Find me a Seat

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MOTIVATION

Nowadays, it is a common problem that university students go to their university buildings in order to study but they cannot find an available seat. It is a known fact that hunderts of employees and students visit universities in Vienna every day and use the seats there. Due to the high demand, some of them have to wait for an uncertain time until they can take advantage of the accessible seating the university has to offer. As a solution to this problem, we considered implementing an android mobile application which displays available seats in order to prevent prolonged waiting periods. This would allow students and employees of university of Vienna to have the possibility to book available seats for a certain period of time. The main aim of the project is to avoid the unnecessary waiting time and to give the students more control of their studying time. To realise our idea, we designed an easy and user-friendly android app, with which our users can easily reserve a seat.

RELATED WORK

In daily life, there are many problems which are known as „The Reservation Problem" and our project is based on this problem. In our research, we came across some solutions implemented for other applications. To understand the problem and their solutions, we analysed four products on their usability and user interface: Flixbus, Oeticket, Booking.com, and Hollywood Megaplex. We evaluated and compared the pros and cons of each product. Based on this analysis we integrated the best parts of every product into our project. Our research revealed that there are no similar products offering a solution to our specific assignment. As opposed to other products, the main goal of our project is that users receive their bookings without any complications. Unlike other solutions, our target group intends to benefit the booking immediately. During our research, we found that other similar products displayed seats visually as well as assigning each seat a unique key, which provides information about the seats current status. This functionality is a major advantage that we chose to implement into our user interface to improve usability. Therefore analysing other products and its designs helped us to make clear the idea and to plan the next steps.

DESIGN

The screenshots below present our final app. As seen in the snapshots, we decided to have a simple design on the app and focus more on having all the needed functionality implemented.

First things first, every user must log in, in order to use the app. This activity (Illustration 1) offers the user to log in using their username and password.

The homepage (Illustration 2) is the first activity shown to the user after logging in. We decided on implementing bottom navigation menu, because it is easy to use (when navigating through different activities) and it was the most convenient for our application. In the homepage the users can also see their upcoming booking as well as their favorite learning places. Both sections are scrollable, in case the user has multiple bookings or favorites.

Something that was very important to us while creating this app, was to make the whole app but most importantly the booking process as easy and understandable to use as possible (and based on the interviews we had with fellow students, we are pretty positive we fulfilled this goal). The pictures 3-5 show how the booking process works.

The first step is choosing a building (Illustration 3). The search/filter option can help the user find the building faster. In addition to the name, we have also shown the address and the number of free learning places in every building.

The next step is choosing the date, time and floor in which you prefer studying (Illustration 4). To make the process even faster and easier, we implemented a

"Schnellbuchung" functionality – the user does not have to go through the different floors to choose a seating place, this will be assigned randomly by the app. In this activity the user can also favorite the building.

However, if the users want to choose their seating place themselves, Illustration 5 presents the last step of the process. The colors we have used to separate the different seats (booked, not booked, chosen) make it easy for the user to have an overview of the floor as well. After clicking on "Buchen", the process is finished and the student has successfully booked a learning place on the chosen building.

The users can see their booking under the "Buchungen" tab (Illustration 6). For every booking, the user can see how much time is left until the booking starts/ ends.

All the user data are shown in the "Profil" tab (Illustration 7).

The different prototypes we created prior to developing the app, but also the interviews with different students, helped us enormously in making the best design choices and feature choices for our app. We added a "Back" Button/Icon on the pages where the navigation menu is not shown. We decided on the bottom navigation menu instead of the hamburger menu (which we had in some prototypes in the beginning stages), as it is clearer and easier for the users to have all the different options the app offers, always shown to them, rather then being hidden inside the hamburger. We made sure to choose an appropriate font and font size for the whole app as well as refrain from irrelevant features and fields/textboxes that were shown in the first prototypes.

Implementation

To create our application, we used Android Studio to launch the app and chose the Bottom Navigation Template to create scaffolding of our app.

The whole app was programmed with java. We used Android 8.0, API version 26 and tested the app on Pixel2, Pixel XL, Nexus 5X and LG V30.

The users of the app were created manually: uni_administrator (Pw: admin), student1 (Pw: student), student2 (Pw: student), student3 (Pw: student)

The only implementation challenge we had was when trying to update the number of the free seats in the building, after seats had been booked. We tried to use the notifyDataSetChanged() method to implement this functionality. After being unsuccessful with that, we decided to take a different approach to the problem. We created a method onResume(), which gets called up/invoked when going back to the buildings or building details tab after a booking. This wa, after the method has been invoked, the activity will refresh and show the updated number of seats.

EVALUATION

In order to detect incomplete and insufficient parts of the android mobile application, we used 4 usability tests and make a questionnaire to 8 persons from different user categories. We first specified the most important usability tasks and as a team we prepared questions for each task. The usability tasks are following:

- Search for a building of your choice, select it and add the selected building to the favourites list.
- Select a building and book any seat with the quick booking function for tomorrow from 2:00 pm to 3:00 pm.
- Select building and area and book a seat.
- Make 2 bookings: one for later and one for now. Open the booking details of these 2 bookings and end / cancel both of them.

Every test user tried to do the task and at the end of each task, we asked questions about this specific task and gather answers from the users. The questionnaire contains yes or no questions and also open-end questions, with which we want to have feedbacks from the user and use them to improve the app.

Results of the Evaluation

After the usability tasks, we obtain user feedbacks about the app and some suggestions for improvement. In general, the test users like the functionality of the app to reserve a seat in the university building and they would use the app in their daily life. But we also get negative feedbacks such ineffective design in booking, not adequate feedback in the app, especially when booking is done, not understandable functionality (e.g. star-icon for the favourites). Some improvement suggestions from the test users are following:

- Adding explanation message or title to numbers representing free places / all places
- Back button
- Better hint for building search (e.g. filter by address or faculty) instead of just filters.
- In the Bookings activity: if there are multiple bookings, when scrolling down, you cannot view the last booking completely
- If the user clicks on book without having chosen a seat, feedback should be given that the seat must be selected first.
- It would be good if the user could filter the buildings by district
- Etc.

As a team we put these ideas a vote to determine which of these suggestions are a must to implement for the application's functionality, quality, and usability.

REFLECTION

We divided the tasks of each project milestone in the team and everyone did their part. But we should highlight that we all helped each other when we have problems in our parts. And For the milestone 4 we separated the tasks as follows:

-Alex: implementation of improvement ideas for the app, preparation one usability task + its questions.

-Hassan: documentation of motivation, related works and preparation one usability task + its questions.

-Jasmina: documentation design, implementation and preparation one usability task + its questions.

-Eylül: documentation evaluation, reflection, conclusion and preparation one usability task + its questions+.

We found this course very interesting and filled with valuable information that will help us in our careers as developer as well. The main thing we have understood through this course is that design is subjective. It all depends on what you are creating, what is the goal of your website/app, what is the audience looking for and the experience you are creating for them. In order to offer a good user interface, you should be able to accept criticism, be flexible and always look for ways to better your designs.

CONCLUSION

The aim of the project was to reserve the seats for the use of the university students and members. Before implementing our ideas, we first analysed the problems of similar projects, which we may experience during the project. We defined our users and analysed the system problems through use cases. Then, all team members designed a low-fidelity prototype and made interviews to understand users' expectations. Finally, we started to implement the project. What we learned is that we should give importance to users' experiences and be more open to user feedback. We believe that having interviews in intervals and using their feedback can help us to improve our app and adapt it to users' demands.

ACKNOWLEDGMENTS

We would like to thank all volunteers who participated in our studies and provide valuable comments and helpful suggestions

Illustration 1 Login

Illustration 2 Home

Illustration 3 Building

Illustration 4 Building Details

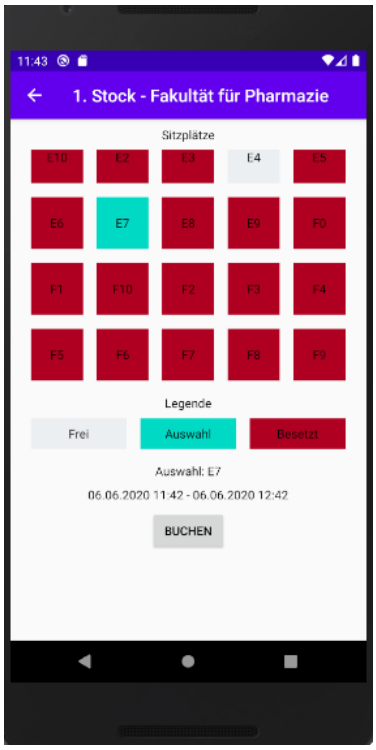

Illustration 5 Seats

Illustration 6 Booking Details

Illustration 7 Profile

REFERENCES

No References