 2: Complexity

The complexity of the system can cause a lot of problems to the users. Due to the complexity of the system, users either spend more time on recalling the knowledge of how to use the system, or they call for support and this to a certain degree gives additional burden to the support staff. In this case, we tried to simplify some workflow for the users in order to increase the effectiveness and efficiency of the system and reduce the learning cost for the users. For example, the workflow of uploading a group of students through Excel was simplified.

## Solution 1: Clear buttons and simpler workflow

In a view called “group management” a box existed which had a button called “New group” (Ny grupp). In that box we added two more buttons to make the process of adding stuff more simple, the buttons that were added are called “Read new student file” (Läs in ny elevfil) and “Add new student” (Lägg till ny elev). These buttons were located in the menu before but are now easier to find since they are grouped together with the other add button that exists and that is related to students or groups (See Figure 7.3).

Processes were complex, an example of that is the process of uploading students with an Excel file. Even though the process was already step by step, it did not include all the necessary steps which needed to be there. It also had a lot of unnecessary steps which could be combined with other steps. What we did was that we combined some steps and reduced the steps from seven to five. We also made it more clear what to do on every page. See for example *Figure 7.4*, where the arrows shows what to do next and what information is missing by making the boxes red. In the last step we have also added a checkbox called “set date later” (Välj datum senare) which indicates that the step is not strictly mandatory.

**Figure 7.3.** Add (Lägg till) box.

**Figure 7.4.** The process of uploading students with an Excel.

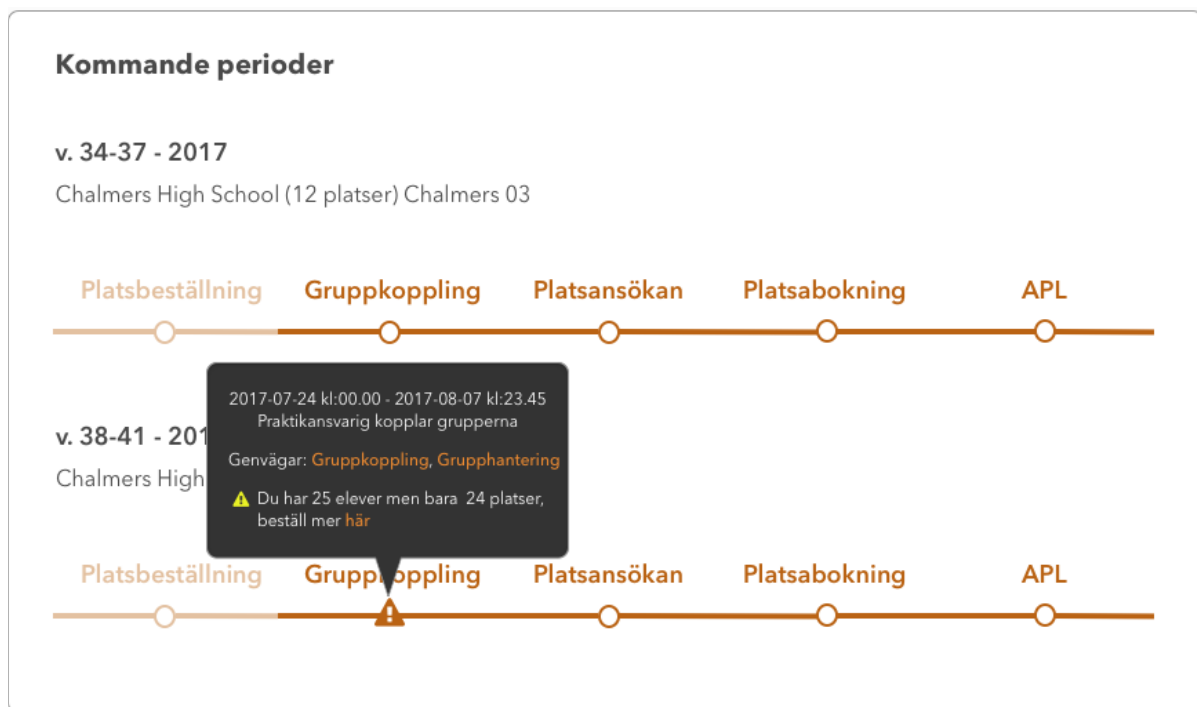
### Problem 3: Memorability

Memorability was the third biggest problematic category. Because of the first two problems, it would be rather difficult for the users to remember where to find which function, or when to do what job. They tended to click on each page and try to find the function everywhere, and this usually cause frustration and anger, and even more so some of them might forget to do

some important tasks in the system. In order to make it easier for the users to remember every important time point of doing the tasks. The timeline on the homepage was improved and a timeline on manage application page was creatively designed.

### Solution 1: Overall timeline

According to the ethnographic study we did, users who had problems with remembering what to do used the timeline which was located on the start page quite a lot. The timeline was therefore improved and we solved the problem of memorability by adding links to related pages of the current process which the timeline indicated. The links were added to the hover-over boxes and in there we also included links to potential fixes of errors which might have occurred (See figure 7.5).



**Figure 7.5.** Overall timeline on the start page.

### Solution 2: Page specific timeline

In addition to having the overall timeline, a page specific timeline was added to a page called “booking management” which showed the specific task to do at the current time and in what order (See figure 7.6). This was formed as a process bar and contained step name and information text. The text was not specified, but rather we suggest that it could contain for example, instructions, deadline times and explanations of the current step.



**Figure 7.6.** Page specific timeline on the page “Booking management”

## Problem 4: Language

The problem of misused terms also leads to the system complexity and decreases the efficiency of the system. As we mentioned in *Chapter 3.4*, the users should not have to think about the interface, and this means the system should speak the user's language. The users need more effort to remember what a term means if it is misused and this should completely be avoided by changing them to correct ones. Therefore, we adjusted some terms in the menu in order to make them more logical so that the users do not need any effort to remember.

### Problem 1: Menus

To make the language more clear and easier to understand we changed some words according to what they contain and what they are for. An example of this can be seen below in *Figure 7.7*, where “Booking management” (Bokningshantering) was changed. This used to be “Booking overview” before, which was illogical since that view is where the user’s handle their students applications, in other words “manage bookings”.



**Figure 7.7.** Menu for planning tools

## Problem 5: User interface

Problems about user interface cause confusion and frustration of the users. They were struggling with understanding different icons and colour-coded information. The efficiency and learnability as we mentioned in *Chapter 3.4* would be reduced. The users should not spend time on understanding the interface rather than that they should be able to learn everything in the system in a more unambiguous way.

### Solution 1: Help the users understand

To help the users understand what a functionality is for or like in *Figure 7.8*, why buttons are inactivated, we used tooltips to give hints on why the buttons behaves as it does. The figure below shows an inactivated buttons which says “Send out cover letter” (Skicka ut följbrev) and the tooltip explains that the cover letter can only be sent out once step one and two in the process are done.



**Figure 7.8.** Tooltip instruction.

## Problem 6: Export/import

Exporting and importing data would be two significant functions. However, the amount of the data in the system is large. The users need to spend effort on selecting what kinds are needed and then adjusting the table to an appropriate size so that it can be printed out. In order to improve the efficiency of exporting and importing data, some features were added to tables which visualise the data in different lists.

### Solution 1: Saving configurations

A good function was improved and made better. In *Figure 7.9*, it is possible to see configuration settings that can be done before exporting to a file. This configuration was good before, except it did not save the configuration after it was done. This meant that every time the user went into the table, they had to do the same configuration again. We solved this problem by adding a save function and associated buttons, “Standard view” (Standardvy) and “Add column” (Lägg till kolumn). This solution makes it easier for the user to export a table in the same style that they want every time and the associated buttons make it easy for them to go back to the standard view or add back any removed columns if desired.

Standardvy

Lägg till kolumn

Kolumner

Exportera

< x >	< x >	< x >	< x >	< x >	< x >	< x >	< x >	< x >
Elev	Epost (Elev)	Praktikgrupp	Period	Plats	Eop	Inriktning	Kommun	Besöksadress
Alfredsson, Linus	Linus@school.se	Chalmers 03	V. 34 - V. 37 - 2017	Undersköterska, Vård och omsorgsprogrammet (Kardiologi/ Diabetesmottagningen) Angereds Närsjukhus		Akutsjukvård Vuxen	Göteborg	Halmtorget 1, 424 22,
Karlsson,Bertil	Bertil@school.se	Chalmers 03	V. 34 - V. 37 - 2017	Undersköterska, Avd 232 (område 3), SU/Mölndal		Akutsjukvård Vuxen	Mölndal	T-huset Plan 5 , 431 80

**Figure 7.9.** Configuring placement lists of the students.

## Problem 7: Missing functions

Some functions were missing in the system, and this would reduce the utility of the system, which means some functionalities are not available so that the users cannot do what they want to do in the system. However, some functions should be provided so that the system can be more logical and easier to understand, and also so the workflow can be smoother. Therefore, some functions were added or improved in the final design.

### Solution 1: Student management

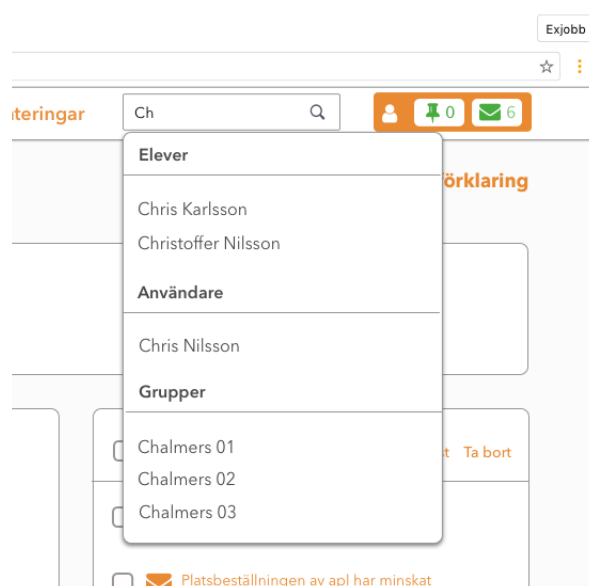
A big problem in the system was that students who did not belong to any groups disappeared from all of your lists. This made it confusing for users, so in our solution, we added an option to find these students in a view called “Student lists” (Elevlistor) which we thought was the most logical place to go and look for students. The solution includes an extra filtering called “group status” (Gruppstatus) which one can use to filter the students by group affiliation (See Figure 7.10).

Namn	Personnummer	Epost	Mobil	Lösenord	Praktikgrupp	
Linus Alfredsson	19920201TF01	Linus@school.se	701010101	a456fC	Chalmers 001	Öppna elevkort
Bertil Karlsson	19920201TF02	Bertil@school.se	710101012	5vX3Xp	Chalmers 001	Öppna elevkort
Kent Johansson	19920201TF03	Kent@school.se	710101013	8Wvk2A	Chalmers 001	Öppna elevkort
Göran Persson	19920201TF04	Göran@school.se	710101014	2eN6pN	Chalmers 001	Öppna elevkort
Albert Lundin	19920201TF05	Albert@school.se	710101015	6qGE3r	Chalmers 001	Öppna elevkort
Lily Li	19920201TF06	Lily@school.se	710101016	6nGv5P	Chalmers 001	Öppna elevkort

Figure 7.10. Student lists

### Solution 2: Advanced search bar

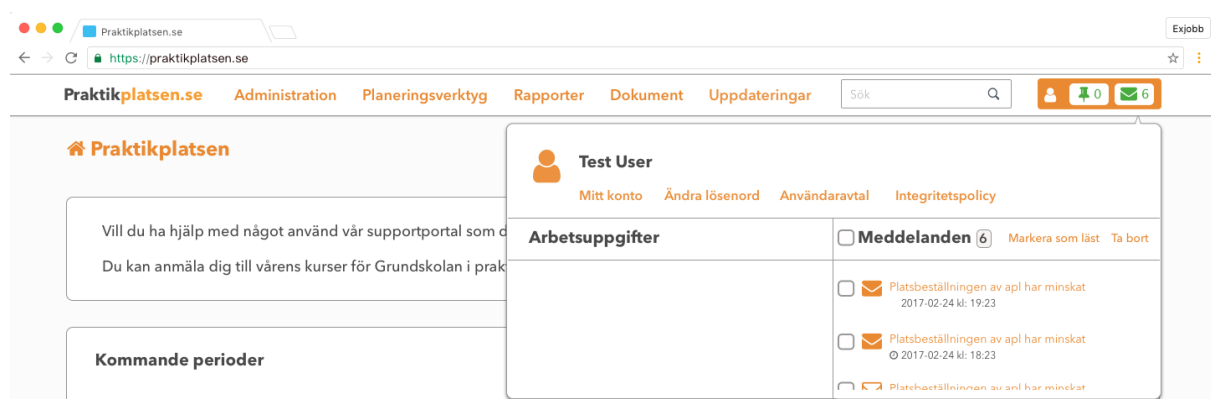
The search bar that existed in the old system was very simple and only searched students, even though there was no indication of this. This caused problems because users would not know what they could search for. In our solution, we added an extensive search where you can search for the most important things: students, users and groups. We considered to add more searchable data but domain experts at *Praktikplatsen.se* considered this to be enough.



**Figure 7.11.** View of search bar

### Solution 3: Standard email functionality

The email functions in the system were very simplified which turned out to make email management more difficult. Our solution was to add the basic functionalities of an email client like for example selecting, removing and marking as read/unread (See Figure 7.12).



**Figure 7.12.** View of email functions

## 7.2 Guidelines

Five different guidelines were developed which applies to everywhere in the system. These are based on some the problems from Appendix D, which we thought were very general and nonspecific to just one page.

1. *Speak the user's language*

The system should not require the users to spend too much time and energy understanding it, even if it is complicated. When interacting with the system, the users should be able to understand every message easily, no matter how knowledgeable they are with computers. The system language should be plain language and provide potential solutions when an error occurs.

2. *Provide consistent and correct information*

Complicated systems usually have many components, different texts and formats, and this leads to inconsistency. Inconsistent information can add complexity. The users should not have to spend energy to comprehend several messages even though they have the same meaning. This can make the system be less efficient. To avoid this, the components, text and formats should keep consistency with each other.

3. *Make functions and buttons visible*

Since the system is complicated, it is inevitable to have a great amount of information. Functions and buttons being visible and invisible can cause confusion and anxiety. This will reduce the working efficiency of the users. The system should try to make the dialogue boxes bigger and reduce scrolling as much as possible.

4. *Inactivate buttons and dropdowns rather than hiding or showing empty ones.*

To avoid errors and confusion by having irrelevant buttons, inactivate them when possible. This makes it easier for users to know where they are and when the buttons can be used.

5. *Consider users with disabilities*

As mentioned in *Chapter 3.4*, Rubin and Chisnell (2008) states that making a system more accessible almost always benefits those without disabilities too. To not exclude a big part of the potential users, which is roughly 20% of the population according to WebAIM (2017), it is important to consider the use of inclusive design and the different disability types that exists; visual, hearing, motor and cognitive.

# 8

## Discussion

In this chapter, the research questions formed in the beginning of the thesis will be discussed. The application of theory and literature will be mentioned. Further, design insights will be given and the different applied methods will be reviewed and evaluated. The chapter ends with suggestions for future work that could further improve the knowledge in this area.

### 8.1 Research question

The research question was made up of two parts, which were:

*“How to identify usability problems in an internship management system **and** design it to increase usability for school administrators?”*

Finding the solutions to both parts of the question was not easy, just one part would probably be enough for a thesis like this, but to get to the final results we would have to go through all of the steps that we did anyways, which is why we chose to include both of the questions. The two parts were initially estimated to take the same amount of time and effort and we planned accordingly and split our project in two phases, each to answer their respective question. During the project it showed that one part was actually more time demanding and more difficult than the other, and that was the first phase. It was harder in the way of getting a concrete answer to the research question, while the second part of the question had an obvious answer in the form of the high-fidelity prototype and guidelines which most of the result section consisted of. For the first question a lot more could probably have been done in the form of using more research methods and comparing them, instead what we focused on was using methods we preferred and knew would fit systems like *Praktikplatsen.se* to show that the way we are doing is a good way to find usability problems in such a system.

#### 8.1.1 Generalizability

Even though the focus was on internship management systems, the results in this thesis can be made general and many of the design proposals and guidelines are based on the goals and principles from the fields of human-centred design, usability, web design and user experience. It shows that the basic principles of those areas can with some alteration be applied to specific and complicated systems as well as regular ones.

The usability problems we have found out in this system caused the users difficulties to understand the system. In fact, many other systems including those are not complicated, could also have similar problems like *Praktikplatsen.se*. The main purpose of the guidelines is to reduce the cost of learning, understanding and remembering the system for both inexperienced and experienced users. Therefore, most of these guidelines can be applied to other systems with this mind-set. In addition, the last guideline of considering users with disabilities should be applied to most of the complicated systems in order to make them more accessible for everyone in the user group.

## 8.2 Application of theory

In this section we will discuss the use and application of the literature and theory from *Chapter 3*.

### 8.2.1 Design process

In this project we used a human-centred approach and the users and developers were included in most parts of the design process. A major focus was on understanding the needs of the users so the methods that we chose answered the questions from the HCD pyramid explained in *Chapter 3.1* in one way or another. We did not ask ourselves directly all of the five questions at every stage, but rather the different questions were answered here and there during the whole process and in the different methods. By including users as often as we did, helped us a lot with not just understanding their needs and goals but also gave us a deeper understanding of the system itself, which made the re-design part much more effective.

The process that we went through was not an old-fashioned interaction design process although it had its similarities. The biggest similarities was that all four main activities from the interaction design process was included in our process: establishing requirements, designing alternatives, prototyping and lastly, evaluating. However, our process was much more complex than that and it also did not start at establishing requirements as suggested in the interaction design process. Since *Praktikplatsen.se* was given to use as a somewhat finished product, we could start at the other end and go directly to evaluation of the system and after that go to establishing requirements.

The good things about the process was that it was divided into two very clear phases. The first phase to do research and analysis, while the second phase put more focus on design and evaluation. Because of this, we could with the time span of each phase focus on exactly what we were doing and we knew what was coming next without the need to go back and forth between phases.

The bad things with the process was that the process was linear in that order, first phase I and then phase II, and when in phase II it was not very easy to go back and change or add anything in phase I, this made it so that we had to make sure that everything in phase I was finished before we moved on to the next phase. This was because the second phase was built upon the results from the first phase, so once started it would be troublesome to change something that was done far back in time in the first phase, because it would affect many of the methods that was done later in time.

### 8.2.2 Usability

In the theory section we described six general usability goals: effectiveness, efficiency, safety, utility, learnability and accessibility. The six general usability goals was used as a reference to connect the problems in the results *Chapter 7* to certain goals or attributes to easier give solutions to them. Many of the goals were used as relevant but some were not found or was not prioritized, like for example utility and accessibility.

We described some important points to consider when doing usability for complicated systems stated by Redish (2007) in *Chapter 3.4.1*. Those points were considered and used to a certain degree, but since they were not instructions but rather guidelines, we loosely followed them by our own interpretation. This worked well and did make it easier for us both design wise and time wise. An example was to collaborate with domain experts, our whole second usability test was with domain experts but the first one we did was with the users, since we

deemed it necessary to see what the actual did in the system and what kind of errors they did. Collaborating with domain experts, which in our case was the *Praktikplatsen.se* saved us a lot of time and work since they all had the same knowledge of the system and when doing usability tests they gave us very consistent and relevant feedback. They were also easier to get in touch with and book for testing since they were all working at the same place and could coordinate their schedules with each other while booking regular users could take up to several weeks to just get a reply. Another example was to get the right scenarios, this took a lot of time to do since we had to do ethnographic studies and data analysis with a lot of users and with a lot of data, but following this advice was very wise since the right scenarios helped us develop very good usability tests which provided us with very accurate and relevant results that helped us make a good design of the system.

### 8.2.3 Web design

In this section, we are going to discuss how the theories in Web design are applied. First, we will discuss how the human behaviour patterns were applied to the project. Then, we will discuss about information architecture in terms of navigation design.

#### 8.2.3.1 Interface design

When doing interface design we involved the domain experts a lot and listened to their feedback while making changes. We also considered the 14 patterns by Tidwell (2011) (See Chapter 3.5.1) and made sure that the system supported the patterns as good as possible. Although many of the patterns were irrelevant to the system, like microbreaks, keyboard only, other people's advice and so on, we considered the different patterns even though we did not evaluate the system after them. A lot of patterns are similar to the ones already described in for example the heuristics we used for evaluation or the usability goals. So it was a matter of prioritizing which ones were to be officially used for evaluation.

The negative part about our interface design is that we might have included too many goals, patterns, attributes to follow. We think that maybe it would be better to pick a limited amount of goals and just follow them thoroughly instead of having a huge amount of goals and loosely follow them. We still ended up with a good result, but maybe it could have been better had we done that.

#### 8.2.3.2 Information architecture

As mentioned in the limitations *Chapter 1.1.2*, information architecture was not directly focused on except for navigation design which is discussed below in *Chapter 8.2.3.3*. Other parts from this principle like content organization, labelling and structuring was indirectly done through other methods in the second phase (See Chapter 5.2).

#### 8.2.3.3 Navigation design

A significant problem we have found out in this system is that the users tended to have difficulties in finding the functionalities. They usually know what they want to do but they do not know where they can do it, or they have done it before but they do not remember where they did it last time. Then, they start to do the exploratory seeking and re-finding in the system, and they fail. Thus, they have to call the support team and ask for help. A bad navigation system actually adds more load of work to both the users and the support team.

Changes have been done on the navigation systems. For example, we improved the global navigation by re-organising the items in each category. We moved the "overviews" to the

category called “reports”, because people tend to go to “reports” to read instead of to do something. Also, we added shortcuts in each page as a way of supplementary navigation. The shortcuts are relevant with the context of the current page, so this would help users who are not familiar with the system and do not know what to do to the next step, and also would help users who are professional so they can move to the page they want in a more efficient way. Timeline we added in “Booking management” can be seen as a courtesy navigation. This is the information to inform the users what task they are doing now and what the next task is. It is for the user’s convenience to show the information so that they do not miss the deadline.

The navigation system will look different for different kind of user. Since we are focusing on the school administrators, we only did changes from their aspect. From a long-term point of view, the concept should be applied to all the administrators in the system.

### 8.2.4 The importance of user experience

Users mentioned their experience of interacting with the system for quite a few times in ethnographic study and usability tests. Most of their descriptions are related to “frustration”, “confusion” and “stress”. For sure we knew this was not a good sign for describing the system, and this is why we wanted to visualise the experience by using an experience map so that we know which parts of the system made them feel positive or negative. We hoped we could find a way to turn the “emotional impact” on the users from “frustration, confusion and stress” to “happy and pleasure”.

By visualising the user experience throughout their working process, we understood what are pain points of the user when they are interacting with the system. We also summarized the reasons why they have troubles from learning their behaviour. This helped us to find out the solutions to each problem.

After understanding the pain point, making the system more logical and consistent, and also giving users quick feedback on navigation became the two main improvements in our study. First, we wanted the system to fit the user’s conceptual model more so it can cost them less to learn and remember the system. Second, we tried to give them quick feedback which help them understand the context of where they are and what they can do in the current page.

### 8.2.5 Similarities with complicated systems

The reason why we consider *Praktikplatsen.se* as a complicated system is that it involves people from different organisations and people have to interact with this system for a long period of time. For example, teachers and students from school, business personnel from the company part and also coordinators from *Praktikplatsen.se*. With all of these people getting involved, more requirements from the users are springing up and designing for the system becomes more complicated.

As we mentioned in *Chapter 3.3*, a complicated system provider always has to consider issues such as privacy, trust and limiting the harmful effects. These issues always add complexity to the system. In the case of *Praktikplatsen.se*, we found out that different schools have different curriculum and different organisation might have different plans for themselves which makes it hard to manage the compatible periods for both. When it comes to the stage of ordering places, companies usually have a limited number of internship positions while school administrators usually tend to require more than that because of the number of the students. Students at different age levels also can make the system complicated because of their different requirements. For example, younger pupils need more supervision from the teachers while adult students usually can manage their own business.

## 8.3 Design insights

The methods applied are commonly used by interaction designers and are often adapted to fit specific situations, and this makes the same methods different in different contexts. In this section we give our insights on applying the different methods in the context of complicated internship management systems and evaluate how well they worked, what the pros and cons are and why they should or should not be used over other relevant methods.

### 8.3.1 User research

The purpose of user research was to identify the usability problems. Many user research methods could be applied to gather problems. The reason why we chose qualitative methods such as observation and unstructured interviews instead of quantitative data gathering methods such as questionnaires and so on, is because of the amount of relevant users we had access to. As mentioned before, Wilson (2014b) stated that unstructured interviews are a great way to get new insights about the interaction of users with technology and also a great way to explore and find out major issues in a new domain. Also, when conducting an ethnographic study, we always got a great amount of in-depth data. For example, how users interact with the system, what kind of problems they experience, how they would solve the problems and how they feel about it. The interviewers could also always ask flexible questions regarding specific circumstances. This kind of data cannot be easily gathered by questionnaires.

However, how to interact with the interviewees should be carefully considered before going out to the field, because we would meet interviewees with different personalities, some of them would feel comfortable talking about themselves while some were shy and tended to give short answers. Therefore, finding an appropriate way to elicit the thoughts from the interviewees without making them feel uncomfortable would be important in an ethnographic study.

In addition, it is considerable to have a detailed time plan for an interview session, for the reason that different people would have different pace of acting and speaking. Since both the interviewers and interviewees do not have unlimited time, it is important to move on after the desired information is collected.

Data analysis in this project was to analyse the support errands and the data from Google Analytics. By analysing Google Analytics data, we got to know which pages were mostly used and which pages the users rarely use. Also, analysing two hundred support errands was not easy but interesting. In the support errands, what kind of problems they had and what the solutions was provided could be seen clearly in the portal, and sometimes they would even express their feelings directly in the inquiry. After categorizing all support errands, the results were clear and it gave us a direction and focus for further research and design.

### 8.3.2 Evaluation methods

Many evaluation methods were considered to be used when planning the project, and only a few of them were applied in this project because there was a time limit so some of the methods were not applicable to the project and some of them were too similar. Therefore, in each evaluation process, we chose one or two methods to evaluate the current product or deliverables. For example, during the first phase, usability tests and heuristic evaluations were done to evaluate the system. Affinity diagram was used to prioritise the problems. Experience mapping was used to visualise the user experience at different stages. Also, a second round of

usability test was done to evaluate the low-fidelity prototype. At last, a perspective-base UI inspection was used to evaluate the high-fidelity prototype.

Evaluation methods can be varied. How to choose the best evaluation method from a set of method package is difficult and it would also be hard to answer which methods can be used to find out most problems, but the only thing we know for sure is that there is no best method for evaluation but a better one. That is, in our project, most of the methods were chosen regarding a problem of time and special recruitment requirements of users.

In the first round of usability test, recruiting the users took a great amount of time. We spent time on finding the users, waiting for the replies for booking an appointment and waiting for the appointment. In this way, booking the users took almost two weeks and if we did not move on, we would have felled behind the plan. Therefore, we had to use the result from first round of usability test as a supplementary information to confirm the results from the previous research.

### 8.3.3 Personas

Personas were planned to used as a visualisation of particular user groups, and it did give us a clear view of how a group of people would behave and work in the system, but along with the project progress, the personas were put away and we only kept the key feature which was the frequency of using the system in mind. The personas was not used throughout the whole design process.

However, in the second iteration of the design process, the personas which were almost discarded were picked up again for the perspective-based UI inspection. The personas provided us two perspectives to find out more problems of the high-fidelity prototype and they also helped us understand the perspectives better as well as finding a main focus when inspecting from each perspective.

### 8.3.4 Prototyping

Two types of prototypes were made, low-fidelity in *Balsamiq* and high-fidelity in *Sketch*. Both of the prototypes were used extensively for testing and worked well with the applied evaluation methods.

The low-fidelity prototype made in *Balsamiq* was easy and fast to make but could still visualize everything that we wanted to show and test. The digital sketches were made interactive right in *Balsamiq* and they acted like a higher-fidelity prototype. There are not much negative about this method except for that it looks unprofessional when presented, but it does serve its purpose, providing a way to do early stage testing that simulates closely what the end-result would feel like.

Using *Balsamiq* instead of for example storyboards or hand drawn sketches worked better for us because it let the users interact with the views in the way that they are used to and it is also much faster to make, at least in this case where the system is complicated and has many views. *Balsamiq*, has pre-defined shapes, buttons, icons and so on which can easily be added by just dragging and dropping, so by choosing *Balsamiq* we got a very detailed low-fidelity prototype in very little time.

When designing the high-fidelity prototype with *Sketch*, we focused more on “look and feel”. It allowed us to make the design with high efficiency, and in this way we could provide the stakeholders with deliverables which are as real as possible. However, when working within a

group, there should be some standards that the group members can follow to design separate pages of the same system, for example, font size and padding between elements.

Making high-fidelity prototypes with *Sketch* is faster and easier than programming the real system, because the system itself is big and complicated. Programming is a way to make high-fidelity prototype but in this project, we adopted *Sketch* to convey a clearer design concept in a more proficient way to deliver the design concept to the developers.

## 8.4 Future work

Below we list some aspects which could give more relevant knowledge about this area but was not within the scope of this project. The suggestions are closely connected to our study and could build upon what we have already presented. The suggestions are

- Incorporate inclusive design into the system and make it more usable for disabled persons. We included this as a general guideline but this could be so more in-depth. *Praktikplatsen.se* does not have any inclusive design in their system so implementing it with them would be a good collaboration.
- In this thesis, we focused on the school administrators of the system. For further work, the other kinds of users could be designed for. The other users were *Praktikplatsen.se* administrators, business users and students.
- The design solutions we made in this report were effective but the system still stays complicated since we wanted to keep the current layout of the system to make it easier for the developers to implement our solutions. Further studies could focus on simplifying the whole system and if possible make it less complicated to use.
- The last suggestions are to extend the first phase of our project and apply more methods to compare and provide a more concrete answer on how to identify usability problems in a complicated internship management system.

# 9

## Conclusion

In this chapter, we will present a conclusion to our findings and an answer to the research question:

*“How to identify usability problems in an internship management system **and** design it to increase usability for school administrators?”*

The research question consists of two parts which were answered in two different phases. The findings from those phases will be presented separately below.

### 9.1 The first part of the research question

*“How to identify usability problems in a complicated internship management system?”*

Identifying usability problems can be done in many different ways and with a lot of different methods. In this thesis, we have shown a combination of methods as presented in Phase I (See Chapter 5.1), how they can be used together and build upon each other to produce a final list of usability problems (See Chapter 7.1). Using them separately would only generate a certain percentage of all usability problems, but combining them and using the materials and results from one method as a base in the other will make it easier to increase the percentage of found usability problems.

The methods used and recommended by us for identifying usability problems in internship management systems are:

- Ethnographic study with interview and observation combination
- Data analysis of system statistics and support errands
- Usability testing with both intended users and domain experts
- Heuristic evaluation with and without prior knowledge of a system

### 9.2 The second part of the research question

*“How to design it to increase usability for school administrators?”*

In order to answer this question, we have done user research which was to discover the answer to the first part of the question and we summarised the answer to a list of usability problems, so the answer to the second part of the research question would be how to find solutions to these usability problems.

In this thesis, Phase II (see Chapter 5.2) was the whole process of how to design the solution. Low-fidelity prototype as well as high-fidelity prototype were created to visualise the solutions to the usability problems, and evaluations (usability tests and perspective-based UI inspection) were conducted respectively on the prototypes in order to finalize the design.

Also, design guidelines were summarised to supplement the prototypes. The guidelines are general and can be used everywhere in the system:

- Speak the user's language
- Provide consistent and correct information
- Make functions and buttons visible
- Inactivate buttons and dropdowns rather than hiding or showing empty ones.
- Consider users with disabilities

# References

- Amazon.com, Inc. 2017. About 1-Click Ordering. Available at: <https://www.amazon.com/gp/help/customer/display.html?nodeId=468482> [Read 27/01/2017].
- Benyon, D (2010). *Designing interactive systems - A comprehensive guide to HCI and interaction design* (2nd edition). England: Pearson Education Limited.
- Benyon, D., & Moody, P. (2004). *Designing interactive systems, DIS 2004: Cambridge, Massachusetts, 1-4 August 2004: across the spectrum: publication based on the Designing Interactive Systems Conference*. New York: Association for Computing Machinery.
- Cooper, A., Reimann, R., Cronin, D., Noessel, C., Csizmadi, J., & LeMoine, D. (2014). *About face: the essentials of interaction design*. INpolis, IN: Wiley.
- Freepik. (2017). <http://www.freepik.com>.
- Garret, J. J. (2011), *The Elements of User Experience: User-Centered Design for the Web and Beyond* (2nd edition). USA: New Riders.
- Giacomin, J. (2014). *What Is Human Centred Design? The Design Journal*, 17(4), 606-623.
- Hartson, R. & Pyla, P. (2012), *The UX Book - Process and Guidelines for Ensuring a Quality User Experience*. USA: Morgan Kaufmann.
- Hurst, J.L., Thye, A. & Wise, C.L. 2014, "Internships: The Key to Career Preparation, Professional Development, and Career Advancement", *Journal of Family and Consumer Sciences*, vol. 106, no. 2, pp. 58-62.
- ISO DIS 9241-210. (2010), *Ergonomics of human system interaction - part 210: Human-centred design for interactive systems*. Tech. rep., International
- Katrinelundsgymnasiet. 2017, *Lärlingsutbildning*. Available at [http://goteborg.se/wps/portal/enhetssida/katrinelundsgymnasiet/utbildningar/vard-och-omsorg!/ut/p/z1/04\\_Sj9CPykssy0xPLMnMz0vMAfljo8ziTYzcDQy9TAy9DSw9TQ0cA9xNnYK9DA0t3MzlwwkpiAJKG-AAjgb6BbmhigBYx4kO/dz/d5/L2dBISEvZ0FBIS9nQSEh/](http://goteborg.se/wps/portal/enhetssida/katrinelundsgymnasiet/utbildningar/vard-och-omsorg!/ut/p/z1/04_Sj9CPykssy0xPLMnMz0vMAfljo8ziTYzcDQy9TAy9DSw9TQ0cA9xNnYK9DA0t3MzlwwkpiAJKG-AAjgb6BbmhigBYx4kO/dz/d5/L2dBISEvZ0FBIS9nQSEh/)
- Krug, S. (2014), *Don't make me think - A Common Sense Approach to Web and Mobile Usability* (3rd edition). USA: New Riders Publishing.
- LUMA Institute. (2012), *Innovating for People Handbook of Human-Centered Design Methods*. USA, Pittsburgh, Pennsylvania : LUMA Institute, LLC.
- Lidwell, W., Holden, K., Butler, J., & Elam, K. (2010). *Universal principles of design: 125 ways to enhance usability, influence perception, increase appeal, make better design decisions, and teach through design*. Beverly, MA: Rockport.
- Maguire, M. (2001). *Methods to support human-centred design*. *International Journal of Human-Computer Studies*, 55(4), 587-634.
- Management system. (n.d.). Retrieved February 10, 2017, from [https://en.wikipedia.org/wiki/Management\\_system](https://en.wikipedia.org/wiki/Management_system)

- Martin, B., & Hanington, B. M. (2012). *Universal methods of design: 100 ways to research complex problems, develop innovative ideas, and design effective solutions*. Beverly, MA: Rockport.
- Morville, P. & Rosenfeld, L. (2006). *Information architecture for the World Wide Web* (3rd edition), USA: O'Reilly.
- Nielsen, J. & Molich, R. 1990, Heuristic evaluation of user interfaces, *Proc. ACM CHI'90 Conf.* pp. 249-256.
- Nielsen, J. (1994), Heuristic evaluation. In Nielsen, J., and Mack, R.L. (Eds.), *Usability Inspection Methods*. USA, New York: John Wiley & Sons.
- Nielsen, J. (1993), *Usability Engineering*. USA: Academic Press, Inc.
- Norman, D. A. (2005). *Human-centered design considered harmful*. *Interactions*, 12(4), 14.
- Norman, DA 2010, *Living with Complexity*, MIT Press, Cambridge. Available from: ProQuest Ebook Central. [9 August 2017].
- Norros, L. & Savioja, P. (2004), *Usability Evaluation of Complex Systems*. STUK-YTO-TR 204, Helsinki.
- O'Connor, N. (2016, October 26). *How to build an experience map*. Retrieved February 04, 2017, from <https://medium.com/@wnialloconnor/how-to-build-an-experience-map-5e55b7ee4f32>
- Patel, R. & Davidson, B. (2014), *Forskningsmetodikens grunder - Att planera, genomföra och rapportera en undersökning*. Spain: Graficas Gems S.L.
- Preece, J., Rogers, Y. & Sharp, H. (2015), *Interaction Design - Beyond Human-Computer Interaction* (4th edition). Chichester: John Wiley & Sons, Inc.
- Redish, J. G. (2007), *Expanding Usability Testing to Evaluate Complex Systems*. *Journal of Usability Studies* 2 (3): 102-111
- Reiss, E. L. (2012). *Usable usability: simple steps for making stuff better*. Indianapolis, IN: John Wiley & Sons.
- Rubin, J. & Chisnell, D. (2008), *Handbook of Usability Testing: How to Plan, Design and Conduct effective Tests* (2nd edition). USA, Indianapolis, Indiana: Wiley Publishing, Inc.
- Scupin, R. (1997). *The KJ Method: A Technique for Analyzing Data Derived from Japanese Ethnology*. *Human Organization* 56 (2): 233-237.
- Shneiderman, B. et al., 2004. *Designing the user interface: strategies for effective human-computer interaction*, Boston: Pearson.
- Skolverket. 2016a, *Arbetsplatsförlagt lärande*. Available at: <http://www.skolverket.se/fran-skola-till-arbetsliv/apl>.
- Skolverket. 2016b, *Genomförande av apl - skola och arbetsplats*. Available at: <http://www.skolverket.se/fran-skola-till-arbetsliv/apl/genomforande-1.207084>.
- Tidwell, J. (2011) *Designing Interfaces* (2nd edition). Canada: O'Reilly Media, Inc.

WebAIM. 2017, *Introduction to Web Accessibility*. Available at: <http://webaim.org/intro/> [Read 2017-05-08].

Wilson, C. (2010). *User experience re-mastered: your guide to getting the right design*. Burlington: Morgan Kaufmann .

Wilson, C. (2013a). *Credible Checklists and Quality Questionnaires*. Elsevier, Inc.

Wilson, C. (2013b), *Brainstorming and beyond*. USA: Morgan Kaufmann.

Wilson, C. (2014a), *User Interface Inspection Methods*. USA: Morgan Kaufmann.

Wilson, C. (2014b), *Interview Techniques for UX practitioners - A User Centered Design Method*. USA: Morgan Kaufmann.

Wodtke, C. & Govella, A., 2011. *Information architecture: blueprints for the Web*, Noida: Dorling Kindersley India.

# Appendices

## Appendix A - Interview & Observation

### Interview & Observation

#### Introduction

- Introduce yourself to the participant.
- Explain the purpose and duration of the study.
- Explain privacy guidelines and how the data will be handled.
- Describe the unstructured nature of the interview, and note that you may want to cover some things in more depth than others.
- Ask if there are any questions before starting.

#### Goals

- Workflow
- Usability problems
- Pros/cons with the system
- User experience
- Support

#### Observation

- Ask the user to perform their daily work. Ask questions while observing. The questions can only be in your mind and asked when suitable.

#### Participant background

- Can you introduce yourself?
  - What are your work responsibilities?
  - How often do you use the system?
- Can you tell us what you usually do in the system on a normal day?

#### Finding out usability problems

- What recurrent problems do you experience in the system and how do you handle them?

## The good and the bad things

- What are the good and bad aspects of the system?
- What do you think can be improved in the system? What would you add and what would you remove?

## Appendix B - Usability problems (and more) from interviews

### Usability problems (and more) from interviews

This document contains citations from the users and comments from us. The citations are for identifying the problems and the comments are for clarification and context.

#### Maja & Marie

*"I go into administration, then verksamhet, and then platsannonser. Here I see the whole region. Which positions there are, But I don't want to see that. I don't want to see what's available at elementary school and so on, So I write in the "free text", to limit to elderly care."*

Maja has to filter every time she goes into "place ads" because she can see ads for the whole region in every unit, but she only wants the ones that are relevant to her, which is those connected to elderly care.

*"When we send information We contact the student through email, we email... and in all follow letters there are not always an email address to the student. [...] We need email addresses. There are only for the teachers."*

In their workflow they usually want the students email, so that they can send information to the students before they come to the internship location. In some follow letters there are only email addresses to the teachers which is a problem for Maja and Marie.

#### Carmen

*"Sometimes it's just one group, sometimes the students are in two or more groups. Which is not exactly the easiest thing to do. It's time demanding."*

Thinks it's troublesome and time demanding when a student is in multiple groups.

*"I think it's very difficult for a user to understand that if you're a student you will login with your personal number"*

Students cannot login with their email, they have to use their personal number which is confusing, since it says "Email / personal number" on the login page.

*"So before I put in the information I have to make the file very nice and pretty. But then when I take files from the system it's not as nice and pretty"*

She export excel files from another system with information, has to change the format of everything before she can import it into the system. It takes a lot of time. Vice versa, when she want's to export information from praktikplatsen, the format of the files are not very readable, and she has to edit them a lot before she can present them to others.

*"[...] will not work ok, and no matter what sort of format I use for the phone number it will not work."*

*"Just like I don't know for some reason, probably because you are here... it just happened you know [...] to recognize the phone number. Sometimes it didn't."*

When importing group lists into the system, it won't import the telephone numbers sometimes, no matter what format.

*"Now sometimes in the same period of the year I can order 30 places sometimes I will not get more than 15. My planning is so depending on... I don't know. It's just pure luck. It's hazard, It's not OK. [...] You order 30 and you will get 25. so I've made my booking there. And then the group is actually a bit bigger. [...] The group cannot be bigger than my order [...] the file that I imported with the student. I can't have more than 30 on that. So if I want to add to students it will tell me no you are not allowed that and I have to contact the support."*

She has a problem with changing conditions, she orders 30 places, but sometimes they will not get enough internships at all. Sometimes the groups gets a bit more than 30, and she has a problem with adding those extra students. Seems like she is also only allowed to order no more than 30 places due to some contract, rules or similar.

*"But I don't know how... how they are playing it in their little square. How does that message look like when they get it, does it come as a mail? does it come... do they look in the system or where is that attachment attached? Because they're saying no we didn't get it"*

She is talking about follow letter and that the supervisors are not getting the attachments. She is confused about how the end letter will look like and if the attachments are attached or not.

*"We have groups from all the times. That really is the one I created. So the old ones are still there"*

*"So it has to be something that tells me where I find those people and also help me find a group here which is sometimes a challenge. Because the older groups they stay there you know like forever. Nobody's taking them away."*

In her system she still has all of the old group visible, which adds a bit of clutter and scrolling. She want them to be removed by default after the period is done.

*"When I do that the student will not get any information. [...] the system does nothing [...] so that means that I have to contact every and each one of them to tell them 'you got this place'"*

When doing late booking the students do not get any messages from the system which adds work for the administrator, because she has to contact them all one by one herself.

*"For "at least", that can't be, that should be "Maximum". Not "at least"*

In the letter that tells the student it's time to apply for places, it says that they should apply for "at least" 5 places, but that is confusing, because they can only apply for maximum 5.

*"I have to export this to excel first [...] do you know how much work there is in here to do to make it nice for the teacher. [...] why would I fix that for the teacher. But the thing is, the teacher has no access to the system, so I have to do it anyway."*

When exporting reports, she has to edit the file a lot before she can print it out on an A4 sheet and give it to the teachers. She removes half of the information in the file manually, so it seems like she doesn't use the "configure" tool in the system.

*"What I've noticed is that in hospitals elderly cares and they don't really update their information on the website."*

A lot of out-of-date information that is not relevant anymore, due to the fact that they are not updated by the users.

*"A sort of an archive you know like all groups go somewhere in the archive and you can get in if for some reason."*

When asked if she want's to add or remove something, she said that an archive function would be good for the groups.

*"So when I was on the phone with support she actually connected a student to a wrong group because the group had the same name with I have created. because I didn't... I didn't think that far to put like VT 17."*

The naming of the groups could be confusing, both for the administrators and the support and could be mixed up.

*"But if you look here there are 40 places left. So people are not, the schools are not sending out students. [...] Now if I would have there a group of 50 people I could not import a file with 50 people though I can take as many as I want. It doesn't work. That's a pity."*

Even if there are many places left, she cannot add more people, because she has only ordered a certain amount of places. There is no easy way to increase the places.

*"Do you know how much work there is in here to do to make it nice for the teacher. "*

She wanted to export data, but she didn't know that she can remove it on the website. Instead, she did it in Excel which took her long time to remove everything she didn't want and make the table prettier.

Marie R.

*“You had to go do all these settings that you didn't have to do before.[...] Yeah and I have to be honest there are probably things I can use here that I don't know, because I don't know how to use them. [...] This is a view that I sometimes use, platsöversikt. [...] yea and you didn't have those steps before. But on the other hand I can see the point in having them.”*

In the overview page, she has to select a lot of settings to show the overview page due to the large size of the categories. According to her, they didn't have to do that before, but she can understand why there are dropdowns like that.

*“I realised now that we would like to see separately, and that is these APL. [...] the same for APL and Lärning and you can't divide them, you can't see them separately in the system. [...] The positions we offer can be used by a Lärning or by an APL student. So sometimes we need to see Lärning and sometimes we need to see APL.”*

She wants to see information of APL students and Apprentice (Lärning ) separately in the system, but now she can't do that.

*“[...] Some school Kungsbacka wants seven but they have only booked three. [...] This is nothing to do with Praktikplatsen, we have this problem that all the educations that are for adults. You know they have this continuous intake of students during the year. [...] sometimes those students they skip school or they change, so they had a hard time really telling how many positions do we actually need [...] So it's, because sometimes we try to get as many positions as possible. And then in the end they might just use half of that and that's not a good thing.”*

She mentioned something about place ordering that the schools usually order the positions more than they actually need. The schools want positions as many as possible and sometimes because of students changing or skipping schools, schools actually book positions less than they ordered. It is a bad thing to the hospital but there is nothing to do with Praktikplatsen and a person (Leila) who work at Praktikplatsen will keep checking the school's' status so they can cancel the positions they don't need in time.

*“[...] my co-workers decide which mentors should have for the students and they also provide you know, a letter or a mail that says welcome and this is how to find us and all that. And sometimes, [...] I got the mails but they didn't or vice versa.”*

After approving the internships, they are supposed to send an email about the position, but sometimes not all of them can get the email.

*“We have a lot of people who speak different languages and it could be useful for some people...”*

The information of what language support they can provide is useful, and they also plan to use that since there are students from other countries who cannot speak Swedish very well and maybe need some support.

*"Because these titles "platsansvarig" "kontaktperson" "eskalerings..." there were so many so many and it wasn't really clear in the beginning, who is... am I the "kontaktperson"? Because I put my self as "platsansvarig" because I don't want anyone else to fiddle with those..."*

The information of the terminology is not very clear, and she was confused in the beginning. Also, the title of the people who are involved in the internship information is not clear. She doesn't know what role she is supposed to be.

*"So here is the thing too. You have to make one "platsannons" per YH, APL and Lärling."*

She wants to create different job ads (platsannons) for YH, APL and Lärling at once. Basically she wants to create the same job ad for YH, APL and Lärling instead of creating three separate ones.

*"So these are the emails I've got so far and as I said it took me some time to get that sorted [...] to just get the emails I need [...] if you want to erase them, or to show that you've read it or not read it. You can't see that and there should also be [...] I think some kind of delete"*

Email in the box are hard to be sorted and she don't know how to erase the email and she didn't know which email is read or not.

*"Sometimes students think that when you say SU you mean Sahlgrenska, Yes. So they don't look and don't realize that they have to go to Högsbo."*

The naming of SU may be clear for the administrators and employees but can be confusing for the students.

*"I don't like this "not supervisor". It would have been good if there was, if you could write yourself that this is the vice chief."*

She is missing a function where you can give your own titles to users.

## Stefan

*"I just ordered 25 but I have 33. Since there are too many, so I am suppose to take away [...] Yeah. So I don't know how to remove those from this one. So how did I do that, do I have to sort to adjust the group by setting new... up to date in group...so this is my problem. This is now I've reached a dead end with my knowledge."*

Stefan only uses the system three times a year, so everytime he uses it, he has to relearn pretty much everything. learnability and memorability is not a strong point in this system. In the quote above, he has a group with too many students, he needs to remove some but doesn't know how.

*"For me this is very tricky because what would happen if I remove this student now... is she lost in space or what?"*

Confused about what will happen if a student is removed from all groups. Will he be able to use her again or does she need to be added again later as a new user? The description in the pop up is a bit hard to understand.

*“So that's very different. And as I said the big problem is I don't use it frequently so I'm not updated. Yeah I know what I want but I don't know how to do it.”*

Feels insecure about what to do since he uses it infrequently. Does not follow all the updates and so on, seems like he just goes with the trial and error method.

*“I sort of go back through the system and and restart. Yeah. It's like when your computer doesn't work, so you restart.”*

When something is off, an error dialogue appears or if the system freezes, he always restarts and logs off and in again.

*“[...] it says an error has occurred. You have to be an administrator to be able to open.”*

After removing a student, this message comes up when you try to open the same student's information card again.

*“So if I wanted to leave the system. Where do I log out.”*

Not certain how to log out of the system. Clicked on every possible menu before finding the button.

*“I don't know what that figure means. I don't even know what it is. Is it a button or a person or what is it.”*

Confused about what the my account button at top right means.

*“Scary. I've done something I didn't know I did. I don't like that at all. This makes me feel like I don't have any control at all. All right. So she's gone. [...] So now I know she probably is removed, but still I can't be sure.”*

When he tried to remove a student, the system got stuck on a loading screen and nothing happened. After logging in and out again, she was already gone from the list. which was confusing for the user.

*“I know that last time two of my students want to switch places and the whole system sort of went berserk. And that was very very tricky thing to do.”*

Does not know how to switch places between students.

*“Once again frustrating... I don't remember... which one.. to... was it this one?”*

Does not remember/understand where you go in to remove a student. Internship groups (Praktikgrupper)? internship periods (Praktikperioder)?

*“So now we are supposed to connect to this...gruppkoppling. Where do I find that”*

Tries to click on the timeline on the first page but that doesn't work, so he is not sure where to find the place to do things.

*“So perhaps it is 25 that. So why it says 24 down here?”*

In place overview, he looks at the bottom to try and see the total amount of places, but that only shows how many rows there are in the table. He doesn't realize that some rows have multiple places.

*“This is sort of too much for me. It's enough. You have 25 places. That's it. That's the only thing I'm interested in.”*

He found the overview of how many places there are in the table. It was at the top, but contains additional information which he thought was unnecessary.

*“And then I wonder why...why do we have to have this huge list. It's too much information for me.”*

The table in place overview has a lot of information he is not interested in at all.

*“None of these names really matters because they have another person helping them.”*

He is talking about the contact persons that are displayed on the lists, they are usually never the ones that the students communicate with.

*“And then when my students go, they don't meet Marian or Sanas or someone else. They meet someone completely different. So I have to ask them about who is your tutor, who helps you.”*

The persons on the lists don't reflect reality.

## Jonas

*“I am colorblind and I think this is... could be better. Just a contrast or...”*

Jonas is colorblind and has difficulties to differentiate between different elements, like links in the text.

*“That's the problem because you forget. Well because if you use it every day, every week, every month. You always keep things fresh. But when you do it twice a year...”*

Since he uses it so infrequent, it is not easy to remember everything that you have to do in the system.

*“Well if I've done it some times, I find my way but it takes time for me to learn the language”*

The terms in the system can be confusing if you are not used to it.

*“Just maybe this one could be here, because why should I look up there. I mean is this less important than those?”*

He is talking about the “show as student” button and wondering why it’s separated from the tabs.

*“Maybe there's another way to check if they have done their homework or not. Well if they have chosen. do you know that? can I have a list for those who...?”*

Jonas usually goes into the “show as student” view to check if they have applied for an internship or not. He is wondering if there is a faster and better way to do this.

*“OK. So here you have an overview of everything. And do you know if I can get a file, an excel file.”*

He is wondering if there is a way to export the “bokningsöversikt” (booking overview) in any way, so that he can see who has applied and who has not.

*“Följebrev. this letter that goes to the employers. Why I have to go this way to edit that? is there another way to... I don't want to go to planeringsverktyg -> bokningsöversikt to edit that”*

Wondering if there is no easier way to access the follow letter from the main menu.

*“Well I think so, yeah but I think that the search function could be... because if search "praktik" nothing happens.”*

He has very big problems with finding the evaluation form that he should give the student to take with them. Tries to use the search bar but nothing happens.

*“I think the biggest problem is that I'm rather new.”*

It is quite hard to find stuff in the system, and he says it’s because he is new. It takes time to get used to the system.

*“The most common things you want to do should be in one click.”*

Since it’s hard to navigate, he wished for easier access to the things that are used frequently from the main menu.

*“So edit följebrev, print evaluation form and a list of those who have not applied. I don't need to know who has applied. I need to know who has not.”*

Things he wished for easier access to. and he also would like to see who has not applied rather than who has applied, because it is a part of his work flow.

*“Print form for student. But here it is called form and not evaluation form. The language is important and you have to be...”*

In booking overview he found out how to print the evaluation form, but the text only says form and not evaluation form, which he was looking for all along.

*“[...] it should be possible to, that you could see the button.”*











Confused about that the buttons in booking overview are not there at certain times. Inactive buttons and options should be marked inactive and not disappear.

## Appendix C - Data analysis of Google analytics

### Data analysis of Google analytics






Analyzation of data from 1/1 - 31/12

#### Operating systems used

Operativsystem	Sessioner	% Sessioner
1. Windows	91 738	 41,53 %
2. iOS	81 573	 36,93 %
3. Macintosh	20 936	 9,48 %
4. Android	17 296	 7,83 %
5. Chrome OS	8 707	 3,94 %
6. Linux	355	 0,16 %
7. Windows Phone	192	 0,09 %
8. (not set)	85	 0,04 %
9. BlackBerry	1	 0,00 %
10. Xbox	1	 0,00 %

**Findings:** The largest user group is using windows computers but the second largest, with almost as many users are using iOS, a mobile operating system.

#### Languages

Språk	Sessioner	% Sessioner
1. sv-se	128 160	 58,02 %
2. sv	75 085	 33,99 %
3. en-us	10 225	 4,63 %
4. en-gb	1 609	 0,73 %
5. ru	1 568	 0,71 %

**Findings:** Swedish is the biggest language used but there are still a few English users (4.63%).

## Frequently visited pages

Sida	Sessioner	% av trafiken	Avhoppsfrek
<a href="#">/Elev/ChangeLosenordFirstTime</a>	2,1 tn	10.0%	9.00%
<a href="#">/Historik</a>	1,8 tn	8.67%	13.2%
<a href="#">/Admin/BokningsOversikt/DisplayBokningsOversikt/</a>	1,8 tn	8.38%	18.1%
<a href="#">/Admin/Platsmall/ShowPlatsInformation/</a>	1,1 tn	5.30%	52.4%
<a href="#">/Admin/BokningsOversikt/AddBooking/</a>	980	4.66%	36.1%
<a href="#">/Admin/Home/Start/</a>	980	4.66%	25.7%
<a href="#">/Admin/PlatsOversikt/Index/</a>	947	4.50%	12.1%
<a href="#">/Admin/Foretagsenhet/DisplayForetagsenheter/</a>	876	4.17%	17.4%
<a href="#">/Admin/PlaneringsOversikt/Index/</a>	856	4.07%	12.4%
<a href="#">/Admin/Platsannonser/Index/</a>	836	3.98%	24.0%
<a href="#">/Admin/Plats/ShowFoljebrev/</a>	823	3.91%	41.9%
<a href="#">/Admin/Anvandare/ChangeProfile/</a>	792	3.77%	13.1%
<a href="#">/Admin/Dokument/DisplayDokument/</a>	728	3.46%	18.8%
<a href="#">/Admin/ErbjudPlatser/ErbjudPlatserModal/</a>	537	2.55%	22.9%

**Findings:** History and Booking overview are the most frequently visited pages.

Sida	Sessioner	% av trafiken	Avhoppsfrek
<a href="#">/Admin/BokningsOversikt/DisplayBokningsOversikt/</a>	4,7 tn	100%	22.4%

**Findings:** Excluding the homepage, booking overview is one of the most used pages.

Sida	Sessioner	% av trafiken	Avhoppsfrek
<a href="#">/Historik</a>	3,7 tn	14.0%	22.6%
<a href="#">/Elev/ChangeLosenordFirstTime</a>	3,5 tn	13.3%	3.08%
<a href="#">/Admin/Platsannonser/Index/</a>	1,7 tn	6.30%	25.4%
<a href="#">/Home/Index?ReturnUrl=/Platsvaljaren</a>	1,6 tn	6.18%	52.3%
<a href="#">/Admin/Anvandare/ChangeProfile/</a>	1,6 tn	6.07%	11.3%
<a href="#">/Admin/Foretagsenhet/DisplayForetagsenheter/</a>	1,3 tn	4.97%	19.4%
<a href="#">/Admin/PlaneringsOversikt/Index/</a>	1,1 tn	4.17%	11.8%
<a href="#">/Admin/PlatsOversikt/Index/</a>	1,1 tn	4.17%	16.5%
<a href="#">/Admin/ErbjudPlatser/Index/</a>	1,1 tn	4.12%	15.7%
<a href="#">/Admin/Questionnaire/GetQuestionnaire/</a>	987	3.75%	60.5%
<a href="#">/Home/Login</a>	896	3.40%	21.0%
<a href="#">/Admin/Verksamhet/DisplayVerksamheter/</a>	796	3.02%	21.6%
<a href="#">/Admin/Dokument/DisplayDokument/</a>	632	2.40%	29.7%

**Findings:** Those relevant pages with over thousand views are: Platsannonser, ChangeProfile, Display Företagsenheter, PlaneringsÖversikt, PlatsÖversikt, Erbjud platser.

Sida	Sessioner	% av trafiken	Avhoppsfrek
<a href="#">/Admin/AktivaPlatser/Index/</a> 	1,2 tn	22.3%	22.0%
<a href="#">/Admin/Grupplistor/Index/</a> 	719	13.2%	37.1%
<a href="#">/Admin/Grupphantering/Index/</a> 	542	9.96%	26.0%
<a href="#">/Admin/Platsbestallning/Index/</a> 	418	7.68%	28.5%
<a href="#">/Admin/Gruppkoppling/Index/</a> 	294	5.40%	26.2%
<a href="#">/Admin/Changelog/DisplayPublicChangeLog/</a> 	256	4.70%	7.42%
<a href="#">/Admin/OversiktVerksamhet/Index/</a> 	256	4.70%	20.7%
<a href="#">/Admin/Lead/Index/</a> 	210	3.86%	27.1%
<a href="#">/Admin/ElevImport/FileImportWizard/</a> 	177	3.25%	26.0%
<a href="#">/Admin/Feriepraktik/Index/</a> 	170	3.12%	58.2%
<a href="#">/Admin/Planering/DisplayTidsaxel/</a> 	152	2.79%	28.9%

**Findings:** AktivaPlatser is the most frequently used page.

## Appendix D - List of usability problems

- **Managing places**
  - How to edit (cancel) place is not clear (order & request)
  - Error messages are hard to understand
  - Misleading information about availability
    - Inconsistent information
    - Incorrect information
  - Fritext, confusing term, no description
- **Managing groups**
  - Don't know how to archive groups or that it exists
    - There is no option to archive a group when uploading with Excel
  - Can't see old groups
  - Students without a group cannot be found anywhere
  - Missing information about errors, e.g. 81 students for 80 places
  - Complicated process when uploading by excel
    - Misleading information, e.g. Two boxes to connect school in uploading group page
    - Redundant steps after uploading the group (checkboxes and parsing data)
    - Too much information
- **Managing applications**
  - Complex process
    - Unclear steps (assigned, booked etc.)
  - Print list of those who have not applied
  - Can't find where to add följebrev attachment
  - Buttons are appearing and disappearing depending on which step you are on
    - Can't find evaluation form
    - Empty dropdowns (Configure button)
    - Active buttons that creates errors (switch)
  - Missing information
    - boxes (headings)
    - description of the recipient for följebrev
  - Not enough links or shortcuts
- **Managing users/student information**
  - Unclear process of giving permission
    - add -> save
  - No edit button for permissions
  - Not enough email management functions
  - Giving permission: Menu with no order.
  - Error message claiming you are not an administrator causes confusion
- **Viewing**
  - Not optimized for color blindness.
  - Can't find where to do common tasks
  - Confusing naming of menu items
  - Too much information in placement list



## Appendix E - Test Plan - FINAL

The template for the test plan was provided by Rubin, J. and Chisnell, D., the authors of the book *Handbook of Usability Testing: How to Plan, Design, and Conduct Effective Tests*.

The source of the template is

[http://media.wiley.com/product\\_ancillary/81/04701854/DOWNLOAD/9780470185483c05.Hdotcom\\_test\\_plan.zip](http://media.wiley.com/product_ancillary/81/04701854/DOWNLOAD/9780470185483c05.Hdotcom_test_plan.zip)

### Test Plan – FINAL

Praktikplatsen.se has been tested in the beginning of the development of the system, but it has changed a lot over time. The results from the initial tests are outdated and the new changes needs to be tested. Support errands are still frequent and the goal is to reduce the support need for the users. In this usability test we will gather objective data for usability measurements and take a holistic look at the system.

### Overall objectives for the study

We will gather baseline data about the overall effectiveness of Praktikplatsen.se. The goals of this study are to:

- Assess the overall effectiveness of Praktikplatsen.se for users with different levels of experience in performing basic, common tasks.
- Identify obstacles to completing daily tasks in system.
- Identify and test common problems that appear in support errands.

### Research questions

In addition, in this study will try to answer these questions from different categories which we got from analyzing 200 support errands and results from ethnographic studies:

#### Permissions

- How easily and successfully can administrators change user permissions?
  - How well are they aware of this function?

#### Manage student applications

- How easily and successfully can administrators create and send out följebrev?
- How easily and successfully can administrators do late booking for students?
- How easily and successfully can administrators book internships for students?
  - What is the workflow when managing student applications? What is the start point and what is the end point?
- How easily and successfully can administrators cancel a booking?

#### Group connections

- How easily and successfully can administrators connect groups to periods?

- What questions do users ask when doing this and what error do they make?

#### Groups

- How easily and successfully can administrators create groups with and without excel imports?
- How easily and successfully can administrators look up group periods?
- How easily and successfully can administrators disconnect students from groups?
- How easily and successfully can administrators archive groups?

#### User/Contact information

- How easily and successfully can administrators create new users and students?
- How easily and successfully can administrators move a student from a group to another group?
- How easily and successfully can administrators change their own account (i.e. phone number & email address) information?
- How easily and successfully can administrators change school information?

#### EOP

- How easily and successfully can administrators create and EOP for students?
  - What mistakes do they make and what are the obstacles do they encounter during the process?

#### Place ordering

- How easily and successfully can administrators do place ordering?
  - What obstacles do they encounter when doing this?

#### Locations/Period planning

- Where in the system do users go to find place overview?
- Where in the system do users go to find planning overview?
- How easily and successfully can administrators define internship periods?
- Where in the system do users go to check the timeline?
- Where in the system do users go to check the planned periods?

#### Export data

- Where in the system do users go to find how to export group list?
- How easily and successfully do they export reports?

#### Other functions

- Where in the system do users go to find how to manage students? Search bar? Group lists?
- How easily and successfully can administrators find the documents they want?

- Where in the system do users go to read their email? homepage? account dropdown?
- Where in the system do users go to find update changelogs?

At the end of the sessions, we will have quantitative data on:

- Errors in creating new users and students, so we will know where and why the user makes a mistake.
- Errors in changing information.
- Whether the participant can find the correct places to complete certain tasks.

We'll also have qualitative data:

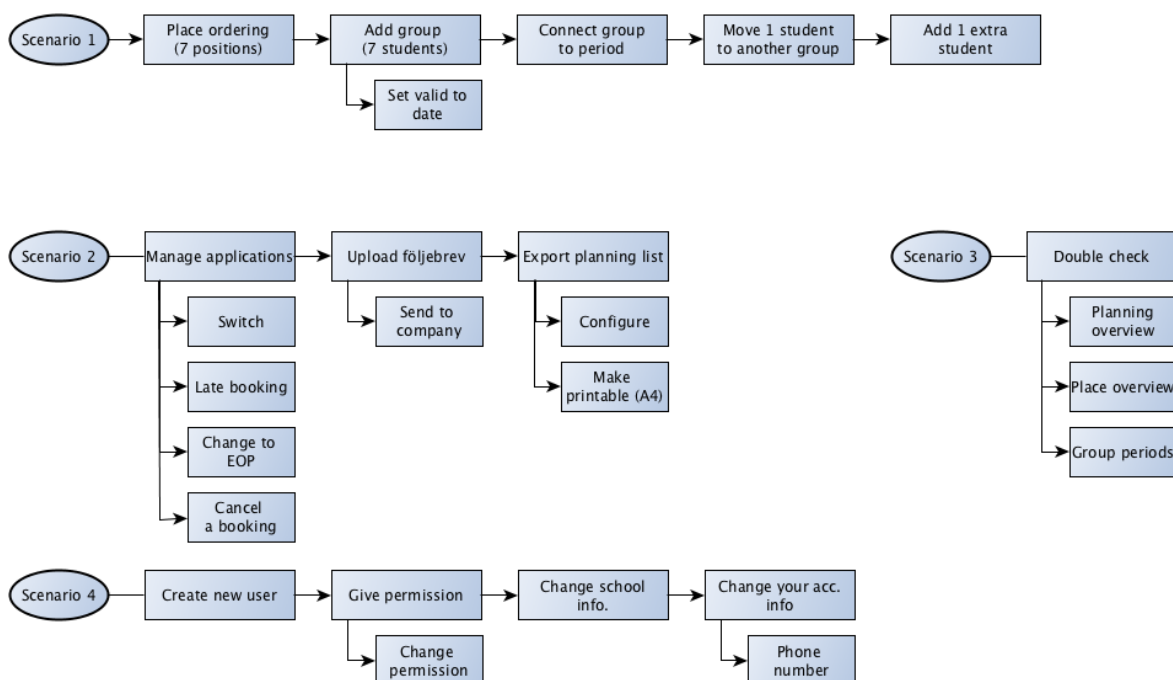
- The verbal protocol - the participants will make continuous commentary when doing the task, and they will be encouraged to think aloud, from which we will know where and why they are confused.
- Debriefing the interviews will give us a clear picture of what stands out about the experience of using the system. This will help up set priorities on potential changes to the system.

## Scenarios

To answer the large amount of research questions, we have created some scenarios that will guide the user through a normal workflow. These scenarios will contain tasks which are similar to participants usual work and will answer several questions from the different categories.

The workflow has been identified through ethnographic studies beforehand, so the scenarios has on purpose been designed with tasks which are commonly done but also some rare ones.

The different scenarios which will help guide the user through the different tasks are shown as below:



## Location and setup

The location we choose is the working place of the participants, because the working place is the a place where the participants can feel familiar and comfortable. Participants will use a Mac and Chrome with a high-speed connection to the Internet. Also, Quicktime will be on to record the screen interaction and voice.

## Recruiting participants

Characteristic	Desired number of participants
<b>Participant type</b> pilot regular backup	1 5 5
<b>Total number of participants</b>	11
<b>Use frequency</b> infrequently: less than once per week moderately often: 1-5 times per week very often: More than once everyday	1 2 2
<b>System experience</b> less than 1 year of experience more than 1 year of experience	2 3

We will exclude people who are

- Employers
- Students
- Developers
- Administrators at Praktikplatsen.se

## Methodology

In this usability study, we will explore what factors will influence the effectiveness of Praktikplatsen.se. Qualitative data about how the participants experience the system and quantitative data about error and success rate will both be gathered to assess the system. Participants will be recruited according to different characteristics of the users. They will be required to finish some tasks in the usability test.

We will use a within-subjects design

Due to the limitation of the recruitment, instead of recruiting a lot of users to do different tasks, we decided to use within-subjects design so that we can only recruit five users to finish several tasks in different sequences. The sequences of tasks will be randomized and balanced out to reduce the effect of learning transfer.

Start point: participants start where they would usually start

We will not decide where the participants should start. Different type of users will usually start in different pages and if they do different tasks they will not start on the same page. Therefore, the participants will start where they would normally start.

### Session outline and timing

The test sessions will be 60 minutes long. We will use 15 minutes of each session for pre-test introductions and post-test debriefing interviews. The sessions will take place at different places where the school administrators work.

Pre-test arrangements

Have the participant:

- Assured about privacy of the data.

Introduction to the session (2 minutes)

Discuss:

- Purpose and duration of the study.
- Participant's experience with usability studies.
- Importance of their involvement in the study.
- Moderator's role.
- Recording systems.
- The protocol for the rest of the session.
- Thinking aloud.

Background interview (3 minutes)

Discuss the participant's:

- Experiences using Praktikplatsen.se.

Tasks (45 minutes)

Participants will start at the page where they normally start and they will be asked to complete some tasks. When doing the task, they should think aloud.

Post-test debriefing (10 minutes)

- Ask broad questions in order to collect preference and other qualitative data.
- Ask followup questions on any particular problems that come up for the participant.

### Session schedule

The table below lays out a schedule of sessions for the study.

Date	Name	User type
------	------	-----------

March	Martin H.	Pilot
March	Carmen D.	Pilot & Real
March	Malin	Real
March	Jonas	Real
March	Stefan	Didn't present
March	Handan	Didn't present

## Measures

To answer the questions we proposed in the Research questions chapter (See page 2).

We will collect both performance and preference data during the usability test session.

Performance:

- Errors made in a task
- Number and percentage of tasks incorrectly completed
- All incorrect selections
  - Incorrect menu choices
  - Incorrect icons selected
- Number of tasks completed or not completed with and without assistance—we will track three levels of prompting when participants need assistance.
  - None              Participant completed a task without prompting.
  - Try again        Participant completed a task when asked, “Can you think of any other place to look?” or after reading the help documents.
  - Failure           Participant fails to complete a task even after being prompted.
- Count of “negative comments or mannerisms”
- Count of asking for assistance/support
- Count of visits to the document

Preference:

- Appropriateness of site's functions to users' tasks
- Perceived amount of time and number of steps
- Ease of use overall
- Usefulness of terms and labeling

## Report contents

The final report of the findings in the usability test will be presented in the master's thesis report.

- Summarization of the background of the study, including the goals, methodology, and participant characteristics
- Presentation of the findings for the research questions.
- Quantitative and qualitative results.
- Discussion of the implications of the results.
- Design suggestions and guidelines based on the results.
- Suggestions of follow-on research

Praktikplatsen.se will review the draft and comment on it. We will incorporate agreed changes and then present a summary of the findings in a master's thesis and at a presentation at Chalmers University of Technology.

## Project schedule

### Planning meeting / kickoff

We are having a planning meeting on the 2nd of march to discuss the different sections of the test plan with our supervisor at praktikplatsen.se. High level tasks have already been defined by us but will be revised together with the supervisor. Based on that meeting we will finalize this plan.

### Test plan, session script and materials

When Praktikplatsen.se has agreed on our test plan, we will finalize it and create a session script and materials for collecting data to be used during the sessions. The script and materials are to ensure that all administrators get the same instructions and to make sure that the gathered data is on the same issues and relevant throughout the whole project.

It is important that Praktikplatsen.se has agreed on the content of our test plan and provides feedback. Because big changes to the tasks and activities after the session script is created could result in questionable and irrelevant data and findings.

## Test environment

We will be testing in the field at the administrator's work places to get the most correct context as possible. The test will be done in a virtual test environment of praktikplatsen which is an exact copy of the real system. This way, any errors done during the sessions will not affect the administrators real work.

The participants will use one of our computers, which is a Macbook Pro 13 inch. The laptop will be used with an external mouse but with the built-in keyboard. The screen will be filmed with built-in screen capturing technology in Quicktime as will audio. For further audio analysis we will record everything said during the session with an iphone microphone.

## Moderator role

We will be at the participant's workplace and sit in their room while conducting the sessions. The session will be introduced and then a should background interview will be conducted. The tasks will be introduced when appropriate. This study is exploratory which means that we

will probably have to ask unscripted follow-up questions during the tasks to understand the participants behavior and experience. Notes will be taken by hand and the participants comments will be recorded with an iPhone.

The sessions will be digitally recorded with Quicktime and will be debriefed afterwards by the two of us who are conducting the tests. Our contact person at Praktikplatsen.se will only get the findings in the final reports. Are there any major issues, they might be reported earlier to the contact person at Praktikplatsen.se, since they are working continuously with updating the system.

#### Reviewing, tabulating, and analyzing data

With the notes and screen recordings, we will review, tabulate and analyse the data to answer the research questions listed in this document. The results will be used to present findings, recommendations and also as a base for redesign. The results will be provided written in the master's thesis and also presented at Chalmers University of Technology.

#### Project timeline

What	When
Initial working meeting · Review project objectives, scope, deliverables · Identify participant selection criteria · Agree on final schedule	March 1
Deliver final screener and test plan	March 2
Recruit participants	Continuously by Martin
Deliver final session script	March 5
Dry run of the session script	March 6
5 usability study sessions of 60 minutes each	March 7-17
Present study findings	In the master's thesis

#### Deliverables

- Draft and final copies of participant selection criteria in a screening script.
- A test plan (this document) describing the general approach and schedule for the study.
- Draft and final copies of the session checklist.
- Dry run of the session checklist at praktikplatsen.se.
- 5 usability study sessions of 60 minutes each (along with one pilot session with a participant).
- Debriefings with moderators.
- Quicktime screen recordings of each session.

- A final written report in the form of a master's thesis.
- A presentation of findings, recommendations and redesign at Chalmers University of Technology.

## Tasks

The participants will start where they would normally start because different type of users will usually start in different pages and if they do different tasks they will not start on the same page. In the beginning we will briefly interview the participants to get an eye for how they experience the system. We will then give them scenarios to follow which are in the same context as what they usually do. This way we can identify usage patterns and additional usability problems that can be further tested in follow-on research. Lastly, we will also get a good understanding of the participants thought process and how Praktikplatsen.se fits into their daily work.

## Appendix F - Summary of usability test I

This appendix explained what we have measured during the usability test, and also the result we summarised. Performance data were collected according to scenarios. For example, the number of how many mistakes this user has made in this scenario was written next to the user's name.

Performance:

- Errors made in a task
- Number and percentage of tasks incorrectly completed
- All incorrect selections
  - Incorrect menu choices
  - Incorrect icons selected
- Number of tasks completed or not completed with and without assistance—we will track three levels of prompting when participants need assistance.
  - None* Participant completed a task without prompting.
  - Try again* Participant completed a task when asked, “Can you think of any other place to look?” or after reading the help documents.
  - Failure* Participant fails to complete a task even after being prompted.
- Count of “negative comments or mannerisms”
- Count of asking for assistance/support
- Count of visits to the document

Preference:

- Appropriateness of site's functions to users' tasks
- Perceived amount of time and number of steps
- Ease of use overall
- Usefulness of terms and labeling

### Scenario 1:

- a. Number and percentage of tasks incorrectly completed
- b. Number of tasks completed or not completed with and without assistance—we will track three levels of prompting when participants need assistance.
  - None* Participant completed a task without prompting.

*Try again* Participant completed a task when asked, “Can you think of any other place to look?” or after reading the help documents.

Jonas: 4

Carmen: 1

*Failure* Participant fails to complete a task even after being prompted.

Carmen: 2

### 2. Place ordering

- a. Errors made in a task
  - i. Carmen: 1
  - ii. Malin: 0
  - iii. Jonas: 0

- b. Count of “negative comments or mannerisms”
  - i. Carmen: 0
  - ii. Malin: 0
  - iii. Jonas: 1
- c. Count of asking for assistance/support
  - i. Carmen: 0
  - ii. Malin: 0
  - iii. Jonas: 0
- d. Count of visits to the document
  - i. Carmen: 0
  - ii. Malin: 0
  - iii. Jonas: 0
- e. All incorrect selections
  - i. Incorrect menu choices
    - Carmen: 1
    - Malin: 1
    - Jonas: 3
  - ii. Incorrect icons selected
    - Carmen: 0
    - Malin: 0
    - Jonas: 0

### 3. Add group

*Carmen: not completed -- try again*

- a. Errors made in a task
  - i. Carmen: 4
  - ii. Malin: 1
  - iii. Jonas: 1
- b. Count of “negative comments or mannerisms”
  - i. Carmen: 1
  - ii. Malin: 0
  - iii. Jonas: 2
- c. Count of asking for assistance/support
  - i. Carmen:
  - ii. Malin: 0
  - iii. Jonas: 0
- d. Count of visits to the document
  - i. Carmen: 0
  - ii. Malin: 0
  - iii. Jonas: 0
- e. All incorrect selections
  - i. Incorrect menu choices
    - Carmen: 2
    - Malin: 0
    - Jonas: 1
  - ii. Incorrect icons selected
    - Carmen: 0
    - Malin: 0
    - Jonas: 0

### Set valid date

- a. Errors made in a task
  - i. Carmen: 0
  - ii. Malin: 0
  - iii. Jonas: 0
- b. Count of “negative comments or mannerisms”

- i. Carmen:
  - ii. Malin: 0
  - iii. Jonas: 0
- c. Count of asking for assistance/support
  - i. Carmen: 0
  - ii. Malin: 0
  - iii. Jonas: 0
- d. Count of visits to the document
  - i. Carmen:
  - ii. Malin: 0
  - iii. Jonas: 0
- e. All incorrect selections
  - i. Incorrect menu choices
    - Carmen: 0
    - Malin: 0
    - Jonas: 0
  - ii. Incorrect icons selected
    - Carmen: 1
    - Malin: 0
    - Jonas: 0

#### 4. Connect to period

- a. Errors made in a task
  - i. Carmen: 0
  - ii. Malin: 0
  - iii. Jonas: 0
- b. Count of “negative comments or mannerisms”
  - i. Carmen: 0
  - ii. Malin: 0
  - iii. Jonas: 0
- c. Count of asking for assistance/support
  - i. Carmen: 0
  - ii. Malin: 0
  - iii. Jonas: 0
- d. Count of visits to the document
  - i. Carmen: 0
  - ii. Malin: 0
  - iii. Jonas: 0
- e. All incorrect selections
  - i. Incorrect menu choices
    - Carmen: 0
    - Malin: 0
    - Jonas: 1
  - ii. Incorrect icons selected
    - Carmen: 0
    - Malin: 0
    - Jonas: 0

#### 5. Move 1 student to the other group

*Carmen: not completed*

- a. Errors made in a task
  - i. Carmen: 1
  - ii. Malin: 0
  - iii. Jonas: 0
- b. Count of “negative comments or mannerisms”
  - i. Carmen: 0

- ii. Malin: 0
  - iii. Jonas: 0
- c. Count of asking for assistance/support
  - i. Carmen: 0
  - ii. Malin: 0
  - iii. Jonas: 0
- d. Count of visits to the document
  - i. Carmen: 0
  - ii. Malin: 0
  - iii. Jonas: 0
- e. All incorrect selections
  - i. Incorrect menu choices
    - Carmen: 1
    - Malin: 0
    - Jonas: 0
  - ii. Incorrect icons selected
    - Carmen: 1
    - Malin: 0
    - Jonas: 0

**6. Add one extra student**

- a. Errors made in a task
  - i. Carmen: 0
  - ii. Malin: 0
  - iii. Jonas: 0
- b. Count of “negative comments or mannerisms”
  - i. Carmen: 0
  - ii. Malin: 0
  - iii. Jonas: 0
- c. Count of asking for assistance/support
  - i. Carmen: 0
  - ii. Malin: 0
  - iii. Jonas: 0
- d. Count of visits to the document
  - i. Carmen: 0
  - ii. Malin: 0
  - iii. Jonas: 0
- e. All incorrect selections
  - i. Incorrect menu choices
    - Carmen: 0
    - Malin: 0
    - Jonas: 0
  - ii. Incorrect icons selected
    - Carmen: 0
    - Malin: 0
    - Jonas: 0

**Scenario 2:**

**1. Manage application**

- a. Errors made in a task
  - a. Carmen: 0
  - b. Malin: 0
  - c. Jonas: 0
- b. Count of “negative comments or mannerisms”
  - i. Carmen: 0

- ii. Malin: 0
  - iii. Jonas: 0
- c. Count of asking for assistance/support
  - i. Carmen: 0
  - ii. Malin: 0
  - iii. Jonas: 0
- d. Count of visits to the document
  - i. Carmen: 0
  - ii. Malin: 0
  - iii. Jonas: 0
- e. All incorrect selections
  - i. Incorrect menu choices
    - Carmen: 0
    - Malin: 0
    - Jonas: 0
  - ii. Incorrect icons selected
    - Carmen:
    - Malin: 1
    - Jonas: 0
- b. Switch**
  - a. Errors made in a task
    - i. Carmen: 1
    - ii. Malin: 1
    - iii. Jonas: 2
  - b. Count of “negative comments or mannerisms”
    - i. Carmen: 0
    - ii. Malin: 0
    - iii. Jonas: 0
  - c. Count of asking for assistance/support
    - i. Carmen: 0
    - ii. Malin: 0
    - iii. Jonas: 0
  - d. Count of visits to the document
    - i. Carmen: 0
    - ii. Malin: 0
    - iii. Jonas: 0
  - e. All incorrect selections
    - i. Incorrect menu choices
      - Carmen: 1
      - Malin: 0
      - Jonas: 0
    - ii. Incorrect icons selected
      - Carmen: 1
      - Malin: 0
      - Jonas: 0
- c. Late booking (Assign)**
  - a. Errors made in a task
    - iv. Carmen: 0
    - v. Malin: 0
    - vi. Jonas: 0
  - f. Count of “negative comments or mannerisms”
    - i. Carmen: 0
    - ii. Malin: 0
    - iii. Jonas: 0

- g. Count of asking for assistance/support
  - i. Carmen: 0
  - ii. Malin: 0
  - iii. Jonas: 0
- h. Count of visits to the document
  - i. Carmen: 0
  - ii. Malin: 0
  - iii. Jonas: 0
- i. All incorrect selections
  - i. Incorrect menu choices
    - Carmen: 0
    - Malin: 0
    - Jonas: 0
  - ii. Incorrect icons selected
    - Carmen: 0
    - Malin: 0
    - Jonas: 0
- d. **Change to EOP**
  - a. Errors made in a task
    - i. Carmen: 0
    - ii. Malin: 0
    - iii. Jonas: 0
  - j. Count of “negative comments or mannerisms”
    - i. Carmen: 0
    - ii. Malin: 0
    - iii. Jonas: 0
  - k. Count of asking for assistance/support
    - i. Carmen: 0
    - ii. Malin: 0
    - iii. Jonas: 0
  - l. Count of visits to the document
    - i. Carmen: 0
    - ii. Malin: 0
    - iii. Jonas: 0
  - m. All incorrect selections
    - i. Incorrect menu choices
      - Carmen: 0
      - Malin: 1
      - Jonas: 0
    - ii. Incorrect icons selected
      - Carmen: 0
      - Malin: 0
      - Jonas: 0
- e. **Cancel a booking**
  - a. Errors made in a task
    - iv. Carmen: 0
    - v. Malin: 0
    - vi. Jonas: 0
  - n. Count of “negative comments or mannerisms”
    - i. Carmen: 0
    - ii. Malin: 0
    - iii. Jonas: 0
  - o. Count of asking for assistance/support
    - i. Carmen: 0

- ii. Malin: 0
  - iii. Jonas: 0
- p. Count of visits to the document
  - i. Carmen: 0
  - ii. Malin: 0
  - iii. Jonas: 0
- q. All incorrect selections
  - i. Incorrect menu choices
    - Carmen: 0
    - Malin: 0
    - Jonas: 0
  - ii. Incorrect icons selected
    - Carmen: 0
    - Malin: 0
    - Jonas: 0

## 2. Upload “följebrev” (Cover letter)

### a. Send to company

- a. Errors made in a task
  - i. Carmen: 0
  - ii. Malin: 0
  - iii. Jonas: 1
- b. Count of “negative comments or mannerisms”
  - i. Carmen: 0
  - ii. Malin: 0
  - iii. Jonas: 0
- c. Count of asking for assistance/support
  - i. Carmen: 0
  - ii. Malin: 0
  - iii. Jonas: 0
- d. Count of visits to the document
  - i. Carmen: 0
  - ii. Malin: 0
  - iii. Jonas: 0
- e. All incorrect selections
  - i. Incorrect menu choices
    - Carmen: 0
    - Malin: 2
    - Jonas: 0
  - ii. Incorrect icons selected
    - Carmen: 0
    - Malin: 2
    - Jonas: 0

## 3. Approve bookings

- a. Errors made in a task
  - i. Carmen: 0
  - ii. Malin: 0
  - iii. Jonas: 0
- b. Count of “negative comments or mannerisms”
  - i. Carmen: 0
  - ii. Malin: 0
  - iii. Jonas: 0
- c. Count of asking for assistance/support
  - i. Carmen: 0
  - ii. Malin: 0

- iii. Jonas: 0
- d. Count of visits to the document
  - i. Carmen: 0
  - ii. Malin: 0
  - iii. Jonas: 0
- e. All incorrect selections
  - i. Incorrect menu choices
    - Carmen: 0
    - Malin: 0
    - Jonas: 0
  - ii. Incorrect icons selected
    - Carmen: 0
    - Malin: 0
    - Jonas: 0

#### 4. Export planning list

*Jonas: completed with prompt - try again*

##### a. Configure

- a. Errors made in a task
  - i. Carmen: 0
  - ii. Malin: 0
  - iii. Jonas: 1
- b. Count of “negative comments or mannerisms”
  - i. Carmen: 1
  - ii. Malin: 0
  - iii. Jonas: 1
- c. Count of asking for assistance/support
  - i. Carmen: 0
  - ii. Malin: 0
  - iii. Jonas: 0
- d. Count of visits to the document
  - i. Carmen: 0
  - ii. Malin: 0
  - iii. Jonas: 0
- e. All incorrect selections
  - i. Incorrect menu choices
    - Carmen: 0
    - Malin: 1
    - Jonas: 4
  - ii. Incorrect icons selected
    - Carmen: 0
    - Malin: 0
    - Jonas: 1

##### b. Make it printable

- a. Errors made in a task
  - iv. Carmen: 0
  - v. Malin: 0
  - vi. Jonas: 0
- b. Count of “negative comments or mannerisms”
  - i. Carmen: 0
  - ii. Malin: 0
  - iii. Jonas: 1
- c. Count of asking for assistance/support
  - i. Carmen: 0

- ii. Malin: 0
  - iii. Jonas: 0
- d. Count of visits to the document
  - i. Carmen: 0
  - ii. Malin: 0
  - iii. Jonas: 0
- e. All incorrect selections
  - i. Incorrect menu choices
    - Carmen: 0
    - Malin: 0
    - Jonas: 0
  - ii. Incorrect icons selected
    - Carmen: 0
    - Malin: 0
    - Jonas: 0

### Scenario 3:

#### 1. Double check

##### a. Planning overview

*Carmen: not completed*

*Jonas: completed with prompt - try again*

- a. Errors made in a task
  - i. Carmen: 2
  - ii. Malin: 0
  - iii. Jonas: 0
- b. Count of “negative comments or mannerisms”
  - i. Carmen: 0
  - ii. Malin: 0
  - iii. Jonas: 1
- c. Count of asking for assistance/support
  - i. Carmen: 0
  - ii. Malin: 0
  - iii. Jonas: 1
- d. Count of visits to the document
  - i. Carmen: 0
  - ii. Malin: 0
  - iii. Jonas: 0
- e. All incorrect selections
  - i. Incorrect menu choices
    - Carmen: 2
    - Malin: 2
    - Jonas: 2
  - ii. Incorrect icons selected
    - Carmen: 0
    - Malin: 0
    - Jonas: 0

##### b. Place overview

*Jonas: complete with prompt - try again*

- a. Errors made in a task
  - i. Carmen: 1
  - ii. Malin: 0
  - iii. Jonas: 0
- b. Count of “negative comments or mannerisms”

- i. Carmen: 0
  - ii. Malin: 1
  - iii. Jonas: 0
- c. Count of asking for assistance/support
  - i. Carmen: 0
  - ii. Malin: 0
  - iii. Jonas: 1
- d. Count of visits to the document
  - i. Carmen: 0
  - ii. Malin: 0
  - iii. Jonas: 0
- e. All incorrect selections
  - i. Incorrect menu choices
    - Carmen: 1
    - Malin: 1
    - Jonas: 1
  - ii. Incorrect icons selected
    - Carmen: 0
    - Malin: 0
    - Jonas: 0

**c. Group periods**

*Jonas: completed with prompt - try again*

*Malin: completed but found information somewhere else*

- a. Errors made in a task
  - i. Carmen: 3
  - ii. Malin: 0
  - iii. Jonas: 0
- b. Count of “negative comments or mannerisms”
  - i. Carmen: 2
  - ii. Malin: 0
  - iii. Jonas: 0
- c. Count of asking for assistance/support
  - i. Carmen: 0
  - ii. Malin: 0
  - iii. Jonas: 1
- d. Count of visits to the document
  - i. Carmen: 0
  - ii. Malin: 0
  - iii. Jonas: 0
- e. All incorrect selections
  - i. Incorrect menu choices
    - Carmen: 3
    - Malin: 0
    - Jonas: 1
  - ii. Incorrect icons selected
    - Carmen: 0
    - Malin: 0
    - Jonas: 0

**Scenario 4:**

**1. Create a new user**

*Jonas: completed but found information somewhere else and then try again -- completed*

- a. Errors made in a task

- i. Carmen: 2
  - ii. Malin: 0
  - iii. Jonas:
- b. Count of “negative comments or mannerisms”
  - i. Carmen: 0
  - ii. Malin: 0
  - iii. Jonas: 3
- c. Count of asking for assistance/support
  - i. Carmen: 0
  - ii. Malin: 0
  - iii. Jonas: 1
- d. Count of visits to the document
  - i. Carmen: 0
  - ii. Malin: 0
  - iii. Jonas:
- e. All incorrect selections
  - i. Incorrect menu choices
    - Carmen: 0
    - Malin: 0
    - Jonas: 3
  - ii. Incorrect icons selected
    - Carmen: 1
    - Malin: 0
    - Jonas:

## 2. Give permission

- a. Errors made in a task
  - iv. Carmen: 0
  - v. Malin: 1
  - vi. Jonas: 0
- f. Count of “negative comments or mannerisms”
  - i. Carmen: 0
  - ii. Malin: 1
  - iii. Jonas: 1
- g. Count of asking for assistance/support
  - i. Carmen: 0
  - ii. Malin: 0
  - iii. Jonas: 0
- h. Count of visits to the document
  - i. Carmen: 0
  - ii. Malin: 0
  - iii. Jonas: 0
- i. All incorrect selections
  - i. Incorrect menu choices
    - Carmen: 1
    - Malin: 0
    - Jonas: 0
  - ii. Incorrect icons selected
    - Carmen: 0
    - Malin: 0
    - Jonas: 0
- a. **Change permission**
  - a. Errors made in a task
    - i. Carmen: 0
    - ii. Malin: 2

- iii. Jonas: 0
  - b. Count of “negative comments or mannerisms”
    - i. Carmen: 0
    - ii. Malin: 0
    - iii. Jonas: 1
  - c. Count of asking for assistance/support
    - i. Carmen: 0
    - ii. Malin: 0
    - iii. Jonas: 0
  - d. Count of visits to the document
    - i. Carmen: 0
    - ii. Malin: 0
    - iii. Jonas: 0
  - e. All incorrect selections
    - i. Incorrect menu choices
      - Carmen: 0
      - Malin: 0
      - Jonas: 0
    - ii. Incorrect icons selected
      - Carmen: 0
      - Malin: 0
      - Jonas: 0

## 2. Change school information

### a. School address

- a. Errors made in a task
    - i. Carmen: 0
    - ii. Malin: 0
    - iii. Jonas: 0
  - b. Count of “negative comments or mannerisms”
    - i. Carmen: 0
    - ii. Malin: 0
    - iii. Jonas: 0
  - c. Count of asking for assistance/support
    - i. Carmen: 0
    - ii. Malin: 0
    - iii. Jonas: 0
  - d. Count of visits to the document
    - i. Carmen: 0
    - ii. Malin: 0
    - iii. Jonas: 0
  - e. All incorrect selections
    - i. Incorrect menu choices
      - Carmen: 0
      - Malin: 0
      - Jonas: 0
    - ii. Incorrect icons selected
      - Carmen: 0
      - Malin: 0
      - Jonas: 0

## 3. Change your account information

### a. Phone number

- a. Errors made in a task
    - i. Carmen: 0
    - ii. Malin: 0

- iii. Jonas: 0
- b. Count of “negative comments or mannerisms”
  - i. Carmen: 0
  - ii. Malin: 0
  - iii. Jonas: 0
- c. Count of asking for assistance/support
  - i. Carmen: 0
  - ii. Malin: 0
  - iii. Jonas: 0
- d. Count of visits to the document
  - i. Carmen: 0
  - ii. Malin: 0
  - iii. Jonas: 0
- e. All incorrect selections
  - i. Incorrect menu choices
    - Carmen: 0
    - Malin: 0
    - Jonas:
  - ii. Incorrect icons selected
    - Carmen: 0
    - Malin: 0
    - Jonas: 0

## Appendix G - Heuristics evaluation results

This appendix contains the results gotten from discussions of both heuristic evaluation studies.

### Study 1:

#### Visibility of system status

Nothing

#### Match between system and the real world

Possible to export empty files. Solution: Error message.

The words are confusing if you are not an expert in the area. Solution: Change it to simpler terms.

User control and freedom

Starting point? Solution: add home

Too much control so it get's a bit confusing

#### Consistency and standards

The process flow is not complete. You do something at one place and then go to another place to finish it. Like create a platsannons, then connect it to groups and periods.

Inconsistent structure, everything is in the main navbar, could be placed separately.

“!”: No information is shown

Symbol usage, not consistent. Double settings?

Same terms for different levels

Click on tabs and it will collapse to the right?

Some pages show all, like in the timeline. But some pages show nothing at all until you choose to filter it.

#### Error prevention

Gives error message for previous steps? Organisationsnummer in ny huvudman.

Long loading time, no timeout?

#### Recognition rather than recall

When you create a platsannons, you have to remember the title and search for it in perioder or any other page to do something.

In document when i clicked on a document it just downloaded the file without letting me decide whether it should download or not. Also it's not that clear that the link is a download link.

The popup button next to the document link should be changed to download and clicking of the file can instead show the popup window.

### Flexibility and efficiency of use

Good for power users but hard to find what to do if you are a normal user. Too many menus and dropdowns.

Need introduction or learning to actually use the website.

### Aesthetic and minimalist design

Symbols and color can be used to guide the users subconsciously.

Planeringsverktyg → tidsaxel. No need to be able to filter to see all "skolform" you need to scroll anyways to see the next.

Update logs, why can everyone see it?

### Help users recognize, diagnose, and recover from errors

Too long loading page when creating stuff. Timeout? Cancel?

### Help and documentation

Good with vyförklaring, but the explanations are still not good enough or thorough.

Would need documentation on how to create and do stuff.

What input is needed in the different forms

## Study 2:

### Visibility of system status

- Scenario 1:
  - Group upload - control page - the button of viewing table information can be ignored.
- Scenario 2:
  - Show the where you are in the process in bokningsöversikt. You only see it now if it says "Bokad" instead of "Tilldelad". But those two terms could be mistaken for the same thing.

- Some buttons are removed in different stages and some buttons show nothing when clicked on. Should be the same (inactive) for all.
- Scenario 4:
  - Show some information such as “No message created” instead of just showing an empty box to the user.
- Other:
  - In tidsaxel, the functions could be included on the first page in the timeline there. It’s a detour to go in there to find functions instead of going directly through the menu.
  - In the start page summaries, you can expand but not collapse information.

## Match between system and the real world

- Scenario 1:
  - Nivå (“Level”) can be a bit confusing if you don’t look at the options to see what it contains.
  - Last page is called statistics in add student, which is confusing.
- Scenario 2:
  - Confusing that you have to go to “Bokningsöversikt” to manage students. Why do you manage in an overview? Why are the other overviews not places where you manage stuff?
  - To do an action, like switch and so on, you have to click on the “configure/settings/gear” symbol which can be confusing.
  - Why is branch not mandatory when you create EOP?
- Scenario 3:
  - In planeringsöversikt can be unclear what the shortenings mean. Like “best.” “till.” “bok.” → Hover over the letters, something should be shown.
- Scenario 4:
  - E-mail page → easier to manage the email, instead of just delete all the mails.
- Other:
  - When hovering certain symbols, they change cursor to show that it’s clickable, but it’s not! some symbols show tooltip when hovered, but seem as clickable and some are reversed (clickable, but no tooltip).

- EOP → Not enough branches.
- Pretty confusing what the headings in the menus mean and what it contains. Also they are very similar.

## User control and freedom

- Scenario 1:
  - In place ordering, there is no X button to easily delete that order, but you have to change it back to 0, to remove it.

## Consistency and standards

- Scenario 1:
  - When doing place ordering, “Fritext” is a bit unclear what it is? Can only I see it or everyone?
  - In place ordering page, some places indicate how many places are left, but some don't
- Scenario 2:
  - Bokningsöversikt has 2 options in the menu, student and place. Why are they not choosable on the same page? This makes it confusing about what bokningsöversikt really does.
  - Configure - Export tables: Configure button can be seen in some pages, and there are different configure ways.
  - In bokningsöversikt; The “switch” box has a heading, but the other boxes do not.
  - The layout of “switch” is similar to those drag and drop functions.
  - Unclear if the “följebrev” is sent to only companies or to the students to, because when there is a green sent “följebrev” symbol, it is under the student's status.
- Scenario 4:
  - Giving permission: Menu with no order.

## Error prevention

- Scenario 1:
  - When in the process of adding students and in the tab “koppla enheter”, 2 boxes appear, you can connect “utbildningsenhet” to empty rows. confusing.

- If I remove student from all groups, where is she? can I add her back (undo)?  
The warning says that I can't.
- Scenario 2:
  - The switch button should be inactivated if there are no chosen jobs in the box.  
Clicking the button without anything there creates an error.

## Recognition rather than recall

- Scenario 1:
  - The “Spara platsbeställning” button, is a bit unclear if it's a button or not.
- Scenario 2:
  - In placeringslista the configure and export buttons are kind of separated from the actual table.
- Scenario 3:
  - The summary at the top could be more clear and visible, is kind of disconnected from the table, in place overview.
- Scenario 4:
  - Can be unclear that the little windows is scrollable and some options might be missed because of this. Why not make it a bit bigger?
  - When adding permissions, it's unclear that the buttons “add permission” is there. You just want to press save.
- Other:
  - Before choosing the something in the drop-downs, maybe there should be default view instead of empty.
  - Grupphantering & Grupphantering in both category and sub-category. This is a bad naming system.

## Flexibility and efficiency of use

- Scenario 1:
  - There is no way to set the valid date when creating group by excel. Have to go into group settings afterwards.
  - Upload group: Too much check boxes. You still have to do the class and school choice in the next page.

- Scenario 2:
  - Should be possible to make several selections and configure them at the same time, instead of one-by-one or ALL.
  - The shortcuts on the right side. There should be more links there. Like for example placement list etc.
  - When configuring stuff in the placeringslista, it takes time to remove or add stuff.
  - When configuring in the placeringslista, everything is reset when you leave. Should be saved, so it's the same configuration every time.
  - When exported to Excel, the table looks nothing like the configured view. It's all in a mess in Excel and columns needs to be resized
- Scenario 3:
  - Place overview: Why are all columns not sortable?
- Scenario 4:
  - Why can you not edit a permission directly, but you have to add a new one?
- Other:
  - These drop downs will take a lot of time to navigate. It's hard to use it for the first time user. Even for the old users, it's hard to find stuff they want.
  - There is one item in the sub-menu sometimes, why are they not the main-menu?

## Aesthetic and minimalist design

- Scenario 1:
  - If you remove a student. Even if you don't remove from all groups, the same warning appears, which can scare people from the removal process.
  - When adding a student, the address information is in it's own tab instead of in basic information and it's not even mandatory.
- Scenario 2:
  - Placeringslista: A lot of information from the start. Why not have it the other way around? Resets everytime...
- Scenario 3:

- In planeringsöversikt, Why are the 0's clickable? an empty dialog box appears when clicked.
- In Översikt planerade period: Why is this even here? this information could be baked into the other overviews and places.
- Scenario 4:
  - “Add permission” and “Save”: the users need to click both of the buttons to save the permission.
  - The guides are really needed for the first and infrequent users, but for old users, putting guides at the top takes a lot space and it cause inconvenience (More scrolling) when browsing the information.

## Help users recognize, diagnose, and recover from errors

- Scenario 1:
  - In place ordering, super confusing error message, when ordering more than available. For example, I ordered 140 places and the error says “you can order max 140”... while the problem is that there are not enough places available (70 available).
- Scenario 4:
  - The error message, saying you have to be an administrator to do stuff, is really confusing. Because it implies that you do not have administrator rights, which you have. This pops up when you try to save before adding permission.

## Help and documentation

- Other:
  - Document: Tags, shouldn't be school form, that should be it's own column. Tags should be specific or “categories”.
  - Documents: There are doubles or triples of some documents.

## Appendix H - Transcription for Perspective-based UI Inspection

Transcription made from the data found in ethnographic study and data analysis. The data was categorised by three different factors: doing, feeling and thinking.

Transcript/notes	Doing	Feeling	Thinking
“Sometimes it's just one group, sometimes the students are in two or more groups. Which is not exactly the easiest thing to do. It's time demanding.”		I feel frustrated because it's time-demanding to work with multiple groups	
“I think it's very difficult for a user to understand that if you're a student you will login with your personal number”			I think letting a student understand logging in with their personal number is difficult
“So before I put in the information I have to make the file very nice and pretty. But then when I take files from the system it's not as nice and pretty”	I put in information from excel		
“[...] will not work ok, and no matter what sort of format I use for the phone number it will not work.”		I feel bad because no matter what sort of format I use for the phone number it won't work	
“Just like I don't know for some reason, probably because you are here... it just happened you know [...] to recognize the phone number. Sometimes it didn't.”	I import phone numbers of the students to the system.		

<p>“Now sometimes in the same period of the year I can order 30 places sometimes I will not get more than 15. My planning is so depending on... I don't know. It's just pure luck. It's hazard, It's not OK. [...] You order 30 and you will get 25. so I've made my booking there. And then the group is actually a bit bigger. [...] The group cannot be bigger than my order [...] the file that I imported with the student. I can't have more than 30 on that. So if I want to add to students it will tell me no you are not allowed that and I have to contact the support.”</p>		<p>I feel lucky when I get what I want from the system. I feel frustrated when I cannot upload group bigger than the number I have ordered. I feel frustrated when I get less places than I have ordered</p>	<p>I think this is hazard.</p>
<p>“But I don't know how... how they are playing it in their little square. How does that message look like when they get it, does it come as a mail? does it come... do they look in the system or where is that attachment attached? Because they're saying no we didn't get it”</p>	<p>I send cover letters. I attach files to the cover letter.</p>	<p>I feel curious because I cannot see how the attachments looks like</p>	
<p>“We have groups from all the times. That really is the one I created. So the old ones are still there”</p>		<p>I feel frustrated that I cannot archive the groups.</p>	
<p>“So it has to be something that tells me where I find those people and also help me find a group here which is sometimes a challenge. Because the older groups they stay there you know like forever. Nobody's taking them away.”</p>		<p>I feel challenged to find a group.</p>	
<p>“When I do that the student will not get any information. [...] the system does nothing [...] so that means that I have to contact every and each one of them to tell them ‘you got this place’”</p>	<p>I contact each student to tell them about the booking of the positions.</p>		
<p>“For "at least", that can't be, that should be "Maximum". Not "at least"</p>			<p>I think what it says here is wrong.</p>

<p>"I have to export this to excel first [...] do you know how much work there is in here to do to make it nice for the teacher. [...] why would I fix that for the teacher. But the thing is, the teacher has no access to the system, so I have to do it anyway."</p>	<p>I export tables to Excel. I fix the tables for the teacher.</p>		
<p>"What I've noticed is that in hospitals elderly cares and they don't really update their information on the website."</p>			<p>I think companies should update their information in time.</p>
<p>"A sort of an archive you know like all groups go somewhere in the archive and you can get in if for some reason."</p>			<p>I think there should be archived in the system.</p>
<p>"So when I was on the phone with support she actually connected a student to a wrong group because the group had the same name with I have created. because I didn't... I didn't think that far to put like VT 17."</p>	<p>I contact support</p>	<p>Curious of why groups can have the same name</p>	
<p>"But if you look here there are 40 places left. So people are not, the schools are not sending out students. [...] Now if I would have there a group of 50 people I could not import a file with 50 people though I can take as many as I want. It doesn't work. That's a pity."</p>		<p>I feel pity for not letting me connect a group with 50 people to a period with 40 places.</p>	
<p>"Do you know how much work there is in here to do to make it nice for the teacher."</p>			<p>I think too much work is needed to be done to make the table prettier.</p>
<p>"I am colorblind and I think this is... could be better. Just a contrast or..."</p>		<p>sad because color contrast could be better because of color blindness.</p>	<p>I think this color contrast could be better because I am color blind.</p>
<p>"That's the problem because you forget. Well because if you use it every day, every week, every month. You always keep things fresh. But when you do it twice a year..."</p>			<p>I think you have to use it frequently to keep thing fresh.</p>

“Well if I've done it some times, I find my way but it takes time for me to learn the language”		confused because the system terms are hard to understand	I feel like it takes time to learn the language
“Just maybe this one could be here, because why should I look up there. I mean is this less important than those?”			I think some buttons should be moved
“Maybe there's another way to check if they have done their homework or not. Well if they have chosen. do you know that? can I have a list for those who...?”	I check if the students have applied or not	I feel concerned about the students applying or not	
“OK. So here you have an overview of everything. And do you know if I can get a file, an excel file.”	I look at overviews		
“Följebrev. this letter that goes to the employers. Why I have to go this way to edit that? is there another way to... I don't want to go to planeringsverktyg -> bokningsöversikt to edit that”			I think there should be a faster way to get to the edit följbrev option
“Well I think so, yeah but I think that the search function could be... because if search "praktik" nothing happens.”	I search		
“I think the biggest problem is that I'm rather new.”			I think the biggest problem is that I'm rather new
“The most common things you want to do should be in one click.”		frustrated because it's hard to navigate to common tasks	I think there should be shortcuts to common tasks
“So edit följbrev, print evaluation form and a list of those who have not applied. I don't need to know who has applied. I need to know who has not.”	I edit följbrev		I think that knowing who has not applied is more important
“Print form for student. But here it is called form and not evaluation form. The language is important and you	I print evaluation forms		

have to be..."			
"[...] it should be possible to, that you could see the button."		frustrated because the buttons have disappeared	I think the buttons should be visible at all times
"So if I wanted to leave the system. Where do i log out."	I log out		
"I don't know what that figure means. I don't even know what it is. Is it a button or a person or what is it."		I feel confused about the meaning of the symbols	
"Scary. I've done something I didn't know I did. I don't like that at all. This makes me feel like I don't have any control at all. All right. So she's gone. [...] So now I know she probably is removed, but still I can't be sure."	I remove students	I feel scared because I removed a student without confirmation	
"I know that last time two of my students want to switch places and the whole system sort of went berserk. And that was very very tricky thing to do."	I switch places		I think it's very tricky to switch
"Once again frustrating... I don't remember... which one.. to... was it this one?"		I feel frustrated because I can't remember	
"So now we are supposed to connect to this...gruppkoppling. Where do I find that"	I connect groups	I feel confused because I can't find where to do group connections	
"So perhaps it is 25 that. So why it says 24 down here?"		I feel confused about the displayed information	
"This is sort of too much for me. It's enough. You have 25 places. That's it. That's the only thing I'm interested in."	I look up how many places are available		

"And then I wonder why...why do we have to have this huge list. It's too much information for me."		I feel overwhelmed because there is too much information	
"None of these names really matters because they have another person helping them."			I believe the names in the system don't really matter
"And then when my students go, they don't meet Marian or Sanas or someone else. They meet someone completely different. So I have to ask them about who is your tutor, who helps you."		I feel confused because the students don't meet the person that is listed as contact person	
"And I like the graphics when I go back here to the Start. This one sort of gives me a clue where I am in the process. And this also guides me when I'm working on my system now.. So this sort of shows me the work flow what I am supposed to. "	I check timeline	I feel clear when I see this (timeline)	

# Appendix I - Tasks for the 2nd iteration of usability test

The tasks were created according to the stages we summarised in the experience map.

## Tasks for the 2nd iteration of usability test

### Managing places

- Order 3 places for äldreboende in week 34 - 37
- Edit and save the order
- Remove the order

### Managing groups

- Find how to upload in the page
- Upload students with excel
- Collapse the summary
- Finish import
  
- Check student list
  - Check students who are without a group

### Managing applications

- Go through the process of managing applications
  - Go to the second page
  - Approve
  - Send cover letter

### Managing users/student information

- Go through the process of adding a user and giving permission
  - Add user
  - Give permission
  - Edit permission
  - Save permission
  - Remove permission

### Viewing

- Homepage
  - Check error message
  - Check platsbokning message for week 38 - 41
  - Search for Chalmers 03

- Check email
  - Check all
  - Delete all
- Check the menu
  - Planeringsverktyg
  - Rapporter
- Check placeringslista
  - Configure the table

## Appendix J - Perspective-based UI inspection results

### Managing places

- Orange text indicates that it is clickable.
  - The text should go back to black.
- Singular student
- Remove line under heading
- Alert box should be in the middle
- Make it clear that buttons are not clickable when in edit mode

### Managing groups

- Excel with 1 “I”
- Remove the button in the uploading page when connecting groups
- Make the box mandatory but with checkbox
- The text in the uploading page
- The gray text in the progress bar
- Collapse and expand button for the summary
- Remove operation
- Move kontrollera closed to the text
- Remove “era”
- Order of the groups
- Grey out the background at final popup
- Student list: Should it be buttons or links??

### Managing applications

- Printable version
- Inactivate följebrev in first step!
- Tooltip, how to activate button

### Managing users/student information

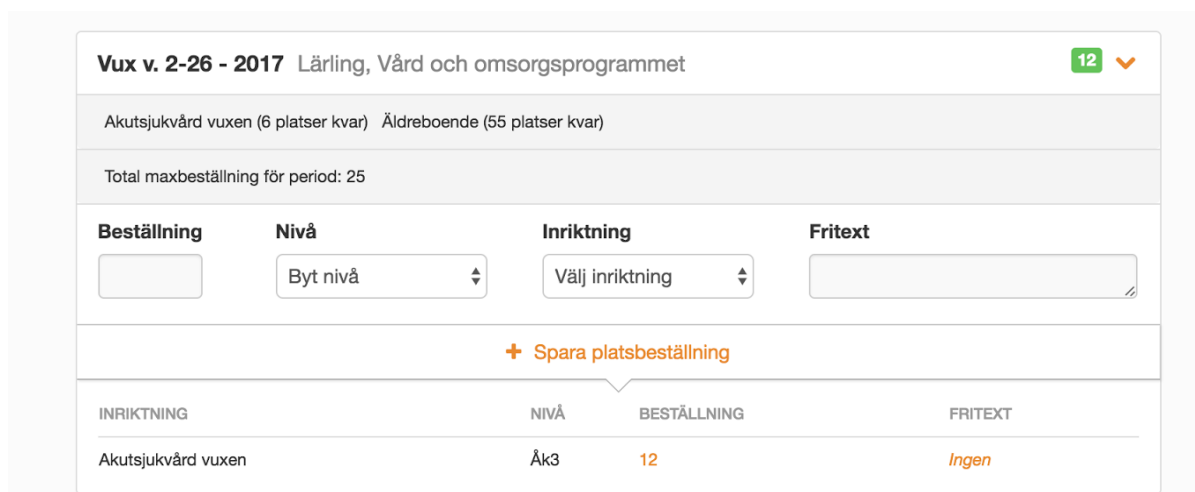
- Change dropdown to combobox
- Align stuff in permission - Viewing
- Darker process bar
- Tooltip: Orange link

## Viewing

- Text to small in the timeline tooltip
- Email (account) padding to make it separate from the homepages email.
- Elevlista -> Elevlistor

## Appendix K - Current views of Praktikplatsen.se

### K.1 Managing places



**Vux v. 2-26 - 2017** Lärling, Vård och omsorgsprogrammet 12

Akutsjukvård vuxen (6 platser kvar) Äldreboende (55 platser kvar)

Total maxbeställning för period: 25

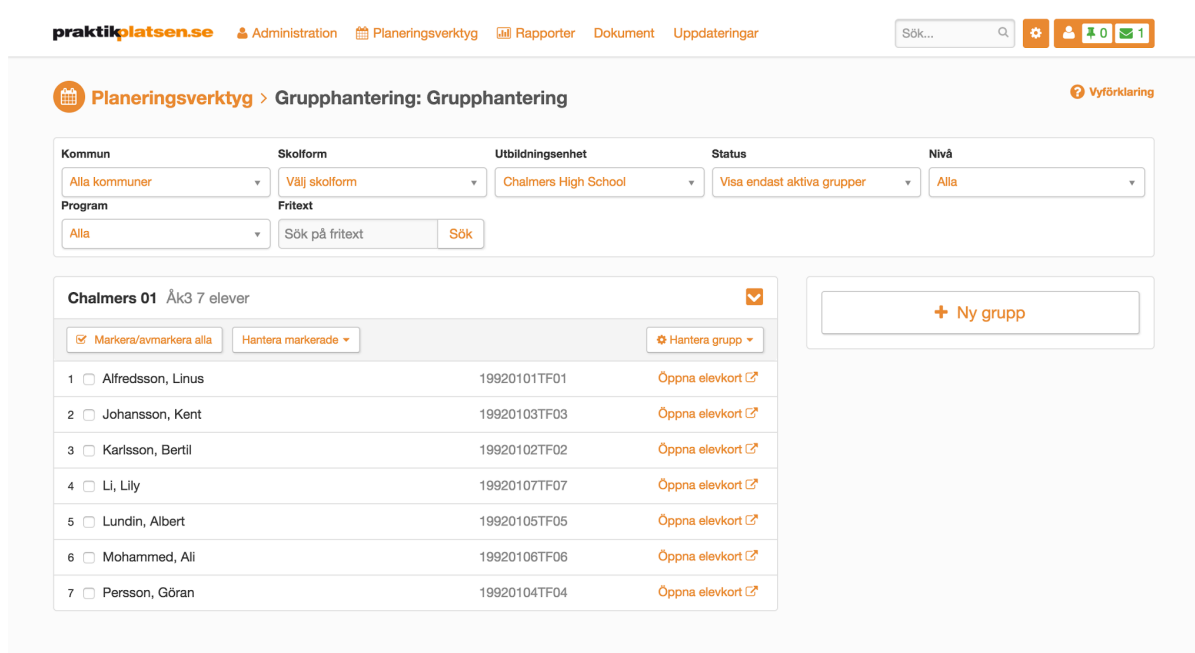
**Beställning** **Nivå** **Inriktning** **Fritext**

**+ Spara platsbeställning**

INRIKTNING	NIVÅ	BESTÄLLNING	FRITEXT
Akutsjukvård vuxen	Åk3	12	Ingen

Figure K.1. Placing an order in the current system

### K.2 Managing groups



**praktikplatsen.se** Administration Planeringsverktyg Rapporter Dokument Uppdateringar

Sök...

**Planeringsverktyg > Grupphantering: Grupphantering** Vyförklaring

**Kommun** **Skolform** **Utbildningsenhet** **Status** **Nivå**

**Program** **Fritext** **Sök**

**Chalmers 01** Åk3 7 elever

☒ Markera/avmarkera alla  Hantera markerade  Hantera grupp

1	<input type="checkbox"/> Alfredsson, Linus	19920101TF01	<a href="#">Öppna elevkort</a>
2	<input type="checkbox"/> Johansson, Kent	19920103TF03	<a href="#">Öppna elevkort</a>
3	<input type="checkbox"/> Karlsson, Bertil	19920102TF02	<a href="#">Öppna elevkort</a>
4	<input type="checkbox"/> Li, Lily	19920107TF07	<a href="#">Öppna elevkort</a>
5	<input type="checkbox"/> Lundin, Albert	19920105TF05	<a href="#">Öppna elevkort</a>
6	<input type="checkbox"/> Mohammed, Ali	19920106TF06	<a href="#">Öppna elevkort</a>
7	<input type="checkbox"/> Persson, Göran	19920104TF04	<a href="#">Öppna elevkort</a>

**+ Ny grupp**

Figure K.2. The view of where to manage groups

Ladda upp fil
Filinformation
Koppla kolumner
Koppla enheter
Koppla grupper
Kontrollera
Statistik

### Koppla utbildningsenheter

Till vilka utbildningsenheter ska eleverna läsas in? Är boxen röd så kommer inte den utbildningsenheten att läsas in. Klicka på koppla utbildningsenhet för att ändra.

kopplas till utbildningsenhet:  
Ingen vald

Koppla utbildningsenhet

**Chalmers High School**  
kopplas till utbildningsenhet:  
Chalmers High School

Koppla utbildningsenhet

Tillbaka
Nästa steg >

**Figure K.3.** A step in the process of uploading students via file.

## K.3 Managing applications

praktikplatsen.se
Administration
Planeringsverktyg
Rapporter
Dokument
Uppdateringar
Sök...
1

Planeringsverktyg > Bokningsöversikt
Vyrklarng

Kommun	Skolform	Utbildningsenhet	Status	Praktikgrupp
Alla kommuner	Alla skolformer	Chalmers High School	Visa endast aktiva grupper	Chalmers 01

Praktikperiod  
Vux v. 2-26 - 2017

<b>Alfredsson, Linus</b> 920101-TF01 0 platser sökta Öppna elevkort	<div>Redigera följebrev</div> <div>Skicka ut följebrev manuellt</div> <p>Följebrev skickas automatiskt ut till verksamheterna för alla elever som är bokade när platsbokningen stänger (2016-12-25 kl: 23:45). Väljer du att skicka ut ett följebrev manuellt kommer det inte att skickas automatiskt. Du kan alltid välja att skicka om ett följebrev manuellt även om det har skickats ut tidigare.</p> <div>Kopiera tilldelningar från en annan period</div> <div>Byt platser</div> <p>Vill inte att heta i Avsikten till vnetar</p>
<b>Johansson, Kent</b> 920103-TF03 0 platser sökta Öppna elevkort	
<b>Karlsson, Bertil</b> 920102-TF02 0 platser sökta Öppna elevkort	
<b>Li, Lily</b> 920107-TF07 0 platser sökta Öppna elevkort	
<b>Lundin, Albert</b> 920105-TF05 0 platser sökta Öppna elevkort	

**Figure K.4.** The view of managing applications

Följebrev skickas automatiskt ut till verksamheterna för alla elever som är bokade när platsbokningen stänger (2016-12-25 kl: 23:45). Väljer du att skicka ut ett följebrev manuellt kommer det inte att skickas automatiskt. Du kan alltid välja att skicka om ett följebrev manuellt även om det har skickats ut tidigare.

Kopiera tilldelningar från en annan period

Byt platser

Välj plats att byta i översikten till vänster.

⇕

Välj plats att byta i översikten till vänster.

Avbryt Byt platser

Praktikperiod

Grupp

**Figure K.5.** Functionalities for managing applications

## K.4 Managing users

Lägg till användare

×

Grunduppgifter

Behörigheter

Förnamn \*

Test

Epost \*

test@chalmers.se

Mobilnummer (för SMS)

XXX-XXX XX XX

Handledartyp

Ej handledare

☒ Skicka välkomstmail

Efternamn \*

User

Titel

Telefon (för samtal)

Kopiera mobilnummer

Handledare, fritext

Nästa steg >

**Figure K.6.** First step of adding a new user

**Lägg till användare** ✕

Grunduppgifter
Behörigheter

Behörighet	För vad	Vilken
Praktikansvarig	Utbildningsanordnaren	Chalmers High School

[+ Lägg till behörighet](#)

Praktikansvarig, Chalmers High School ✕

◀ Föregående steg
Spara

**Figure K.7.** Second step of adding a new users. Assigning permissions.

## K.5 Viewing

### Kommande perioder

v. 16-17 - 2017

Skälltorpsskolan (102 platser) 8 d vt17, 8 c v17, 8 h v17, 8 e vt17



v. 42-43 - 2017

Skälltorpsskolan (102 platser)



**Figure K.8.** Timeline to see the general process.

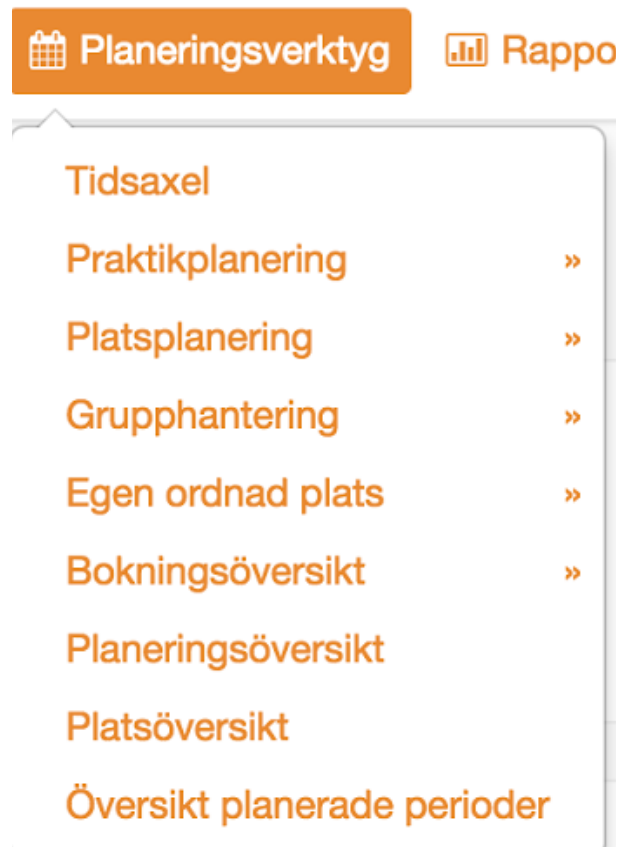


Figure K.9. A complicated menu of the available planning tools



Figure K.10. Account menu with email function

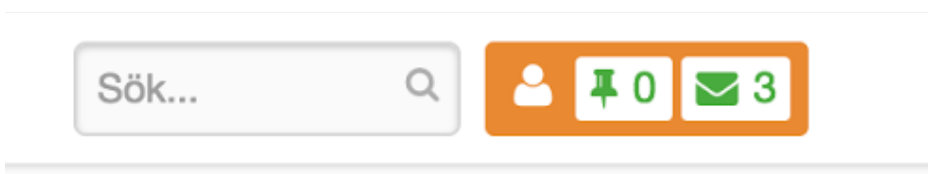


Figure K.11. Search bar for searching students.

**praktikplatsen.se** Administration Planeringsverktyg Rapporter Dokument Uppdateringar

Sök...

**Rapporter > Placeringslista** [Vyförklaring](#)

**Skolform** Gymnasie/Vux  
**Program** Alla program  
**Utbildningsenhet** Studium/GY Vux  
**Nivå** Alla nivåer  
**Status** Visa endast aktiva grupper  
**Praktikgrupp** Välj praktikgrupp  
**Praktikperiod** Välj praktikperiod  
**Kommun** Alla kommuner  
**Fritext** Sök på fritext **Sök**  
**Kolumner** **Exportera**

Du har gjort kolumnanpassningar för utskrift och export [Återställ](#)

Bokningsstatus	Grupp	Period	Plats	Eget ordnad plats	Inriktning	Kommun	Besöksadress	Arbetstider	Lunch	Kontaktperson	Kontaktperson telefon	Kontaktperson epost
Bokad	BF 2:3 VT17	Barn och fritid v. 21-24 - 2017	Barnskötare, Barn och Fritidsprogrammet (Förskola Kariagatan 10B, avd Örön) Göteborgs Stad Örgryte-Härlanda		Pedagogisk	Göteborg	Kariagatan 10B, 416 61 Göteborg	Följa handledarens arbetstider	Medtag lunch	Linda Sandberg	031-3656762	linda.sandberg@orgryteharlanda.g
Bokad	BF 2:3 VT17	Barn och fritid v. 21-24 - 2017	Barnskötare, Barn och Fritidsprogrammet (Förskola Timjansgatan 52, avd. Maneten) Göteborgs Stad Angered		Pedagogisk	Göteborg	Timjansgatan 52, 424 21 Angered	Följer handledarens schema	Medtag egen lunch	Maria Hedlund	0725-361603	maria.hedlund@angered.goteborg.s
Bokad	BF 2:3 VT17	Barn och fritid v. 21-24 - 2017	Barnskötare, Barn och Fritidsprogrammet (Förskola Kummingatan 128-130, avd Vitsippan) Göteborgs Stad		Pedagogisk	Göteborg	Kummingatan 128-130, 424 21 Angered	Följer handledarens schema (08.00 - 15.00)	Medtag lunch	Monika Makarczuk	031-3651841	monika.makarczuk@angered.goteb

**Figure K.12.** A placement list of all the students internships.