Assignment 2B

IC1007   HT17-1
Human-computer Interaction: Principles and Design

Group 11

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Table of Contents

List of Figures

1   Introduction

In this assignment, a heuristic evaluation is performed on the SL website (http://sl.se/en/). In section 2, the heuristic evaluation methodology is described. Section 3 shows the results of the evaluation. In section 4 the findings are summarized their severity to the website is discussed.

2   Method

Heuristic evaluation is a method used to discover usability issues in a user interface. Unlike cognitive walkthrough, the Heuristic evaluation follows ten design principles and the evaluator's role is to check if the interface fulfils these criteria:

1) Visibility of system status
2) Match between system and the real world
3) Recognition rather than recall
4) User control and freedom
5) Consistency and standards
6) Error prevention
7) Flexibility and efficiency of use
8) Aesthetic and minimalist design
9) Help users recognize, diagnose, and recover from errors
10) Help and documentation (Nielsen, Ten usability heuristics, 1995)

Ideally, the evaluation should be done by several evaluators with expertise in interactive system design, all working independently, so that problems in the interface can be found more effectively. The reasoning is that a single evaluator cannot possible find all the different kind of problems in the interface and having more evaluators review the interface increases the chance of discovering more and unexpected problems. If an evaluator finds a problem, they should mark it down and describe which of the heuristics were broken and at what severity rating. (Nielsen, How to Conduct a Heuristic Evaluation, 1995)

In this assignment, we play the role of four evaluators who conduct their evaluation of the site independently. Then we put our findings together.

The severity rating can be used to give a rough estimate on how urgent it is to fix the usability problem. The urgency depends on three factors; frequency (how often does the problem arise), impact (how easy is it for the users to overcome the problem) and persistence (how bothered will the users be by the problem). A scale of 0 to 4 rating is used as a guideline for measuring the problem's severity:

· "0 = I don't agree that this is a usability problem at all"
· "1 = Cosmetic problem only: need not be fixed unless extra time is available on project"
· "2 = Minor usability problem: fixing this should be given low priority"
· "3 = Major usability problem: important to fix, so should be given high priority"
· "4 = Usability catastrophe: imperative to fix this before product can be released" (Nielsen, Severity Ratings for Usability Problems, 1995)

The severity ratings are often sent as a questionnaire after the evaluators have finish listing all their findings. The reason as to why this is not done during the evaluation session is to avoid having incomplete severity ratings, as the evaluators are often distracted with finding usability problems.

3   Evaluation

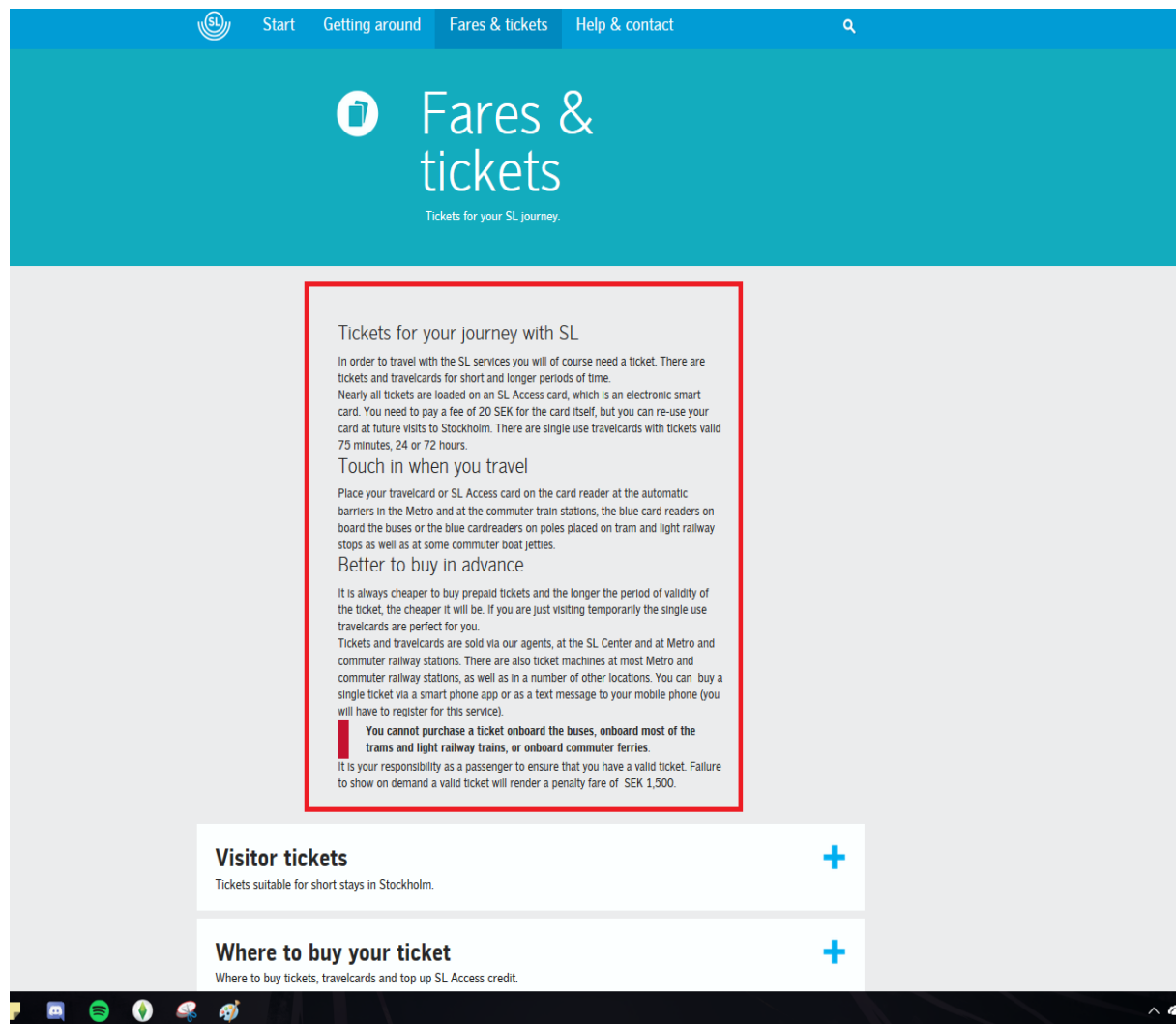## 3.1 Problems with Severity Rating 4

Figure 1: Screenshot of SL "Fares & tickets" page.

- **Problem description**: When a first-time user, such as a tourist, has successfully searched for a route, they might want to buy a ticket for that trip. On this page, they will find no information about what ticket they will need for this trip, or where to get it. They will have to go to "Fares & tickets" but might be afraid that they then won't be able to buy the ticket for that exact trip there. In the real world, after asking about a route at the information desk, the customer would be offered to buy the appropriate ticket (see Figure 1). Here, the system fails to present information in a natural order.
- **Heuristic(s) violated**: Match between system and the real world.
- Severity rating: 4
- **Motivation**: This problem will occur every time a new user searches for a route, so it is very frequent. It does not have great impact because after a little looking around, the user will go to the "Fares and tickets" page. The problem is not persistent, meaning that once a user has learned how to solve it, they will not be bothered by it again. This problem has a negative market impact on the site. If a user fails to find what ticket they need for their trip or how to buy it, they will stop using the site.
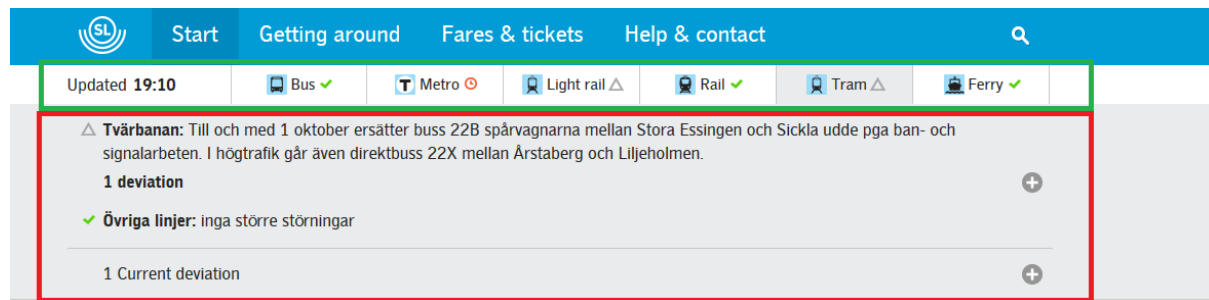
Figure 2: A screenshot of the SL website's upper menu bar.

- **Problem description:** On the start page, there is a menu with several icons representing different ways of transport (highlighted with a green marking on Figure 2). If the user clicks on any of the icons, the menu will expand and information about the transport status (eg. The metro) is shown. This menu is stated in swedish and not in english, making the information inaccessible for foreign users, this is highlighted on Figure 2 with a red color.
- **Heuristic(s) violated**: Match between system and the real world
- **Severity rating:** 4
- **Motivation:** This is a problem that will occur every time the user wants to find information about any transport delays or cancellations etc. Due to the fact that the user cannot understand the information, they will have difficulties solving the problem without the help of an outside party.

3.2 Problems with Severity Rating 3

- **Problem description**: In the center of the start page there is a big map which can be interacted with. Say that a user clicks on the Fridhemsplan metro station. A pop-up then appears on the map and offers some options. One of these options is "From" which means that you want to travel from Fridhemsplan to somewhere. If the user selects that option, "Fridhemsplan" will appear in the "From station/stop/address" at the far left of the page. This change is barely visible and easy to miss. What the user expected was probably a pop-up or to be re-directed to a new page. The user is not effectively made aware if the change he has made to the system.
- **Heuristic(s) violated**: Visibility of system status.
- **Severity rating**: 3
- **Motivation**: This problem will occur whenever a user interacts with the map, unless they have a lot of experience using the site. The problem is hard to solve, some user may not solve it at all if they don't think to look at the form to the left carefully. The problem is not persistent, once it has been solved the user will know how to solve it next time.

- **Problem description**: On the start page, there is a menu with some icons like a bus and a ferry (highlighted with green marking on Figure 2). At the right of each icon there are different symbols. At one point, there was a green check sign by the bus and a grey triangle by the ferry. It is not obvious what these things mean, or even that the objects are intractable. One might, for instance, assume that the menu is just an image showing what transport vehicles the Stockholm transportation system supports. This menu actually shows on which parts of the transport system there is currently a problem. Expanding a menu item will show detailed information about the problem. Unfortunately, a user might look elsewhere for this information and fail to find it.
- **Heuristic(s) violated:** Match between system and the real world.
- **Severity rating:** 3
- **Motivation:** This problem occurs every time a new user uses the site to try to find information about delays, cancellations etc. It could be very hard for the user to solve. If they don't realize that they can interact with the menu of icons, the will likely fail to find the information they are looking for. The problem could be found by making a search for some routes but that is troublesome.
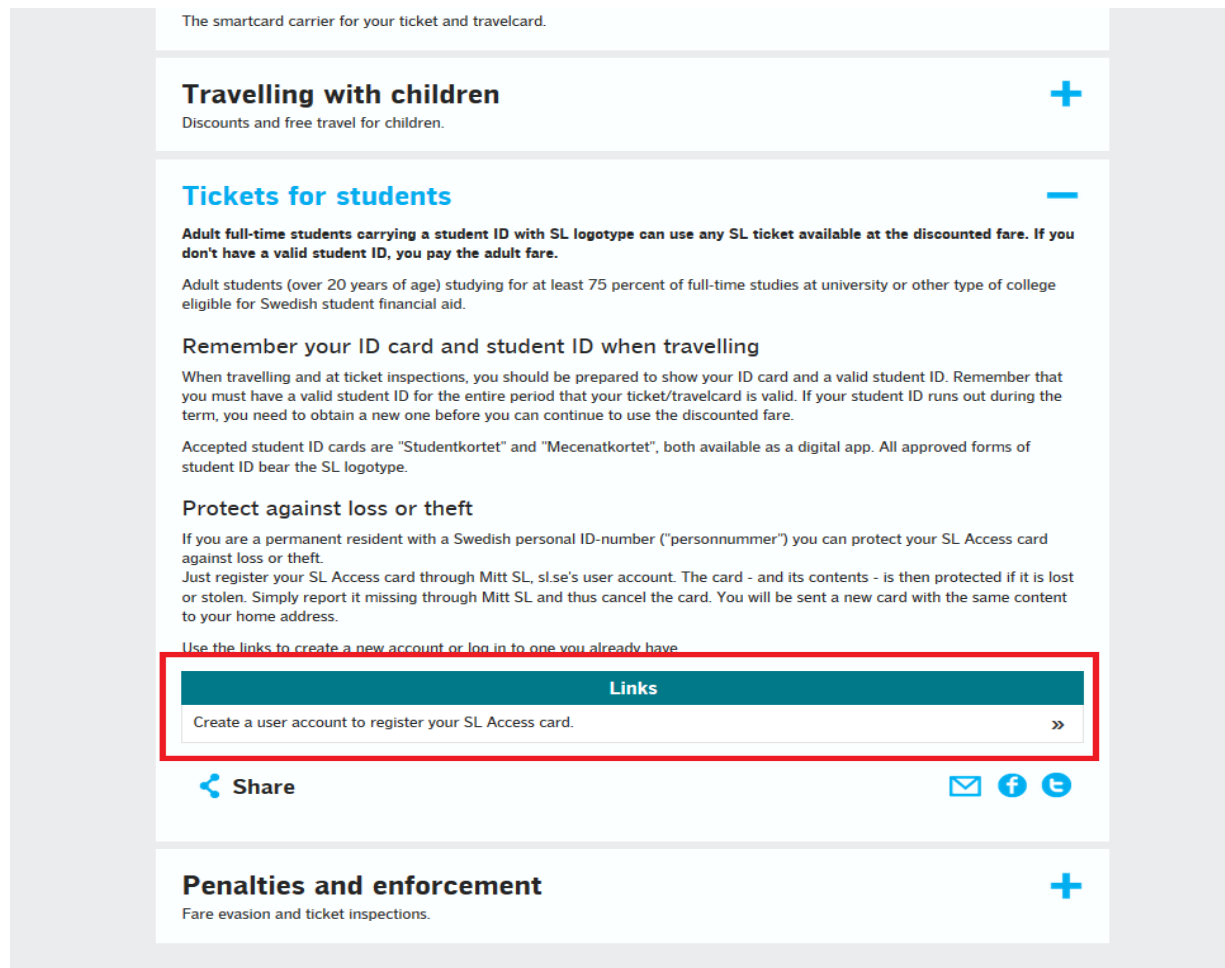
Figure 3: Screenshot of the SL "Tickets for students" information.

- **Problem description:** Under "Tickets for students" there is a link which says, "Create a user account…". When clicked, the link takes the user to a blank page in the Swedish version of the site, which is absolutely not where the user was trying to get. It is not clear at all how the user should find what they were looking for from here.
- **Heuristic(s) violated:** User control and freedom, Help users recognize, diagnose and recover from errors.
- **Severity rating:** 3
- **Motivation:** This problem is not in a very visited part of the web page, like the main page, so it will not occur very often. But if it occurs, the user probably can't solve it in any other way than to contact SL by phone, which is not really a solution as far as the interface goes. It turns out that the English site actually does not offer a sign-in at all. The user is in no way helped to find that information or offered any solutions to the problem. This problem is persistent, meaning that the user will encounter it every time the try to register in the English version of the site and they will consistently fail to solve it.

- **Problem description:** When the site is visited again by the same user (same device), it has stored previously searched destinations. The site does not store other options of a search, such as is the user had a walkway restriction or wanted to have a particular intermediate stop.
- **Heuristic(s) violated**: Flexibility and efficiency of use, Recognition rather than recall.
- **Severity rating**: 3
- **Motivation:** People who use the site regularly might experience this problem. If they often take the same trip it can become annoying for them to enter all options every time they make that search. If the user does not remember what options they entered last time and has to find that out again (eg. by googling) this is also time-costly. This is a very persistent problem, although it is fairly easy to solve by simply entering all desired options.

3.3 Problems with Severity Rating 2

- **Problem description:** Users who go to the "Fares & tickets" page probably want to find out what tickets they need for their trip and where to buy them. What they see is a bunch of text telling them, amongst other things, how to use the travel cards (see Figure 1). This text takes up the whole screen and might lead the users to feel overwhelmed and fail to find what they were looking for. All this information competes with the more relevant menu under it, which has structured the information the users are probably looking for.
- **Heuristic(s) violated:** Aesthetics and minimalist design.
- **Severity rating:** 2
- **Motivation:** This problem will occur every time a user with little experience if the site visits the "Fares & tickets" page. Solving the problem is easy, it simply takes scrolling down. The problem is however persistent, it will bother users every time they look for something in that page.
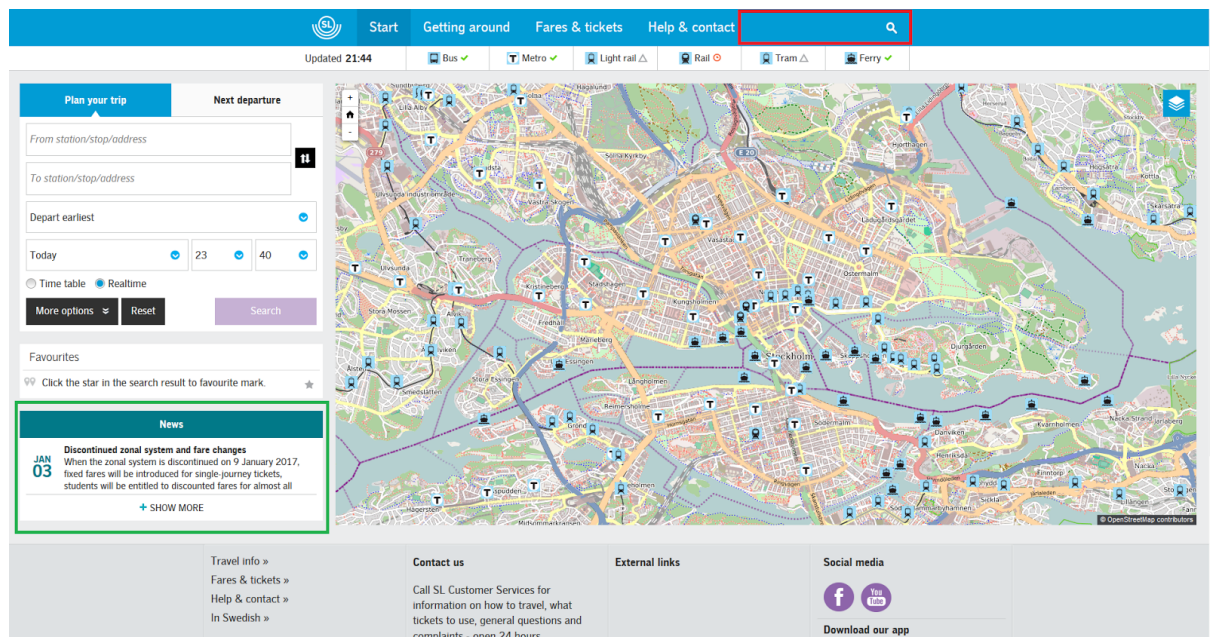

Figure 4: Screenshot of SL homepage.

- **Problem description:** The search field at the top right offers no suggestions when the user starts typing (highlighted with a red marking on Figure 4).. This forces the user to have to recall things rather than recognize them and also increases the risk of users making typing errors.
- **Heuristic(s) violated**: Recognition rather than recall., Error prevention.
- **Severity rating:** 2
- **Motivation**: The problem is very frequent, it occurs every time the search field is used. Its impact is small, once the search is made the user will probably wound what he was looking for in the search results.

- **Problem description**: The tram and light rail share identical icons/symbols, this is highlighted on Figure 2 with a green colour.
- **Heuristic(s) violated**: Consistency and Standards.
- **Severity rating:** 2
- **Motivation:** The user might not be able to distinguish any difference between the tram and light rail since they are represented by icons that are very similar to each other. This is a problem that the user will always encounter and will probably learn how to handle after trial-and-error.

Figure 5: Screenshot of SL search menu.

- **Problem description**: On the start page, if the user chooses the "Earliest Departure" option they will be asked to input the time that they wish to depart in (see Figure 5). The developer(s) of SL has chosen to constrain the users' choice to only military time format (highlighted with red markings), not allowing the user the option to input the time in any other formats, for example the AM/PM time format. This would make it difficult for users who do not follow military time.
- **Heuristic(s) violated**: Match between system and the real world
- **Severity rating:** 2
- **Motivation:** This is a problem that will occur every time the user uses the search field and can be fixed after the user learns about the military time format.

- **Problem description**: There are no documentations on how to actually use the website, e.g. how to use their respective features such as "More options" (what does it actually include and what does each option do).
- **Heuristic(s) violated**: Help and documentation.
- **Severity rating**: 2
- **Motivation:** Users who have no experience with using the site might have difficulties using it since searching the terms does not give any results and the site offers no tutorial options. This is a problem that will probably occur one-time since the solution is to learn how the site works or give up learning it and ask help from the SL staff instead.

- **Problem description:** There is no documentation on the differences between the options "Timetable" and "Realtime". Searching the term "Realtime" in the english site does not give any results even though the swedish site offers an explanation of the term in swedish.
- **Heuristic(s) violated**: Help and documentation.
- **Severity rating**: 2
- **Motivation**: Users who have no experience with using the site might have difficulties using this feature since searching the terms does not give any results and the site offers no tutorial options. If the users do not learn what the options mean, they will not use the feature.

- **Problem description**: The "More Options", which has all the sub details for filtering your search, is hidden and are not easily accessible to users, especially the first-time users.
- **Heuristic(s) violated**: Flexibility and efficiency of use
- **Severity rating**: 2
- **Motivation**: The users who is not very much familiar with the site will find it hard to understand the purpose of that button and to navigate it as per their needs in a timely manner and to use it effectively.
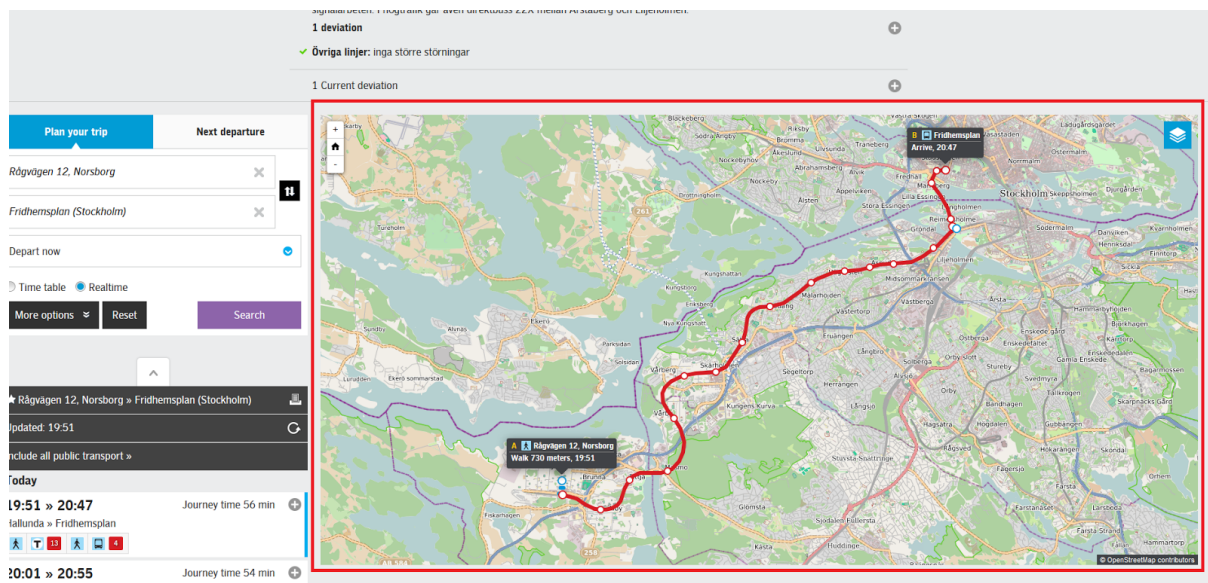

Figure 6: Screenshot of the map on the SL homepage.

- **Problem description:** More than half of the page is covered by the map (highlighted with a red marking on Figure 6), which is of same importance as rest of the elements of the site. The map can be reduced by half of what the size is off now. It will give more space for much more important elements. The map can be something that the user can enlarge with a click or a drag tool, if the user requires to.
- **Heuristic(s) violated:** Aesthetic and minimalist design
- **Severity rating:** 2
- **Motivation**: When a user opens the site, more than half the page is filled with the map, which is of less importance to him at that point. He will be using it mainly to check the other elements and these are places to the extreme left and bottom of the page, reducing its importance and visibility. After the user have made his search filtered, then we can enhance the map, so as to show him the detailed routes of the selected mode of transportation.

- **Problem description**: The "News" section should be given more importance than what is give to it now (highlighted with green markings on Figure 4). The most relevant and important updates and news regarding transportation is given there and it should be placed somewhere more eye catchy for the users.
- **Heuristic(s) violated:** Visibility of system status
- **Severity rating:** 2

- **Motivation**: All the updated news are highlighted in this area. This can be of great use to all kinds and types of users. All the important news regarding any aspect of transportation is mentioned here. So this should be considered as a very important element for the site (this can also be a place for very relevant advertisements (in the case of no news).
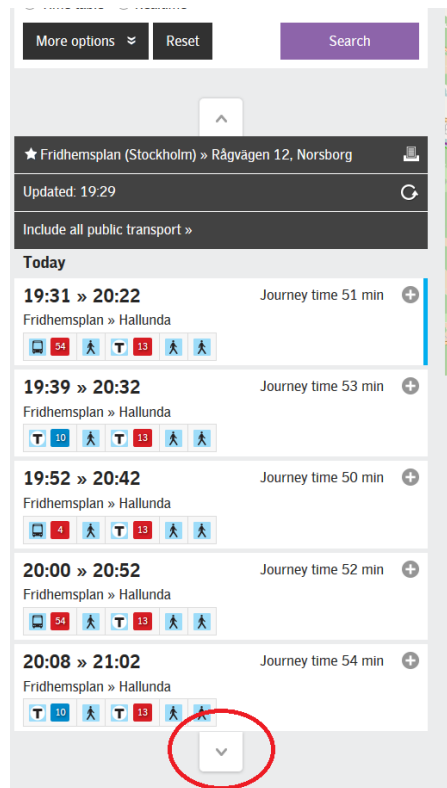

Figure 7: Screenshot of the SL search results.

- **Problem description**: The system allows the user to expand their search results which will show later departures (by clicking on the icon marked red on Figure 7), but it does not have any buttons that allows the user to undo this action, for example to collapse the list of searched results.
- **Heuristic(s) violated**: User control and freedom, Consistency and standards.
- **Severity Rating**: 2
- **Motivation**: This can be inconvenient for the user since they would have to scroll up to to see the earlier search results. This is a problem that will occur every time the users use the site. The solution to this is to press the search button and re-search with the same input, making the search button also act as a "reset" button. This conflicts with the user's conceptual model of how a "search" button should work which might lead the user to think that the search button is also a redo button.

3.4 Problems with Severity Rating 1

- **Problem description**: Under "Fares & tickets" there is an item called "Tickets for students". Under it there is a bar reading "Links". This bar looks clickable, but it is actually just a header (see Figure 3). The real link underneath is diminished by the bar and hard to spot.
- **Heuristic(s) violated**: Aesthetic and minimalist design.
- **Severity rating**: 1
- **Motivation**: This problem is not in a very visited part of the web page, like the main page, so it will not occur very often. It is easy for the user to overcome.
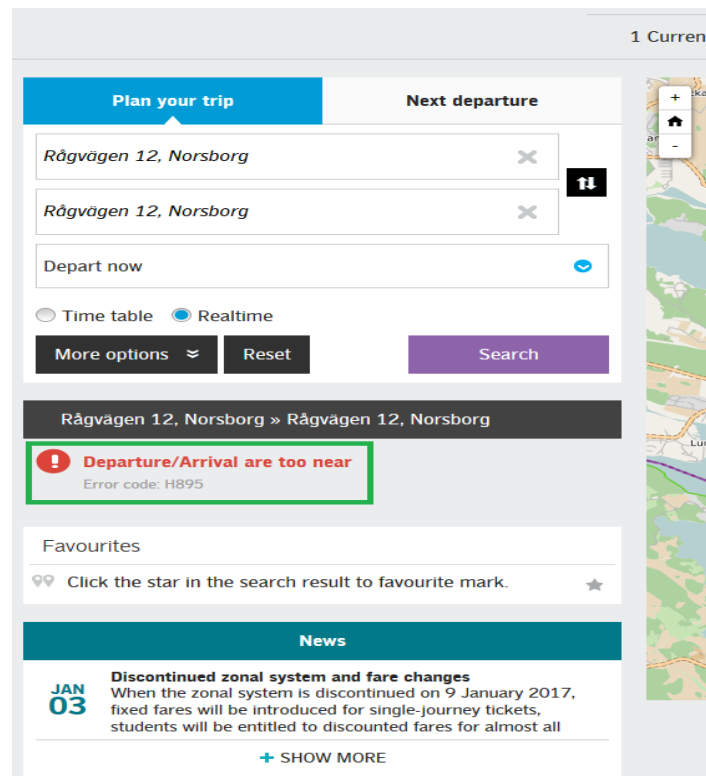
Figure 8: Screenshot of the SL search result with the same inputs in both fields.

- **Problem description**: In the main page, if the user enters their own location (by GPS) as both the start and destination, an error occurs and an error message is displayed (see Figure 8). This error could be prevented if the user was not allowed to use their location in both fields.
- **Heuristic(s) violated**: Error prevention
- **Severity rating**: 1
- **Motivation**: This problem is not very frequent, it only happens when the user makes this specific mistake. An error message helps the user solve the problem but it takes more time than if the mistake was not allowed to happen in the first place.

- **Problem description**: In the bottom left of the main page there is a link to "Travel info" which goes to the "Getting around" page which is already linked in the main page.
- **Heuristic(s) violated**: Consistency and standards.
- **Severity rating**: 1
- **Motivation**: A user who clicks on "Travel info" will probably find what they were looking for in the "Getting around" page, so in that sense the problem is very easily solvable.

3.5 Problems with Severity Rating 0

- **Problem description**: In the main page, if the user enters the same location as both the start and destination, an error message is displayed. This message includes an error code (highlighted with a green marking on figure 3) which is incomprehensible for users and no suggestion on how to recover.
- **Heuristic(s) violated**: Help users recognize, diagnose and recover from errors.
- **Severity rating**: 0
- **Motivation**: This problem is not very frequent, it only happens when the user makes this specific mistake. It could for example occur if the user uses the GPS function and puts their location in both fields. Although the error message does not say much, it provides some hints on what might have gone wrong and how to solve that problem.

4   Conclusion

Several examples of where the English version of the SL site violates Nielsen's heuristics were found by the evaluators. Most problems caused by these violations were rated as major or minor usability problems. Some issues, however, were given severity rating 4 which means that they are so damaging to usability, they should be fixed before the product is released. Since the SL website is already up and running, it is too late for that. The evaluation highly suggests that the site should be modified in order to solve these problems as soon as possible.

References

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Appendix

Peer Review for Group 14

- To get a higher grade, the report is missing a clear and concise description of the Heuristic Evaluation method.
- The 10 heuristics are mentioned but not defined.
- The report is missing recommendations for the problems presented.
- For the highest grade, at least 20 examples of violations to the heuristics should be found and at least two per heuristic. Currently there are fewer.
- There is no description of how severity is rated or what the scale is (that it goes from 0 to 4 and what the different scores represent)
- There is no motivation behind the severity ratings, how did you arrive at them?
- The conclusion says that the site is "fluid"?
- The report perceives the auto-correction on the search field as a heuristic constraint but the constraint serves as a way of preventing the user from misspelling the location's name and lessens the burden on the working memory (fulfilling the "error prevention" and "recognize rather than recall" principles).