Need-Finding

Table of Contents

1.Introduction

To begin with, a crucial step in developing a solution is identifying who will be using it and who will ever have to come across it (stakeholders). The stakeholders we identified for this case have been the tenants and the staff of the student residence, with the staff consisting of the Manager and the Customer Service Advisor.

In order to achieve an understanding of stakeholder needs and form a list of functional, non-functional, and usability/user experience requirements, the following methods were used:

- **Interviews**
- **Questionnaire**
- **Direct observations**

2.Methods

2.1.Direct observations

As part of our problem exploration, we conducted direct observation at Lumis Student Accommodation, focusing on how tenants book and use communal rooms (the gaming room, cinema room, and events lounge).

The student observer spent time in these shared spaces and monitored how the booking process works in a real setting. This meant watching how tenants request access to rooms, how bookings are organized (informally via a WhatsApp group in this case), and how management is involved (or not involved) in overseeing room usage. By observing actual interactions and behaviors on site, such as the environment, the tools used, and the challenges tenants faced, the details of the booking system became more clear. This context will help as a basis for other methods of research.

2.2.Questionnaire

Even though our preliminary observations showed us a clear picture of the challenges at Lumis, we still wanted to determine whether these problems affected everyone, not just the individuals we had direct conversations with. We used Google Forms to develop an online survey in order to accomplish this. The primary objective was to ascertain how a greater number of residents actually use the common areas, how they feel about the existing regulations, and what particular issues they deal with on a regular basis. We wanted to collect actual data to support our narrative.

Ethical Considerations and Data Privacy

We were aware that students could be unwilling to share the whole truth because we are dealing with problems like damaged furniture and disputes with administration. We ensured that the survey was totally anonymous in order to address this. No personal information, like names or room numbers, was requested. Additionally, we asked a direct "consent" question right at the start (Appendix A1). Participants were able to be open about their complaints since they knew their responses were secure and would only be utilized for this research.

Questionnaire Design and Structure

Google Forms was used in the survey's construction to enable automatic data gathering and easy distribution. In order to optimize completion rates, it was made to be brief, taking around five minutes to complete. In order to identify certain pain areas in the present user experience, the questionnaire's form followed a logical flow:

1. **Usage:** The initial query inquired whether users make use of the common areas. If the respondent answered “No”, they were asked whether concerns such as messiness or overcrowding were the underlying causes.
2. **The Booking Process:** Questionnaire participants were queried regarding their current procedures for room reservation and whether they encountered any issues, such as duplicate bookings or deleted messages, potentially due to a malfunction within the WhatsApp system.

3. **Conflict:** Respondents were asked about their emotions to better understand the nature of the tension between staff and students. Enquiries related to observations or conflict participation concerning common areas, such as disagreements over cleaning or property damage, were also made.
4. **Solution:** Finally, users were asked for their opinions and sentiments regarding potential solutions to the issue. Specific inquiries, such as verifying room availability with minimal effort and an open suggestion box, were also incorporated to better understand the users requirements.

2.3.Interviews

The interviews were carried out using a semi-structured approach. The use of semi-structured interviews allows to cover specific, pre-determined topics (like current workflows and pain points) while also giving flexibility to follow up on interesting or unexpected points brought up by the participants. This balance ensures that key information for requirement development is collected (for example, the need for digital access control and photo evidence) while still allowing for a deep understanding of the user experience and staff difficulties.

Ethical Considerations and Data Privacy

All interviewees signed a consent form agreeing to be recorded. The full official documents can be found in the Appendix. In summary, the recording of the interviews will be transcribed and stored (transcription-only), and only shared and used for the purpose of this research.

Staff

- **Objective:** To gain a comprehensive understanding of the administrative and operational challenges regarding shared space management.
- **Focus Areas:** Identifying current workflow inefficiencies, maintenance pain points, accountability issues, and the staff's expectations for a digital solution.

- **Participants:** A Customer Service Advisor and the Residence Manager.

Tenants

- **Objective:** To gain an understanding of the various behaviors and challenges faced by the tenants when accessing shared spaces.
- **Focus Areas:** Identifying current booking issues, conflicts that emerge, and tenant's preferences for the final solution.
- **Participants:** Tenants in Lumis Living.

3.Results

3.4.Direct Observations

The direct observation at Lumis Student Accommodation validated and contextualized several findings from the interviews, particularly concerning the informal management of the Cinema Room and Gaming Room.

Giving Context to the Current Informal Workflow

- **Reliance on a Single Platform:** The observation confirmed that the WhatsApp group is the single, default mechanism for scheduling, communication, and conflict resolution among tenants for the Cinema and Gaming Rooms. This system is highly dependent on the group's active members and is prone to being overlooked by residents who are not constantly monitoring the chat.
- **Booking Visibility and Conflict:** The observation of the group chat showed that booking requests are usually simple text messages (e.g., "Cinema Room tonight at 8"), which quickly get lost by other social messages. There is no centralized calendar or clear visual schedule, leading to tenants having to scroll through long message histories to check availability, which increases the chance of double bookings or misunderstandings.
- **Access Control (Lack Thereof):** The physical security for the Cinema Room and Gaming Room was observed to be non-existent or easily ignored, confirming

the staff's concern about a lack of accountability. Access is open, meaning anyone can go in, which contributes directly to the difficulty in assigning responsibility for later misuse or damage.

Physical Environment and Misuse

- **Observed State of Rooms:** The observer noted evidence of the "dirt" and "misuse" cited by the staff. Specifically, the Gaming Room was observed with uncleaned spills and discarded food packaging left on tables, strongly supporting the need for a mechanism to enforce cleanliness and accountability after use.
- **Tool Usage:** The observation showed tenants spending considerable time trying to connect to and configure communal equipment (e.g., setting up gaming consoles or connecting a laptop to the cinema projector), indicating a potential need for clearer instructions or a simpler, more standardized setup process within a digital solution.

3.2.Questionnaire

Conducted through the questionnaire, primary research covered the interaction of Lumis Student Accommodation (Lumis) with the shared spaces. The research showed the most used procedures to book shared spaces, issues in their implementation and the general level of satisfaction with the experience.

Current Workflow:

- **Non-standardised Procedure**: The research clearly indicates that the main procedure for booking the room in Lumis is through writing in the WhatsApp group (Appendix A4). However, the following more detailed question indicates that 27% of the tenants are unsure about the way to make a reservation and 72% experienced difficulties with tracking the availability of the space (Appendix A6).
- **Reliance Only on People:** The lack of an automated system to track reservations puts the responsibility to follow a large amount of data about the

people, reservations, time and date in the WhatsApp chat on the tenants. Research indicates that this approach led to 61% of responders experiencing problems with overbooking (Appendix 6A), 52% experienced problems accessing shared space (Appendix A12), 33% responded that the conflict between the management and the tenants was connected to the loss of track of the keys from a shared space (Appendix A8).

Conflicts and Atmosphere:

- **Blended Responsibility and Conflicts:** Questionnaire reviewed the lack of transparency and traceability in who and when accessed to shared spaces. 72% of responders indicated that they either observed or were a part of the conflict with residency management (Appendix A7). The majority indicated the main source of conflicts to be: shared space was left dirty (50%), the keys were lost (33.3%), something was broken in the space(22%).

3.3.Staff Interviews

The staff interviews, conducted with the Residence Manager and a Customer Service Advisor, aimed to gather primary data on the administrative and operational challenges in managing communal spaces. Key findings highlighted the current workflow and inefficiencies from an operational standpoint, pain points, and desired solutions and requirements.

Current Workflow and Inefficiencies

The interviews revealed a fragmented management system. Currently, only the "Events Lounge" is officially managed by staff through a physical key handover process. Conversely, the Cinema Room and Gaming Room are "managed" informally by the tenants themselves via a WhatsApp group. The staff highlighted that this informal method is not officially recognized or monitored by Lumis management, leading to a lack of enforced rules. A significant operational bottleneck identified is the reliance on physical keys. The management noted that keys frequently go missing or are not returned on time, forcing staff to "run after" tenants to retrieve them.

Identified Pain Points

Analysis of the interviews highlighted "dirt" and "misuse" as the primary sources of problems.

- **Hygiene and Damages:** Staff reported that rooms are frequently left dirty, with trash (such as fast food bags) left behind, and damage caused to furniture and curtains.
- **Lack of Accountability:** A critical issue is the inability to determine responsibility for damages. For open spaces like the Cinema Room, there is no record of who was present during specific times, making it impossible to hold individuals accountable for "disarray and damages". Even for the keyed Events Lounge, staff noted challenges in proving who caused specific damage if it is not identified immediately upon key return.
- **Double Bookings:** While the staff is not always aware of the specific conflicts in the student-run WhatsApp group, they acknowledge that without a centralized system, overlapping requests occur, and high demand (particularly during exam periods) forces them to manually deny requests.

Desired Solutions and Requirements

Both stakeholders expressed a strong preference for a digital transformation of the booking process. The Customer Service Advisor suggested a "combined app" that integrates room booking with other residence services such as the laundry app.

3.4.Tenant Interviews

The multiple Tenant interviews conducted aimed to gather primary evidence of the current procedures taken to book existing shared spaces as well as the issues and conflicts faced. The preferences of the tenants and the features required were also explored with the result highlighting desired changes through the current workflow, identified pain points, desired features to improve the current state.

Current Workflow and Inefficiencies

The current workflow contains many issues and many tenants complained about it where you book a specific room by sending a message in the building's shared group chat. The issue with this is that there is no way of finding out whether a slot is available or not unless the tenant scrolls up and filters the messages. Some tenants also rely on others to respond to their messages and tell them the chat is booked leading to multiple altercations on who booked the space first. Another method to book the room is with the receptionist where he would keep count of who has the room but the problem with this method is that there is no way of finding out if the room is booked without going down and asking, as well as there being no type of coordination between the two methods leading to clashes in the bookings and arguments over who is correct.

Identified Pain Points

There are multiple identified pain points that are shared between tenants: no accountability for the cleanliness of the rooms and their - tenants would leave garbage and destroy furniture - the rooms need a key which is kept by the booker however a lot of the time there is no record or accountability of who has the key or the booker didn't return the key and tenants have to go through the trouble of looking for the person. Another issue mentioned by the interviewees is how long the room is being booked for where tenants would go to book it for a week and only use it when they want, blocking other tenants from accessing these spaces.

Desired Solutions and Requirements

Some of the desired implementations desired by the tenants was the ability to have a calendar type view to see all the available timings, setting limitations on how many hours can be booked by a single person, notifications for when cancellations occur, the account to require a room number so accountability would be provided, as well as a simple interface to navigate the different rooms and book the times.

4.Requirement Development

Requirements are separated for the different types of stakeholders as each has different particular needs for the system, even though some might be shared between each other.

4.1. Shared Requirements

Functional Requirements (FR)

- **FR1 (Real-Time booking).** The system shall provide real-time availability visibility and synchronize the schedule for all users to prevent conflicting reservations.
- **FR2 (Photo evidence and room condition).** The system shall allow users to capture and upload real-time photos of the space to track room condition and liability.
- **FR3 (Issue reporting).** The system shall provide a mechanism for users to report issues, such as cleanliness or maintenance needs, directly to management.

Non-Functional Requirements (NFR)

- **NFR1 (Accountability).** The system shall verify the user's identity and link every session to a specific tenant profile for accountability.
- **NFR2 (Ease of use).** The system interface shall be simple and intuitive to ensure navigation without errors for users of varying technical skills.

4.2. Staff Requirements

Functional Requirements (FR)

- **FR4 (Time limits).** The system shall enforce configurable booking limits (e.g., maximum hours per day) to ensure fair usage.
- **FR (Terms and conditions).** The system shall require users to digitally accept terms and conditions before finalizing a booking.

Non-Functional Requirements (NFR)

- **NFR3 (Languages).** The system shall support multiple languages, specifically English and German.
- **NFR4 (Admin security).** Only users with administrative status shall be able to modify or cancel bookings made by third parties.

4.3. Tenant Requirements

Functional Requirements (FR)

- **FR7 (Open to company).** The system shall allow users to toggle an "open to company" status on their booking to encourage socialization.
- **FR8 (Show amount of people).** The system shall track and display the current number of people occupying a bookable space.
- **FR9 (Key transfer confirmation).** The system shall provide a function to confirm the transfer of physical keys between users.

Non-Functional Requirements (NFR)

- **NFR5 (Multi-device accessibility).** The system shall be fully functional and accessible on both mobile devices and personal computers.

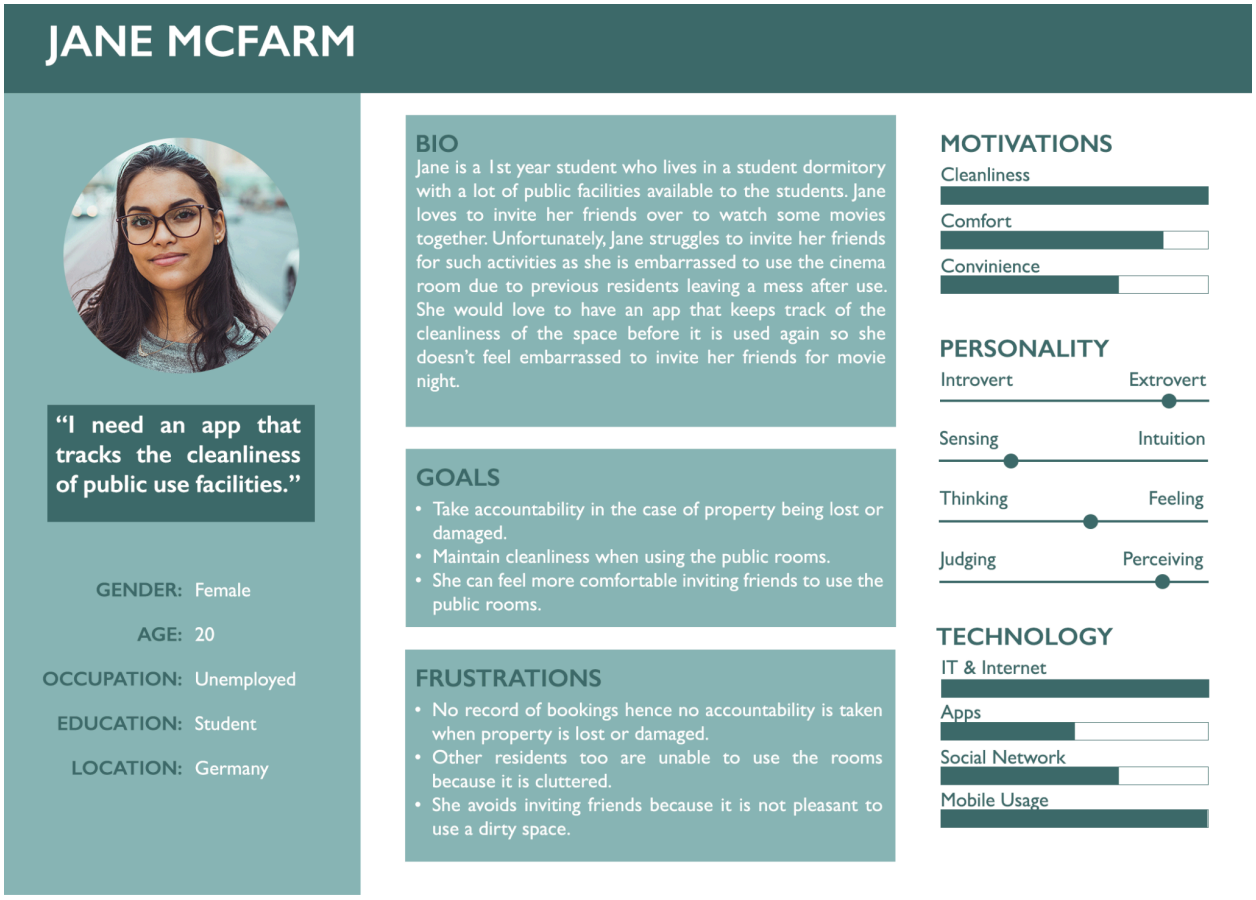
Usability/ User experience requirements(UXR)

- **UXR1: (UI simplicity).** The user interface shall be simple to navigate.
- **UXR2 (Calendar view).** The booking shall be displayed in a daily calendar view.

5.Analysis of the collected requirements

We performed a deep analysis utilizing Personas, Scenarios, and Hierarchical Task Analysis (HTA) to confirm the functional and non-functional criteria previously mentioned. This makes sure that each one of the system's requirements works for a specific user objective.

5.1.Persona 1



Requirements

- **FR1 (Real-Time booking)**
- **FR2 (Photo evidence and room condition)**
- **NFR1 (Accountability)**
- **NFR5 (Multi-device accessibility)**

Task Analysis

Scenario. Jane wants to host a movie night with her friends. But she is worried that when they get there, the room might be dirty. In order to avoid the shame of a messy space, she uses the new booking system to confirm the room's current status and reserves a clean slot before going to the room or bringing her guests.

Steps**.** User Goal: View current cleanliness status of the cinema room

1 Log into new booking system

- 1.1 Enter Username: Email/Username/Phone Number
- 1.2 Enter Password
- 1.3 Press “Log in” button

2 Display Dashboard, go into Timetable

- 2.1 Select “Timetable”

3 Selecting desired filters

- 3.1 Select Room Type: Cinema Room
- 3.2 Select Current Date
- 3.3 Select Current Time
- 3.4 Press “Confirm Choices”

4 Display Filtered Content

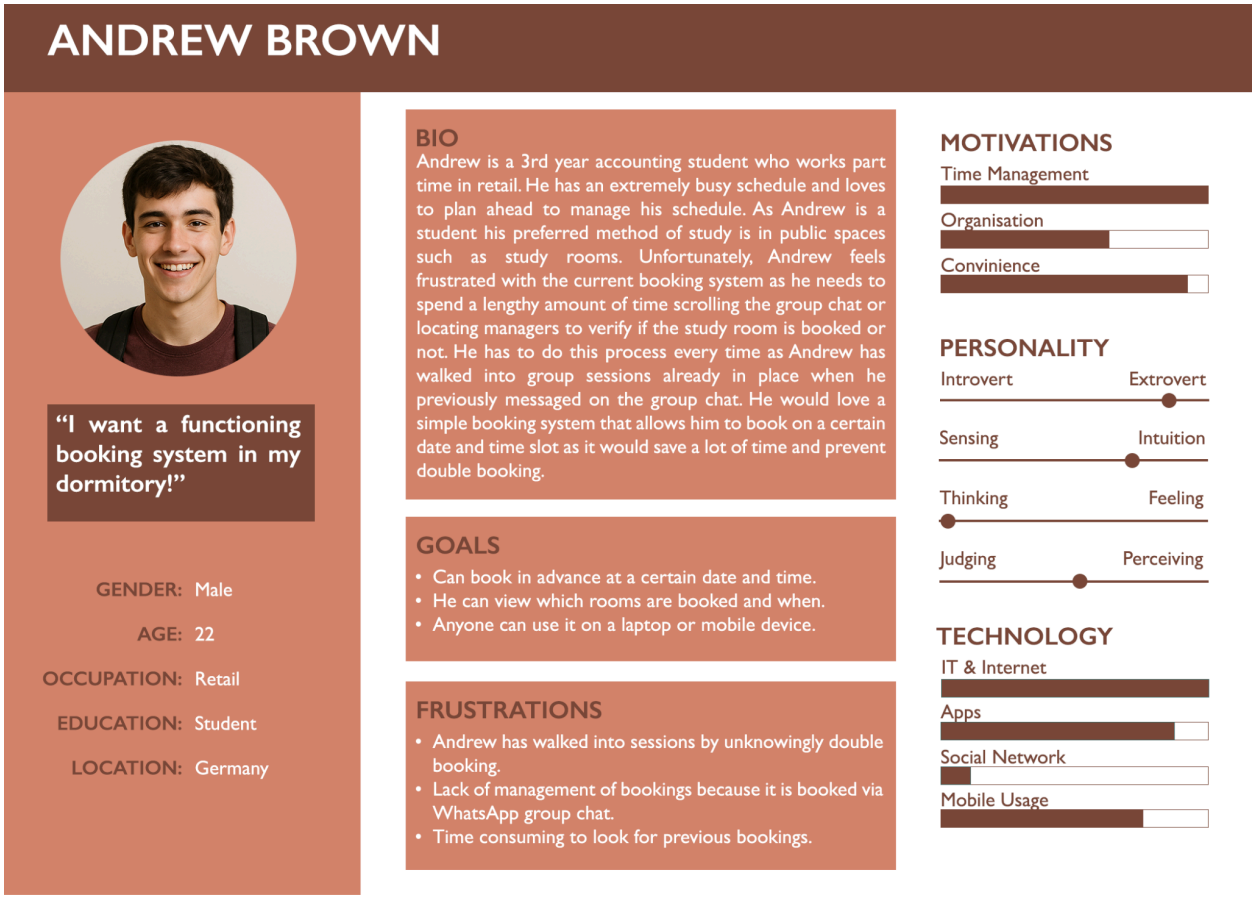
- 4.1 Display Room Type: Cinema Room
- 4.2 Display Current Date & Time
- 4.3 Display Timetable

5 Select wanted booking slot

6 Display Cleanliness Status:

- 6.1 Green Status: Ready
- 6.2 Orange Status: In Progress
- 6.3 Red Status: Not Ready

5.2.Persona 2



Requirements

- **FR1 (Real-time availability)**
- **FR4 (Time limits)**
- **NFR5 (Multi-device accessibility)**
- **NFR2 (Ease of use)**

Task Analysis

Scenario. Andrew wants to reserve the events lounge for an intensive study session that evening from 18:00 to 20:00 while he is on break from his retail job. He doesn't have time to check if the space is taken by scrolling through hundreds of messages in a group chat. He immediately filters the schedule for the "Study Room,"

opens the online app on his phone, finds a clear 18:00 window, sets booking type to “Private”, and quickly confirms it.

Steps. User Goal: Book the study room and make it a private event

1 Log into new booking system

- 1.1 Enter Username: Email/Username/Phone Number
- 1.2 Enter Password
- 1.3 Press “Log in” button

2 Display Dashboard, go into Timetable

- 2.1 Select “Timetable”

3 Selecting desired filters

- 3.1 Select Room Type: Events Lounge
- 3.2 Select Date
- 3.3 Select Time
- 3.4 Press Confirm Choices

4 Display Filtered Content

- 4.1 Display Room Type: Events Lounge
- 4.2 Display Date & Time
- 4.3 Display Timetable

5 Select wanted booking slot

6 Press Reserve

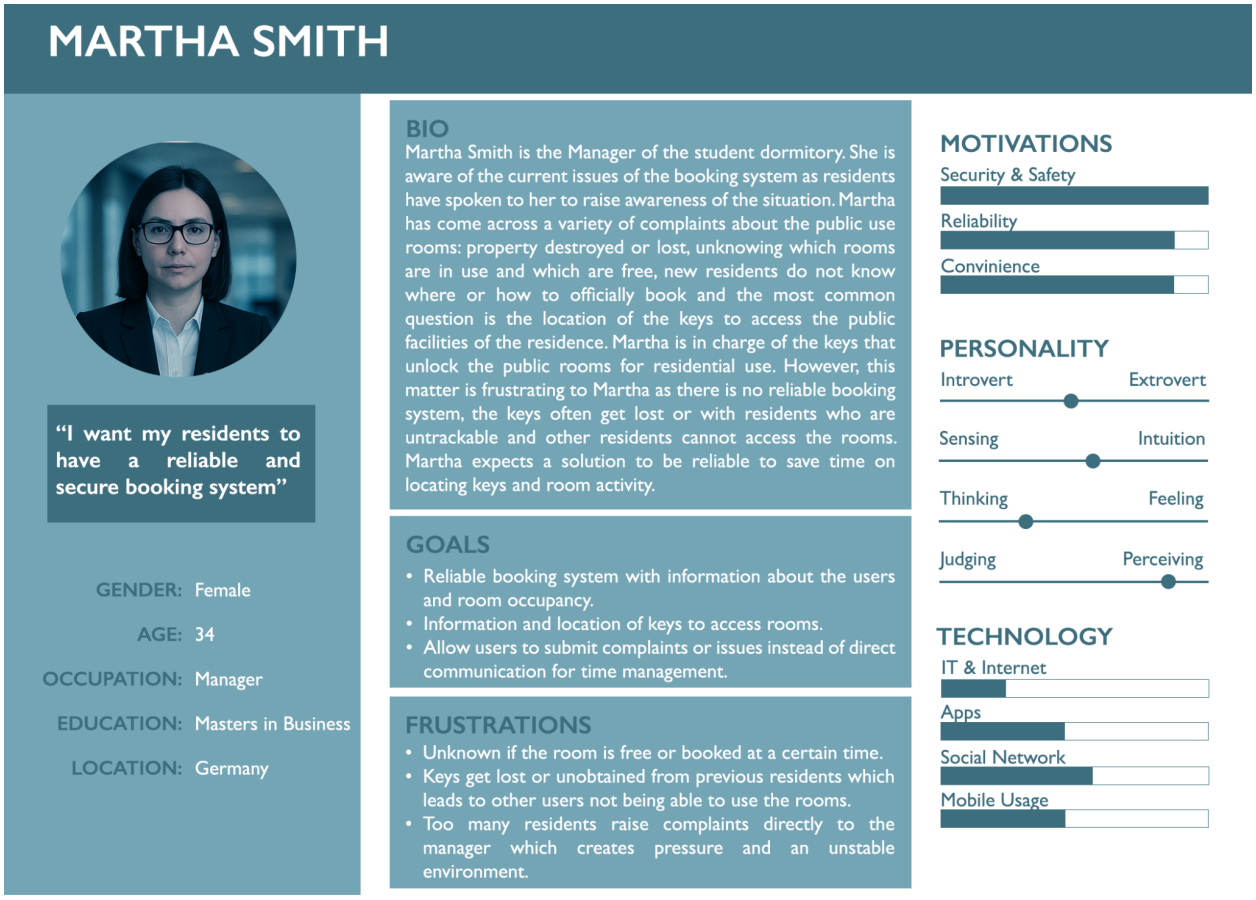
7 Confirm Selection

- 7.0 Complete in order
- 7.1 Confirm Room Type, Date & Time
- 7.2 Select Private event
- 7.2 Confirm Name & Apartment Number
- 7.3 Press Confirm Reservation

8 Display Personal Bookings

- 8.1 Display Timetable
- 8.2 Display reserved slot on Timetable

5.3.Persona 3



Requirements

- **FR9 (Key transfer confirmation)**
- **FR3 (Issue reporting)**
- **FR1 (Accountability)**
- **FR6 (Terms and conditions)**
- **NFR3 (Languages)**
- **NFR4 (Admin security)**

Task Analysis

Scenario. When Martha gets to the office, she logs into the administrative dashboard instead of being inundated with students requesting keys. She has to evaluate a complaint regarding a damaged chair in the event lounge and see if the Study Room key was returned last night. Without getting up from her desk, she looks at

the key location summary, determines which student is in possession of the key, and examines the visual proof that was included with the damage report.

Steps. User Goal: Accessible administrative dashboard where the user can view all mandatory activity

1 Log into administrative dashboard

Plan 1.0 Following steps can be entered in any order starting from 1.2-1.4

1.1 Select Administration log in

1.2 Enter Username: Email/Username/Phone Number

1.3 Enter Password

1.4 Enter Admin Number

1.5 Press Log In

2 Display Dashboard

Plan 2.0 Display features on administrative dashboard

2.1 View Current Day Timetable & Time

2.2 View Key summary location per Room Type

2.3 Display amount of submission requests

2.4 Display amount of complaints

3 Select Timetable

Plan 3.0 Select in any order from 3.1-3.3

3.1 Select Room Type

3.2 Select Date Range

3.3 Select Time Range

4 Display Timetable

Plan 4.0 Display of the filtered bookings

4.1 View all filtered bookings

4.2 View all booking information

4.3 View all cleanliness information

5 Return to Dashboard

6 Go to Submission Requests

6.1 Display collapsed submission requests in chronological order (title, date & time)

8 Return to Dashboard

9 Go to Complaints

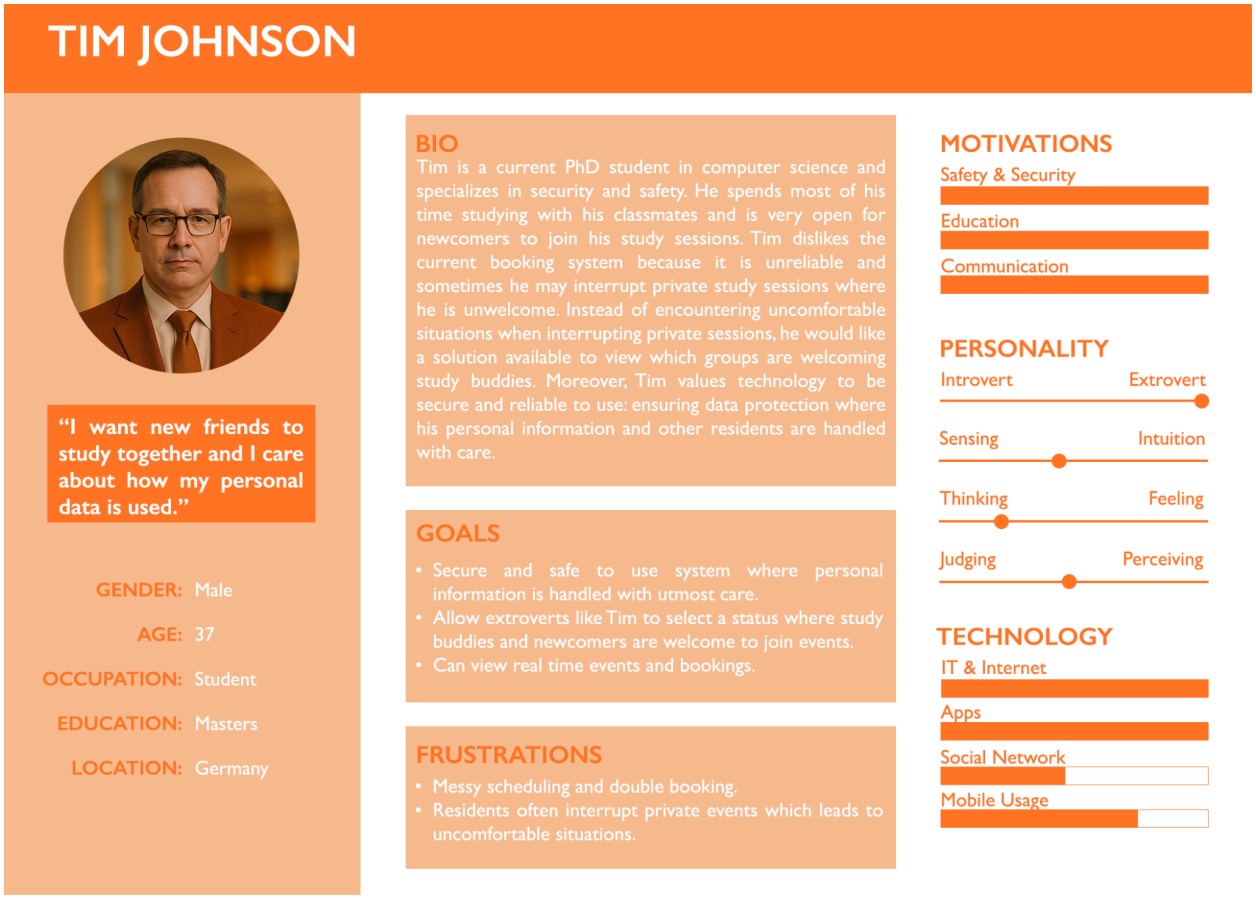
9.1 Display collapsed complaints in chronological order (title, date & time)

10 View Complaint

10.1 Click on complaint

10.2 Display text complaint, photo/file submission (optional)

5.4.Persona 4



Requirements

- **FR1 (Availability)**
- **FR7 (Open to company)**
- **FR8 (Show amount of people)**

- **NFR4 (Admin security)**

Task Analysis

Scenario: Tim wants to organize a group coding session in the Events Lounge. He wants to let the other computer science students in the building know that they are welcome to come along. Without spamming the WhatsApp group, he creates an open invitation by logging into the system, choosing his time slot, and specifically setting the booking type to "Public."

Steps. User Goal: Book the study room and make it a public event

1 Log into new booking system

1.1 Enter Username: Email/Username/Phone Number

1.2 Enter Password

1.3 Press “Log in” button

2 Display Dashboard, go into Timetable

2.1 Select “Timetable”

3 Selecting desired filters

3.1 Select Room Type: Events Lounge

3.2 Select Date

3.3 Select Time

3.4 Press Confirm Choices

4 Display Filtered Content

4.1 Display Room Type: Events Lounge

4.2 Display Date & Time

4.3 Display Timetable

5 Select wanted booking slot

6 Press Reserve

7 Confirm Selection

7.0 Complete in order

7.1 Confirm Room Type, Date & Time

7.2 Select Public event

- 7.2 Confirm Name & Apartment Number
- 7.3 Press Confirm Reservation

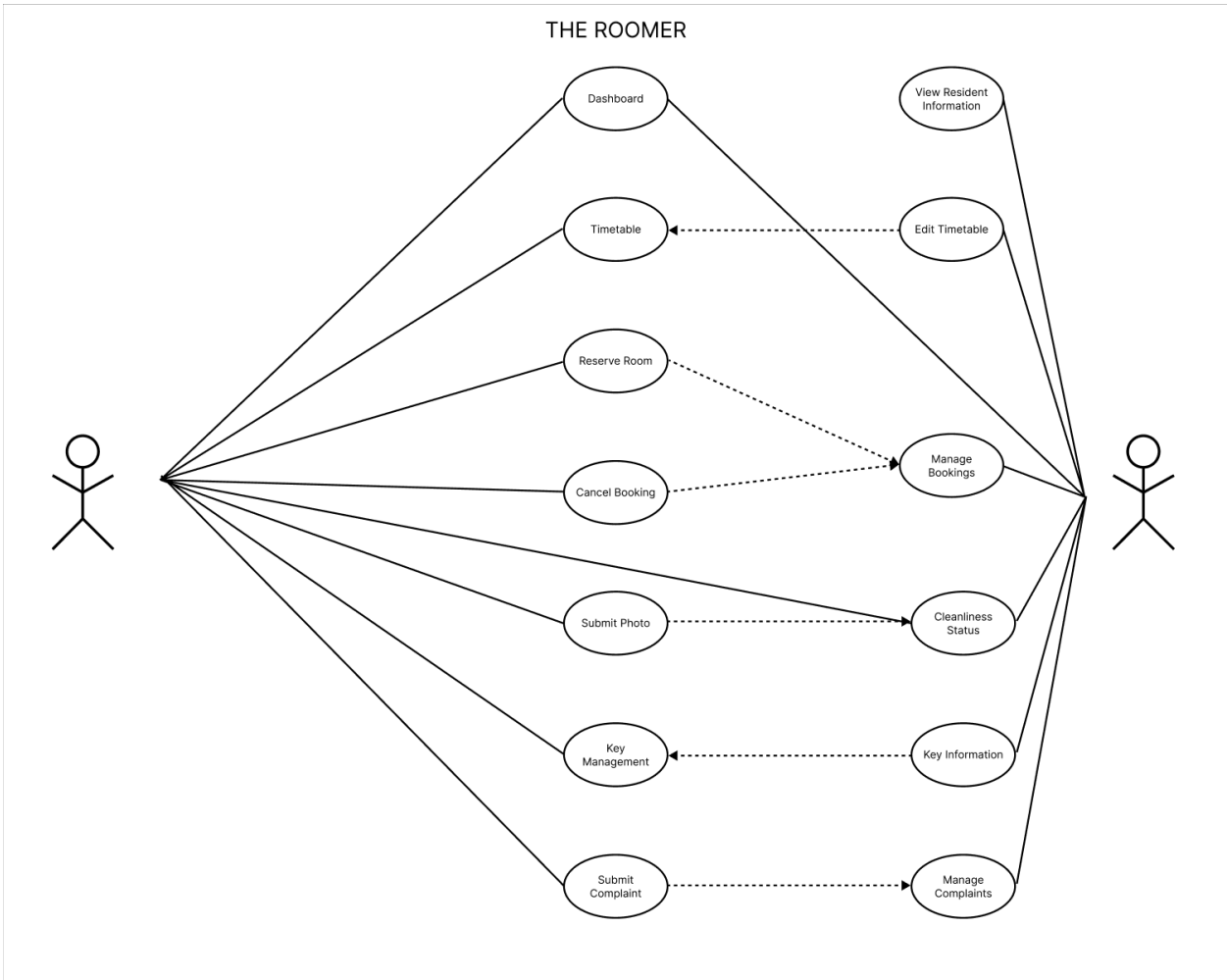
8 Display Personal Bookings

- 8.1 Display Timetable
- 8.2 Display reserved slot on Timetable

Use Case Diagram:

Primary Actor: User

Secondary Actor: Admin



Preconditions:

- User already has an account for the booking system
- Admin already has an account for the booking system

Flow of Events (User):

1. User logs into booking system
2. View Timetable
3. User selects booking filters
4. User browses open booking slots
5. User checks cleanliness status of room
6. User reserves open time slot

    a. Confirm personal details
    b. Select Public or Private event status
    c. Confirm reservation details
7. User returns to Dashboard
8. User views reserved rooms
9. User selects reserved rooms
10. User cancels reservation
    a. May attach a complaint (optional)

Flow of Events (Admin):

1. Log into Admin Dashboard
2. View booking information
3. View location of room keys
4. View submitted cleanliness images
    a. Update cleanliness status
5. View complaints
    a. View text and images

Postconditions:

- User reserves a room
- User cancels reservation
- System logs reservation details
- System tracks cleanliness status and booking status

6.Justification for the requirements

In order to ensure the requirements generated are appropriate to the system and relevant to the issues that have been identified, the reason they exist must be explored and justified for each one individually. When it comes to providing an explanation to these requirements it is simply a matter of putting together all that has been accomplished in this section, from research methods and their results to the personas themselves.

- **6.1.FR1 (Real-time availability)**

  The need for **FR1: Real-time availability** is justified when tenants were describing their issues with the whatsapp group method where they had to constantly check older messages as well as check with the receptionist for the availability.

- **6.2.FR2 (Photo evidence and room condition)**

  The need for **FR2: Photo evidence and room condition** is justified by both staff interviews and direct observations. Staff repeatedly mentioned that rooms are often left dirty or damaged but they have no proof of who caused it. During observation, the Gaming Room was found with spills and rubbish left behind, matching these complaints. Allowing tenants to upload photos before and after their booking helps document the room's condition and links it to a specific user. Persona 1 (Jane) uses this feature to check the cleanliness status before bringing guests, and Persona 3 (Martha, staff) relies on photo submissions when reviewing complaints about damaged furniture.

- **6.3.FR3 (Issue reporting)**

  The need for **FR3: Issue Reporting Mechanism** arises from observed cases where rooms were left messy or equipment was broken, with no clear way for tenants to notify management which led to unresolved problems.

- **6.4.FR4 (Time limits)**

  The need for **FR4: Key Transfer Confirmation** is justified by the observed reliance on physical keys in the Events Lounge and the recurring issues of keys being lost or not returned on time. A confirmation mechanism would formalise this process and help prevent delays and disputes.

- **6.5.FR5 (Terms and conditions)**

  The need for **FR6: Terms and Conditions** acceptance is justified by the repeated mention of conflicts, misuse and unclear expectations between tenants and staff. Questionnaire data showed that 72% of respondents had either witnessed or been part of conflicts related to shared spaces, often involving cleanliness, broken items or key issues. Staff interviews also highlighted the lack of enforceable rules for tenant-managed spaces like the Cinema and Gaming Rooms.

- **6.6.FR6 (Open to company)**

  The need for **FR7: Room Privacy Status** comes from the tenant interview's opinion on the extra features that should be implemented where they wanted the ability to join rooms if possible where tenant 5 would usually ask people to share the room if possible.

- **6.7.FR7 (Show amount of people)**

  The need for **FR8:Number of Occupants in a Space** stems from FR7 where having shared rooms and open rooms requires knowing the amount of people to either not join if too many as well as who is in the room to be held accountable.

- **6.8.FR8 (Key transfer confirmation)**

  The need for **FR8: Confirmation of Key Transfer** comes from the survey's question found in the appendix as A8, where 60 percent of responders that witnessed management fights with tenants found that it was usually about the shared space's key getting lost.

- **6.9.NFR1 (Accountability)**

  The need for **NFR1: Accountability and Identification** is justified by the lack of accountability noted during observations. Since anyone could access the rooms, it was impossible to trace back responsibility for misuse.

- **6.10.NFR2 (Ease of use)**

  The need for **NFR2: Real-Time Booking Synchronisation** is justified by the observation that booking information was often scattered or lost in long WhatsApp message threads. Without synchronisation, tenants could not reliably check availability, leading to double bookings and scheduling conflicts.

- **6.11.NFR3 (Languages)**

  The need for **NFR3: Languages** (English and German support) is based on the diverse, international nature of the Lumis tenant community. Interviews and general knowledge of student accommodation context indicate that not all residents are native English speakers, and some may prefer or feel more confident using German.

- **6.12.NFR4 (Admin Security)**

  The need for **NFR4: Admin Security** arises from the management's requirement to retain control over shared spaces and prevent misuse of the system. Staff interviews highlighted concerns that tenants might try to override each other's reservations or manipulate the schedule if there are no clear access boundaries.

- **6.13.NFR5 (Multi-Device Accessibility)**

  The need for **NFR5: Multi-Device Accessibility** is supported by observations and scenarios where tenants and staff use different devices depending on their context. Tenants often rely on their smartphones while on the move (e.g. Persona 2 checking availability during a work break), while staff like Persona 3 are more likely to use desktop computers in the office. In addition, some students may prefer to manage their bookings from a laptop.

- **6.14 UXR1 (Booking Process)**

  The need for **UXR1: Easy Booking Process & Guidance** is justified by the observed confusion among new tenants unfamiliar with the informal WhatsApp booking method which indicates a clear usability gap.

- **6.15 UXR2 (Calendar view)**

  The need for **UXR2 Calendar view** was mentioned in the tenant interviews where all the interviewees wanted the ability to see the availability of the rooms across the entire week.

5.Conclusion

The extensive need-finding process, using direct observations, questionnaires, and semi-structured interviews with both staff and tenants, successfully uncovered crucial pain points within Lumis Student Accommodation's shared room management. The main issues identified revolved around the lack of accountability, the informal and inefficient WhatsApp based booking system, and the persistent problems with cleanliness and key management.

This analysis called forth to the development of a clearly defined set of 14 requirements, 9 Functional (FRs) and 5 Non-Functional (NFRs). The subsequent analysis utilizing four Personas and Hierarchical Task Analysis (HTA) scenarios confirmed the practicality and need of each requirement, allowing us to be sure that the proposed solution will directly solve the users goals and challenges.

By changing from an informal and manual process to a digital and automated system, the project will achieve:

- **Improved Accountability:** Through features like photo evidence (FR2) and mandatory login (NFR1), linking actions directly to tenants.
- **Enhanced Usability:** Via real-time availability (FR1) and an easy-to-use interface (NFR2), eliminating scheduling conflicts.
- **Easier Management:** Giving staff administrative control (NFR4) and clear records of key status (FR9) and issue reports (FR3).

In conclusion, the justification phase confirmed that every requirement is directly

traceable to real evidence gathered from the target users and stakeholders. This foundation of real, justified and verified requirements now gives us the essential blueprint for the next design and prototyping phases of the solution.