0HM110 User Experience Design (Design Track A)
Final Report: Prototype and Test Iterations
The Experience of Meeting Faculty Members Inside the IPO Building

Group   4
    Luigi Altamirano (1279688)
    Raghav Mohan (0804926)
    Kevin (Y.Y.K.) Tang (0872898)
    Liza (L.V.M.) Verhaert (1260227)

Report Overview

In this report, you will first find a description of the initial design (used in iteration 1). Next, an overview of the used research methods is provided.

For each iteration an ideation is provided, followed by the analysis of this ideation. A final design is proposed at the end of this report.

Along with this report, a data repository is attached. The structure of the repository is explained in appendix A and B. Appendix A describes the file structure of the research data and appendix B describes the prototypes that were used to test the design ideas.

Initial Design

The design for the first iteration is based on the findings from exploratory user research.

Walk-In Hours

Setting up walk-in hours for faculty members is proposed. We define walk-in hour as a standard time slot every week where the student can freely come by the office to ask short questions without scheduling an appointment. The frequency can vary on a yearly or quartile basis.

TU/e Website

The TU/e faculty member web page is edited to provide additional availability information:
- Walk-in hours: The website shows the walk-in hours for a given faculty member page. There was no mention of the case where faculty member don't set up walk-in hours.
- Availability status: This shows the current availability of the faculty member, based on the commonly used Outlook Calendar. 'Available until …' in green, 'Unavailable until …' in red.
- 'Schedule meeting' link: A link that sends the user directly to the Outlook Calendar Scheduling Assistant.

Automated Lightboard

The lights on the light board are automatically influenced by the faculty member's Outlook Calendar.
- Red lights means 'busy', based on Outlook Calendar status.
- Green lights means 'available', based on no meetings being scheduled in the Outlook Calendar.
- Lights turned off mean that the faculty member is 'away', based on their Outlook status.

Research Methods (Investigate)

Since two user groups (students and faculty members) were influenced by these changes, different approaches for measuring the reactions were used.

Qualitative Survey for Faculty Members

For iteration 1 and 2, a qualitative survey was made using Google Forms. This survey included edited screenshots from the TU/e faculty member website and edited pictures from the lightboard, to serve as a static prototype. We chose a survey because our user research showed that faculty members have limited time and a full schedule. This way, a faculty member could schedule filling in the survey (that takes less time than an interview) whenever it suited them.

All faculty members with an office in the IPO building were alphabetically divided into three groups of 30 to 35 people. The first group was asked to participate in the first iteration, the second group in the second iteration, both by email. Since the qualitative survey provided a low response rate (6 in the first iteration, 5 in the second) and a lot of non-meaningful information, we decided to use interviews for the third iteration.

Interview for Faculty Members

For the third (and last) iteration, an interview was conducted with four faculty members. We talked to two PhD candidates and two associate professors, since we noticed in our first research that there were differences between these groups. The interviews lasted approximately 15 to 25 minutes. The interviewers recorded audio and wrote field notes.

During the interview, paper examples were used to guide faculty members through our proposed design. A description of the design is found in 'Ideate - Iteration 3'.

Think Aloud and Follow-up Interview for Students

Due to time constraints, only the second and third iteration included students from TU/e. The student participants were recruited from the IPO main hallway, at the Intermate room and through social connections of the researchers.

Students were seated behind a laptop in one of the study rooms and given four scenarios in which they needed to meet with a fictive faculty member. In iteration 2 they were presented with two prototypes (of the lightboard and the application as described in 'Ideate - Iteration 2') while iteration 3 provided one prototype (the application as described in 'Ideate - Iteration 3'). The students were asked a few questions about their experience through a follow up interview. During the entire procedure, audio was recorded, a screen capture of their use of the wireframe prototype was made, and field notes were written down. There were 3 participants for the second iteration, 4 participants for the third iteration.

By using scenarios and allowing students to "play" with our prototypes we feel that the student uses the system and truly experiences it. Think aloud also provided us with insightful information on the actions that student took. By means of the informal interview afterwards, we could ask additional information about the observations we made during the prototype testing.

Iteration 1

Analyze

In the survey, we included a few quantitative questions in order to better investigate on the current usage of Outlook Calendar. We directly analyzed the data from the survey because each survey question corresponded to one area of interest, and with the amount of responses we have, every response was valuable. Therefore, we didn't apply extensive analysis methods. For each question, data that shared a similar meaning (or shared theme) across different responses and the opinions that were supported with arguments and reasonings, were taken into account.

Outlook Calendar

All respondents reported that their agenda was never overbooked, but that their Outlook Calendar doesn't accurately represent their availability. Only one out of six respondents stated that their Calendar was up-to-date and students can rely on it for making an appointment.

Walk-In Hours

In general, the responses were positive. Only one of the faculty members explicitly mentioned that they think scheduling a meeting is more efficient. They also expressed a desire (if the walk-in hours are going to be implemented) to be able to plan walk-in hours dynamically, so that it can vary every week (at least one hour per week). Another problem that was mentioned, was that such an hour might not be desirable for faculty members who share their office.

TU/e website

There were two major issues brought up in this criteria. The first one was related to the problems discussed in the Outlook Calendar, in which the calendar did not accurately show availability. The second problem was a privacy issue: they reported they didn't want to show private information about their availability on a public website.

Lightboard

There was no dominant preference in this part of the design. As also mentioned above, a problem is that the system shouldn't be based on their Outlook Calendar.

As an example, an empty timeslot in the Calendar didn't always correspond to 'Available'. The status should also be based on the location: the light status shouldn't be on if the faculty member is at home. Nevertheless, the idea of an automated light board is perceived neutral or positive by the majority of the responders, if the information on the lightboard is correct.
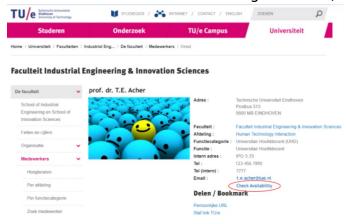
Iteration 2

Ideate

From the data of iteration 1, we have collected results conflicting with the user research. Therefore, we are rephrasing the questions related to overbooking and usage of Outlook Calendar and its Scheduling Assistant.

Walk-In Hours

Since the result from iteration 1 shows that faculty members are generally positive about setting up walk-in hours, we are keeping this part of the design. With their desire to schedule the walk-in hours dynamically, in this iteration, we are testing two different types of flexible scheduling to better investigate on the direction of the design. The first option is based on the Outlook Calendar, the faculty members can choose the walk-in hour timeslot in the application; the second option is planning a recurrent walk-in hour for a quartile.

TU/e website

Our prototype still relies on the Outlook Calendar, because there are conflicts between the data from iteration 1 and our prior study. We would like to have additional information to either support or abandon the use of Outlook Calendar in our system. Regarding the privacy issue reported in iteration 1, we planned on making it accessible only after logging in to the TU/e system (similar to accessing Canvas). By clicking on the 'Check availability' link in the figure (red circle), it would link to the user's log-in page. After successfully logging in, the availability and the walk-in hours will be shown in the same location as the 'Check availability' link. We will also be testing a low fidelity version of this website with students in a smartphone interface to see if the design is intuitive for them to use, by only focusing on the new functions in our prototype (checking availability, walk-in hours, and a direct link to the Scheduling Assistant).

Similar to the part about the TU/e website, our design is still based on the Outlook Calendar primarily. With faculty members reporting that their Calendar wasn't accurate enough and having only three different statuses ('available' (green), 'busy' (red) or 'away' (off)) can provide incorrect information. For example, an empty slot in the Calendar doesn't always correspond to 'available' (green), even if the faculty member is in the IPO building, was mentioned in the survey. Therefore, we are proposing a next version of the Lightboard.

- A red light means 'busy', based on the Outlook Calendar status.
- A green light means 'walk-in hour'.
- A yellow light means 'inside the IPO building', based on the faculty member being logged in to the TU/e network (in the IPO building), but outside of 'busy' or 'walk-in hour' times.
- Lights turned off mean that the faculty member is 'away', based on not being logged in to the TU/e network.

Analyze

For iteration 2, each of us analyzed the data and provide various design solution which in many cases were different or contradictory. Case by case we justified our position, making use of the raw data collected when necessary. We opted not to do a detailed analysis since we wanted to go back and forth between analysis and ideation for this iteration. The diversity of our individual opinions and our willingness to defend them helped us explore all the options and avoid groupthink. The analysis follows a similar format to the first iteration.

Lightboard

All the students preferred to use the website over the lightboard. One of them expressed that it was "pretty obsolete". We realized that students thought of the lightboard as an unattractive nuisance in a such strong way that modernizing did not make sense. One student expressed that he didn't use the lightboard because he was colorblind and didn't feel comfortable with only seeing colors to signal information. Since we were working with color, we realized that accessibility features would need to be built into our interfaces. We concluded that it would not be possible to make our modified lightboard design color blind friendly unless it was completely redesigned.

Walk-In Hours and Scheduler

We realized that the length and importance of the planned interaction with a faculty member determined whether students decided to go to a walk-in hour or schedule a meeting (even when a walk-in hour was available). We also realized there was a limitation in our "meeting scheduler". Firstly, each meeting request would still

require a reply from the teacher to accept it. With three out of five teachers reporting that they didn't have time to respond to all student communications within the same day, we realized that our solution did not offer anything special when compared to the usual way of conducting these interactions: sending an email. Secondly, four out of five teachers reported not to use a tool to schedule a meeting directly based on the other person calendar. We concluded that both students and faculty members were more comfortable with agreeing on a time and date before sending the meeting request when planning meetings with each other. On the idea of implementing walk-in hours, all faculty members expressed their approval of the idea. However, they all preferred having the flexibility to schedule them at different times each week if needed. We concluded that they are comfortable and have the time for allocating time for walk-in hour to help students on weekly basis for quick questions, but only if they are in complete control of when to schedule them.

Availability

We concluded that most faculty members would not feel comfortable with their availability being automatically determined by their outlook agenda. One mentioned that his calendar was not a reliable indicator of his available and busy times, and reported using another tool (Lync) for signaling availability.

Iteration 3

Ideate

Walk-In Hours

Since the result from iteration 2 shows that faculty members are generally positive about setting up walk-in hours, we are keeping this part of the design. On iteration 2 we confirmed that faculty members prefer to have total flexibility on the scheduling of their walk-in hours. We chose Outlook Calendar as the interface for faculty members to configure their walk-in hours. We proposed "#walkin" as an easy to remember identifier for teachers to use when configuring walk-in hours in their calendar. We elaborate a prototype for faculty members to interact with. This prototype includes a section where faculty members can review their scheduled walk-in hours.

TU/e website

In iteration 2 we encountered a student who expressed difficulty distinguishing colors while using our prototypes, due to a medical condition. Thus we included a colorblind mode on the wireframe prototype for students interact with. The information relating to availability, which is solely presented using color coding (red or green), now appears with a description next to it for easier understanding. We reduced the number of availability status for faculty members from three to two. Based on the findings from iteration 2 analysis, we decide to remove the capability of scheduling meetings on a proposed timeslot directly from the website. However, we leave the functionality to automatically send an email to the faculty member by clicking on his/her email.

Availability

We created a paper prototype for the faculty members to configure their availability status for students to see online. We reduce the three previous status options to two: Available (green), Not Available (Red), and no information available (no status selected). The paper prototype is not platform specific. Instead, we show the faculty members how the concept works and we probe whether they prefer it to be designed as a web application, or whether they prefer physical buttons in their office.

Lightboard

Iteration 2 provided sufficient evidence for us to decide that the lightboard had to be excluded from the scope of our design.

Analyze

In iteration 3, unfortunately three screencasts were lost, so for these participants, the backup audio files were used. Since the sample size and the data for each iteration were low, we directly analyzed data from the raw audio recordings and field notes (similar to previous iterations). Due to time constraints, this method also allowed us to rapidly iterate our prototypes. From the audio recordings, we transcribed relevant responses and directly analyzed the data. Again, we decided not to use extensive analyses methods (such as thematic analysis and affinity diagrams) since the sample size was low and the data was easy to directly categorize.

To provide useful insights, each feature of our current prototype is analyzed while taking into account students and faculty members.

Walk-In Hours

Based on the interviews, all faculty members were positive about walk-in hours. Some faculty members preferred to plan recurrent walk-in hours while others wanted flexibility. Our design provides a flexible schedule with the option to plan recurrent meetings, since we are catering to both user groups. While one PhD candidate stated that a disadvantage of walk-in hours is that he can't focus on large tasks during walk-in hours, another faculty member mentioned that it is their duty to signal availability to students. By allowing each faculty member to flexibly plan how much time they would like to dedicate to walk-in hours, both needs are met. Both faculty members and students prefer to have general walk-in hours as opposed to course-specific walk-in hours. Faculty members don't teach enough courses for the second option and students use the scheduled course contact hours to ask questions thus all needs are already being met.

Students preferred to schedule the difficult questions either via email or by letting the faculty members know before going to the walk-in. All four faculty members stated that they don't see the use of students letting them know before entering a walk-in hour. Time seems to be a key factor for walk-in hours. Since longer questions are scheduled via email this implies that walk-in hours will be for situations regarding quick questions.

Availability

Half of the students relied more on walk-in hours and sending emails while the other half used availability regardless of scenarios. This implies that the concept of being currently available is unclear for students. The usage of the green button was also inconsistent among faculty members. The first faculty member never uses it, while the second faculty member feared that he will forget to push the button, and the third faculty member did not understand the concept.

While faculty members tested availability using the red and green buttons, students tested the interface based on context-specific scenarios. For students, when the scenario with no information on the faculty member was presented, they either

decided to knock on the office door or send an email. This implies that the scenario varies, based on how each student is used to acting. The color blind mode option felt like an unnecessary extra step for all students. One student stated that he would prefer to have all information on one page which is in fact an important universal design principle.

Finally, for all students the busy button was a clear indication to not enter the office, implying that it will also help faculty members. Faculty members stated that they might not press or forget to press the button if it's not in an important location, but they also feel a need for this button after moving to a new building where office facilities might be shared. This too is the reason that faculty members prefer to have such buttons in an application interface. In the new building, this button will be personal and allows for mobility which might cater to important future needs.

Integration with Current TU/e Tools

To signal availability and integrate this into the existing systems, our proposition was to use Outlook to schedule walk-in hours and to provide a link to our interface on the staff page. Faculty members are positive about adding a walk-in hour feature to the Outlook Calendar. As mentioned before, students appreciate that all availability information is shown on one page, but for faculty members, the buttons need to be placed carefully for frequent usage.

Both PhD candidates remarked that integrating the buttons inside Lync is a viable option. Lync is an instant messaging enterprise service that faculty members already use to communicate and signal general availability. Unfortunately, two faculty members state that the status on Lync is often inaccurate. From previous iterations and exploratory research we also found that faculty members often use Outlook to check appointments and schedules, so adding the button here might be another option.

Finally, the idea of integrating a virtual chat assistant was not positively met by faculty members since it removes face-to-face contact. Students found that such an interface would be awkward and uncomfortable, so this would not integrate well with existing facilities.

Final Design (Ideate)

The analyses from the previous sections provided us with valuable insights. We use these insights to propose our final design.

Walk-In Hours

To promote more student-faculty interaction, the need for walk-in hours is clearly evident from both sides. It provides students with an opportunity to ask quick and urgent questions. Faculty members feel that it is their duty to signal availability, especially with the growing number of students in the university. Walk in hours should be general and flexible to suit the faculty members' needs. Faculty members can book walk-in hours on their Outlook Calendar. To book a walk-in hour, they add '#walkin' to the header of the appointment. The '#walkin' header will be recognized and the appointment will be visible to students via the availability interface. There is also the option to plan recurrent walk-in hours to cater to long-term planners. Students look up the staff page (via a search engine) where a clickable button with the title 'Check availability' is added. To prevent making the information publicly accessible, students need to enter their credentials before gaining access to the 'availability' interface. Here the faculty members date, day and time of walk-in can be seen.

Availability

Signaling that a faculty member is currently available seems unviable and will be removed from the final design. The availability signal causes uncertainty from the students' perspective and inconsistent usage from the faculty member's perspective. Faculty staff state that they will never use walk-in moments in such an ad-hoc manner. Furthermore, students requiring urgent questions that are lesser than 10 minutes tend to directly walk by the faculty member's office, but by removing the green availability signal, we feel that students will do the same for walk-in hours. For these reasons, we argue that the green 'currently available' in fact makes user experience worse.

The red 'busy' button however is very different. By making the red 'busy' light found in front of each door into digital broadcast, it will save students travel time and allow faculty members to focus on tasks they do not wish to be interrupted from. The red 'busy' button will not require frequent usage, as it is similar to the red switch found near the office door, so current signaling mechanisms, such as closed doors, still work for 'medium business'. The busy button also provides a very nice signaling mechanism for the future, when faculty members will move to the new building. For students the busy button will still be found on the availability interface. For faculty members this is discussed in the next section.

Finally, for students, the color blind mode will be removed from the main page and a universal design concept is proposed. The color key will be removed and the

availability text ('busy' or 'no information') will be provided next to the color field (red or white).

Integration with Current TU/e Tools

One of the faculty members stated that combining our concept with existing technology is a positive innovation step, since it already uses tools that faculty members are accustomed to. We agree with this, since it makes the adoption rate higher and usage easier. The current walk-in hour scheduling system will be incorporated into the Outlook Calendar. The 'busy' button will be either added to Microsoft Lync or to the Outlook Calendar interface. To test which one is more beneficial, further testing is advised. From the students' side, a link to the 'availability' interface will be on the staff page. It is very intuitive for students to first go to the staff page when digitally looking for a faculty member. Finally, one student remarked that it is nice to directly integrate the Outlook Email feature in our interface. Although our design did not initially have this planned, it is a coincidental integration feature that is intuitive for students. Therefore, we propose to add an integrated mailing feature to easily plan appointments and ask questions.

Limitations and Future Research

The current design might improve the overall experience of student-faculty interaction but it is not possible to cater towards all users. When faculty members were asked if they would adopt such a tool in real life, there were mixed responses. One faculty member (an associate professor) commented that walk-in hours might encourage students to ask unnecessary questions. Another one of the faculty members correctly observed that real adoption rate of walk-in hours will differ per faculty member. One faculty member states that they will use it more during exam periods, since they get more questions around that time, while another faculty member states that they prefer to have recurrent walk-in hours to split the load throughout periods. For future studies, it might be beneficial to capture the experience of smaller faculty member groups and focus the design to meet one particular subgroup.

From the students' perspective, if the email response rate for faculty members was high, students opted to send an email regardless of other factors. The response rate is a simulation of "word of mouth" response rates, based on how much is known about the faculty member, and goes beyond the scope of this design.

Nevertheless, it is important to note that each experience is unique. So for our current design, truly experiencing such a system using a high fidelity prototype might provide more insight.

Appendix A - Research Data

All data can be found in the data archive. The purpose of this readme is to describe what is contained within each folder.

Field Notes (main folder)

This folder contains data that is not collected via digital means (for example, hand-written notes).

For iteration 2 and 3 some data was collected in the form of handwritten notes. Each observer has their own notes during the observation, and later on the same day, we typed our full observation from the brief notes we made. The resulting field notes from each observer can be found in the following structure: *Iteration X Y Z*. Where X = iteration number, Y = student or faculty member and Z = participant number. After each participant the researcher who took the respective field notes can be found.

Materials (main folder)

This folder contains the informed consent forms, interview guides, overview and accessible (and editable) link to the Google Form, and flyers.

Informed consent forms

There are two versions of the consent form, one for the faculty staff (*Informed_consent_faculty*), and the other one for students (*Informed_consent_student*). The only difference between the two consent forms is that we asked for permission to do screencast recordings for students.

Interview Guide

We conducted semi-structured interviews with faculty members for iteration 3 (see *Iteration 3 Faculty Member - Interview Guide*).

Email to Faculty Members

For iteration 1 and 2 we sent an email requesting that faculty members fill out our survey (see *Email for survey faculty members*).

Signed Informed Consent Form (subfolder)

This folder contains all the signed informed consents of student and faculty members.

Raw Data (main folder)

This folder contains all the raw data directly collected via electronic devices (audio recordings, screencasts, excel survey results).

Student (subfolder)

All student prototype testing data is stored within this folder.

Audio Backup (subsubfolder)

Here backup audio for each student test is added in the file format *Iteration X Participant Y* where X = iteration number and Y = participant number.

Screencasts (subsubfolder)

Here screencast and audio for each student test is added in the file format *Iteration X Participant Y* where X = iteration number and Y = participant number.

Faculty Members (subfolder)

All faculty member surveys and interviews are stored within this folder.

Interviews (subsubfolder)

Here interviews for each faculty member from iteration 3 is added in the file format *Participant X* where X = participant number.

Surveys (subsubfolder)

Here surveys from each iteration are added in the file format *Iteration X* where X = iteration number.

Appendix B - Prototypes

Similar to appendix A, this appendix functions as a readme that provides more information on what is contained inside the prototypes folder.

Iteration 1 (subfolder)

For iteration 1 we sent a survey to faculty members. A link to the editable survey can be found in the file format *Link to Survey.*

Iteration 2 (subfolder)

For iteration 2 we also sent a survey to faculty members. A link to the editable survey can be found in the file format *Link to Survey.*
We also tested a lightboard prototype for iteration 2 that can be found in file *Lightboard prototype.*
Finally we used a trial version of the software Balsamiq Wireframes to create a low fidelity prototype to test on students. To test this prototype, you need to first download the Chrome extension: https://chrome.google.com/webstore/detail/balsamiq-wireframes-free/imbfadckkgblfbkinjejdeobpfbcopgb/related
Using Google Drive, we were able to create a Balsamiq Wireframe in the *Student Prototype.* A screencast of this prototype can also be found in appendix A.

Iteration 3 (subfolder)

For iteration 3 we conducted interviews with faculty members with a guided cutout paper example. The cutout can be found in the file *Faculty Member Prototype*.
To test the student prototype we made use of Balsamiq Wireframes once more which can be found in *Student Prototype*. A screencast of this prototype can also be found in appendix A.