UX Design

Simplified Sckhaedgeuler (SS)

Snow College

Final Project

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Section 1

Project Evaluation

Description

The process to currently schedule a room at Snow College is convoluted, slow, and inadequate for the majority of users. The Simplified Sckhaedgeuler is an all around scheduling solution that we created to make room scheduling more straightforward, and give more power to the users. We worked on this project throughout the semester, iterating and refining it to the point where we feel we are nearly ready to begin coding.

Throughout this project, our team learned how to use many different UX processes to discover the most effective ways to create a scheduler that is not only useful, but easy to use. As our project grew, it also led to an increase in our list of goals and objectives. Throughout our project, our team found the following goals and objectives to be critical in our project and our various analyses.

Goals and Objectives

1. To replace the slow, disconnected, and sometimes non-existent, system of room scheduling we that is used at Snow College.
2. To consolidate the various campus scheduling methods, and create a single unified interface for all of campus.
3. To provide all users a simple and easy to use scheduling system.

4. To create a system that supports campus expansion and growth by creating a software that is easily scalable.
5. To create some kind of priority system for room reservations.
6. Influence the creation a central system administrator at institutions.
7. Allow users to see room assets and notify building managers to provide those assets.
8. We want to support integration with current software/systems.
9. We want to allow feedback on room conditions.
10. Adequately meet the needs of all classes of users involved with our solution.

How we arrived at our design

Contextual Inquiry and Analysis:

When we were first beginning our project we did some contextual inquiry. We interviewed with several classes of users, to discover their needs and expectations. The information we gathered from these interviews and workshops were invaluable in the rest of our project development.

Sample Interview Questions:

- What room reservation system does your organization currently employ?
- Have you, or are you using another system either now or previously?
- How do you currently schedule a room?
- What is the hardest part of scheduling a room?
- How would you like to see the process of scheduling a room changed?

During these interviews, our envisioned scope of the project began to change and we started to see how complex and large the system of room scheduling really was. We learned about processes and software that we had no idea even existed. We also learned about all the politics and legal issues that would need to be considered, and implemented into our design.

We performed contextual analysis on this data and used the results to guide the rest of our design. We were able to construct some key personas that we felt help us narrow down our design, but also make sure we were covering all our bases, so we didn't leave anything out. During the contextual analysis phase we also began to determine what the users really desired, and shift our focus toward designing for the users rather than designing with what we had in mind for the project. Without contextual inquiry and analysis we would not have been able to produce a clear understanding of the system and wouldn't have been able to design an all-around solution.

Successes:

- We identified some major problems with the current system.
- We began to understand all the complexities and politics of the current system.
- We got substantial amounts of data from multiple perspectives.
- We gained significant insight into the necessary scope of our solution. This helped us greatly when it came to furthering development.

Where we could improve:

- We tended to inject our bias and talk about our ideas during the inquiry phase. We learned how it is important to remove our ideas from this phase.

- We also focused too much on the implementation of the new system we were designing, when we should have been focusing on learning only about the current system as it is now.
- Some scheduling issues made it so we had one-on one interviews with individuals we had originally intended to talk to together, in a workshop. We learned to be more careful in scheduling.
- Several of the questions were irrelevant or redundant. We could have pared down the questions to those that were most valuable.

Requirements and Design:

The next phase we came to was the requirements and design phase. We were able to extract requirements from our contextual analysis and produce a list of requirements we felt encompassed our project. This list was mainly produced by examining the work activity affinity diagram and finding representative work notes from each category.

After requirements extraction, we moved into design. We met together many times during this phase to turn all our ideas into one complete and all encompassing design. Our ideas were generated by keeping the personas we created in mind and making sure we were designing based upon user needs.

Successes:

- We were able to successfully extract a list of requirements from our contextual analysis results.

- Using digital tools (draw.io) we were able to create our WAAD using notes from all interviews in a place we could all access them at once, and access them easily.
- We were able to identify and create three key personas to support us and help us during the design phase.
- We were able to get a rough idea of the importance of each requirement by how many times they were mentioned by each person.
- We created a simplistic design that allow an average user to be able to use the system
- We were able to create a interface that yielded positive feedback
- We met together to get back on track and match our ideas together

Where we could improve:

- Our requirements list was improperly formatted, it should have been formatted differently.
- Our biggest problem during design was remembering that we are designing for the personas and not for ourselves. Although we were able to identify this problem early on during the contextual inquiry phase, it was still hard to completely implement without some practice.
- We didn't always go in the correct order we designing. We could improve on our order of processes.
- We didn't always have the same idea when design and got behind/ahead of each other on the team.

Prototyping and Evaluation:

The last phase for us was prototyping and evaluation. During the prototyping phase of the project we brought all our ideas into one design which helped us create a prototype. We had three personas to support, so we created three prototypes. Each prototype was built around one key task we wanted to have the users evaluate.

During the evaluation phase we were able to test our product in a real world environment and see how it held up. This phase was very successful, and we were able to extract user problems from all the evaluations we held. We were able to create a list of all the problems we identified and rank them in a cost-importance analysis table. This helped us determine the priority of each problem and what we should focus on first.

Successes:

- We were able to identify many important problems with our current implementation.
- We created three successful prototypes that supported our main tasks. We were able to learn a lot from having these evaluated.
- We were able to consider and meet the needs of each of our personas.
- In creating our prototypes, we noticed several areas that might be confusing to users, and were able to make adjustments accordingly.
- Our prototype was easy to use and got the tasks asked for done completely!
- From the information and feedback we received, we could prioritize the issues we needed to address.

Where we could improve:

- Our prototype was did not include “fake data” in the fields. Instead we just filled in the fields with squiggly lines to represent that something would be there. If we had just filled the field in with example data, the prototype would have been easier to understand and give the evaluators a better feel for our product.
- During our first two evaluations we had a few technical problems. These problems could have been worked out had we done one or two practice sessions before holding our actual evaluations.
- There were some logical fallacies in our prototype that we failed to notice. This might have damaged our rapport with consumers.
- Some parts of the prototype didn’t work and were confused to the user.

Key Findings

- We found that there was a considerable amount of work to be done with this project before even considering designing.
- You can’t skip over ideation!
- Current reservation system takes a lot of time and is very prone to bias/error
- A system of emails and phone calls is not working efficiently and sometimes reservations are missed or double booked.
- There is an existing system at Snow College that uses an Oracle and two front-end clients.
- We learned quite a bit about the current system and what people like and dislike about it. We also learned that there are some complex politics that would have to be accounted for in our new system.
- There are already lots of online scheduling systems (we have competition).

- Everyone likes to schedule a room at the same time/location.
- A central system scheduling office/person is critical if this kind of software implementation was to work.
- System can/should be integrated with currently implemented institution software/system.
- Not everyone's ideas work for the institution at hand - there needs to be a balance of ideas in order to try to satisfy everyone, especially the ones in charge and those that will be using the software product.
- It makes people nervous to allow *anyone* to reserve a space - building managers don't have to meet people over email/phone/in-person in order to reserve a room. It isn't personable.
- A Work Activity Affinity Diagram (WAAD) was crucial to identifying key features and putting them into different sections/categories .
- In-field sketches helped understand the existing system and how we can integrate our new software product alongside the current solutions/system .
- Modeling social and flow of software processes helps the developers and modelers how the system will work before it will be implemented. It allows a bridge to those going to the software before it is implemented.
- The personas/work roles that are existing with the current system, proposed system and actual end result are drastically different from each other.
- User testing provides *critical* feedback that is used to improve design.
- You cannot include everything in one version - cost is an important factor.

Achievements

- One of our major achievements was during the contextual inquiry phase, at the very beginning of our project. We began with the idea in our mind of just designing for just students and faculty, but our view of the system really began to expand during inquiry. Had we not been able to interview all the different users we did, we would have developed an incomplete understanding of the current system, and been unable to identify and design for all the users.
- Another major achievements was during the evaluation phase. Our prototype was created well enough that everyone was able to at least complete each task given. We were able to identify some different problems though. We thought evaluation was a great success and milestone for us to reach. Even though technology failed us on parts of our evaluation, we were able to get key information and findings within from all of our evaluations.

Lessons Learned

- We learned how important it is to complete every single phase of the “wheel.” If we had skipped even just one phase of the project, we could have ended up with an entirely different design, that would been based on incomplete data.
- Steps of design may need to be improved or re-done in order to achieve the best design
- We learned a great deal with regard to the importance of contextual inquiry, and the importance of designing for the user. It would have been extremely easy to develop a product we thought was great, but missed the mark completely.

- We learned that evaluations are very insightful and an extremely important part of learning more about our users and how they think. This part of the project is where we were able to see how closely the user and designer mental models matched up.
- You cannot include everything in one version - cost is an important factor.
- We must follow the steps of design in order, or be on the same track. If someone goes ahead or falls behind, we are not as efficient as we could be.

Next Steps

- Our next steps would be to iterate and refine our prototype. We would add more functionality to the prototype and create any key pages that we feel need to be tested by users before implementing them.
- We would also need to refine our processes and user roles. They became more vague as time went on. We could increase our specifications on these user roles.
- After refining and iterating the prototype, we could hold a few more evaluations, and just keep iterating until we feel we are ready to start coding/creating the software that we designed!
- If the design process is re-done, we would take more notes, sketches and pictures in each step of the process. We will also meet together in person more often in order to verify we are on the same page. Technology works well, but doesn't always all one to communicate emotions with one another.

Section 2

Contextual Inquiry:

Interviews and Workshop

1. Main Focus

How do faculty members and students reserve rooms on campus? The existing process Snow College employs for room reservation requires the user to contact of a short list of people in charge of scheduling rooms. There is typically a “room scheduler” for each building on campus and to reserve a room the user needs to be in contact with one of these “schedulers.” Contact is typically made via email messages, phone calls, or personal visits, all of which are slow, tedious, and requires the user to contact the scheduler well in advance to be guaranteed a room.

2. Current Problems with Product

The current room reservation process for each building is managed by an individual alone acting as manager, thus, accessibility can be an issue. If the manager is unavailable, a room reservation is impossible, and if there is a disagreement about a room reservation, the manager will be unable to mediate immediately. Such a system also requires the manager to dedicate time and effort to fulfilling this additional responsibility. Having an individual acting as manager also creates a potential bias or when scheduling rooms. If contact is made via Email, the message may go unnoticed for some time, until it is checked by the manager.

3. Users of the Service

Understanding current users of the room scheduling system:

- Current users:
    - The “room schedulers” in charge of managing the reservation of rooms.
    - Students wanting to reserve study rooms.
    - Faculty member trying to schedule rooms for meetings or classes.
- Users tend to be literate in using computers, so a software solution would probably be most helpful.

Users of the Product/Service

- Margie Anderson - Assistant Registrar & Manager of Room Scheduling (Assistant Registrar at Current Educational Institution)
- Heber Allen - A Current Professor at Snow (Current Professor at Educational Institution)
- Michael Lewellen - Library Worker (Classmate/Associate)
- Ty Bayn, Nathan Hebert - Snow College Students (Classmates)

4. Research

Research:

- Via Email/Phone
- Paper
- Web Based Room Scheduler
    - USU Library Room Scheduler
- First-come, first-serve

- Various Online Services/Software
    - YArooms
        - Online software that can integrate with Outlook.com's calendars. Also provides a tablet app that can show room availability in real time. http://yarooms.com (costs $$) (i love that it gives you an iCal feed if you want it)
    - Skedda
        - Online software that is FREE. It must be run in the browser, like YArooms, however, does not not provide a stand alone mobile app for smart devices. Customizable, user management, notifications and more (http://skedda.com)
    - Robin
        - Online software similar to the others, but has integration with G Suite, office and exchange. Does cost a pretty $$. Shows analytics on rooms/helps with utilization (https://robinpowered.com/)
    - There are other solutions, many can be found by searching "room scheduling software" or "conference room scheduler" using Google or another web search engine.
- Looking at Google Trends, "room scheduling software" is a popular search term in the US. "conference room scheduler" is less popular of search term within the last year but it still decently popular.

- At USU there is an online room scheduler for scheduling study rooms.

- There is a meeting and room scheduling software from ems that makes it easy to find and book rooms for meeting or events. They offer online scheduling via their online software, a mobile app, through Microsoft Outlook.
- SKEDDA is another similar room scheduling software.\

5. Interview Questions

- What room reservation system does your organization currently employ?
- Have you, or are you using another system either now or previously?
    - How effective do you think the system is?
    - How much time would you say it takes you to reserve a room?
    - How reliable do you believe the system to be? Have you had any issues personally?
    - Could you share with us the worst experience you had with the system, and what made it a negative experience?
    - Could you also share with us the best experience you've had, and what made it satisfying?
- Would you be willing to try a new system if it increased your productivity?
- Do you want the room scheduling program to be able to integrate with your current calendar/agenda solution?
- Would you be open to having a online/mobile solution that those wanting to schedule the room could use instead of going through a "building scheduler?"
- Do you feel as though Snow College is small enough it would *not* benefit from another implemented solution?
- How do you currently schedule a room?

- What is the hardest part of scheduling a room?
- How would you like to see the process of scheduling a room changed?
- What do you like about the current reservation process?
- Are you aware of any existing solutions out there to assist in the room scheduling process?

6. Interviews

- Interview 1:
    - Ty Bayn, Nathan Hebert, Ammon Riley - A Snow College Student (Classmate)
- Interview 2:
    - * Mikah Strait - Snow College Registrar (Registrar at Current Educational Institution)
    - Margie Anderson - Assistant Registrar & Manager of Room Scheduling (Assistant Registrar at Current Educational Institution)

7. Workshop

- Workshop Part 1
    - Heber Allen - A Current Professor at Snow (Current Professor at Educational Institution)
- Workshop Part 2
    - Michael Lewellen - Library Worker (Classmate/Associate)
    - * John Ostler - Library Director (Current Institution’s Library Director)

Section 3

Contextual Analysis:

Synthesis of collected data on current scheduling implementations.

1. System Concept Statement

The Simplified Sckhaedgeuler (SS) provides simple and efficient room scheduling for large organizations. SS is easy to learn, and easier to use. With many points of access including a web portal, scheduling a room couldn't be easier. Existing room schedulers and building administrators will be allowed to retain whatever measure of control they desire, or they can let SS handle it autonomously. Users will love the many built-in smart features, including email confirmations and reminders. Feedback and maintenance is also handled effortlessly, allowing users to report issues which will be instantly made known to management, and other room reservees. In short, the Simplified Sckhaedgeuler overcomes the challenges of traditional room management, allowing the process to be effortless and enjoyable.

2. Scope of the Project

During this project, our original ideas and thought process were greatly modified and views were changed. At first, we had a set of ideals that put us in the shoes of the user and super interfaces that we wanted implemented. After talking to participants and learning more about the current system our views changed. From that point on, we tried to put ourselves in the

shoes of all of the users of the system, thus creating a system idea that was better for all users of the software. We asked each kind of user what they were looking for in order to come up with the best idea and get the best feedback from our users.

3. Preparation

For the interview process, we all began with some initial research on our own to better understand the current context of the scheduling system and other solutions out there. Next we each came up with our own set of interview questions to help guide the interviews. Then we scheduled the interviews and began with our questions, but also went with the flow of the conversation to see where the interviewees would lead us, in hope of gaining a better understanding of what the process looks like to them.

Preparation for the workshop began with our group going over the user centered business canvas and filling it out to the best of our ability with our current understanding of the system. Our goal for the workshop was then to finish filling out the user centered business canvas. We began the workshop with an explanation of the business canvas, and guided the workshop to help us fill in the gaps we had left. We were able to gain further insight about the current system along the way.

4. Our Participants

We had many participants in this project. They were vital assets to our projects. For our initial interviews, we had the following participants:

- Margie Anderson - Assistant Registrar & Manager of Room Scheduling (Assistant Registrar at Current Educational Institution)
- Mikah Strait - Snow College Registrar (Registrar at Current Educational Institution)4

- Ty Bayn, Nathan Hebert - Snow College Students (Classmates)

For our workshop, we had the following participants:

- Heber Allen - A Current Professor at Snow (Current Professor at Educational Institution)
- Michael Lewellen - Library Worker (Classmate/Associate)
- John Ostler - Library Director (Current Institution's Library Director)

5. Our Initial Questions

- What room reservation system does your organization currently employ?
- Have you, or are you using another system either now or previously?
- How effective do you think the system is?
- How much time would you say it takes you to reserve a room?
- How reliable do you believe the system to be? Have you had any issues personally?
- Could you share with us the worst experience you had with the system, and what made it a negative experience?
- Could you also share with us the best experience you've had, and what made it satisfying?
- Would you be willing to try a new system?
- Would you want a new room scheduling program to integrate with your current calendar/agenda solution?
- Would you be open to having a online/mobile solution that those wanting to schedule the room could use instead of going through a "building scheduler?"
- Do you feel as though Snow College is small enough it would *not* benefit from another implemented solution?

- How do you currently schedule a room?
- What is the hardest part of scheduling a room?
- How would you like to see the process of scheduling a room changed?
- What do you like about the current reservation process?
- Are you aware of any existing solutions out there to assist in the room scheduling process?

6. Interviews

Our first meeting was with a group of students where we were able to ask about their interpretation of the scheduling system and how they used it. Our second was with two system administrators which ended up largely affecting our understanding of the system and broadened the scope of our project. The meetings went well and we were able to answer not only our initial question, but also begin to understand more about the process of scheduling rooms than we even knew existed.

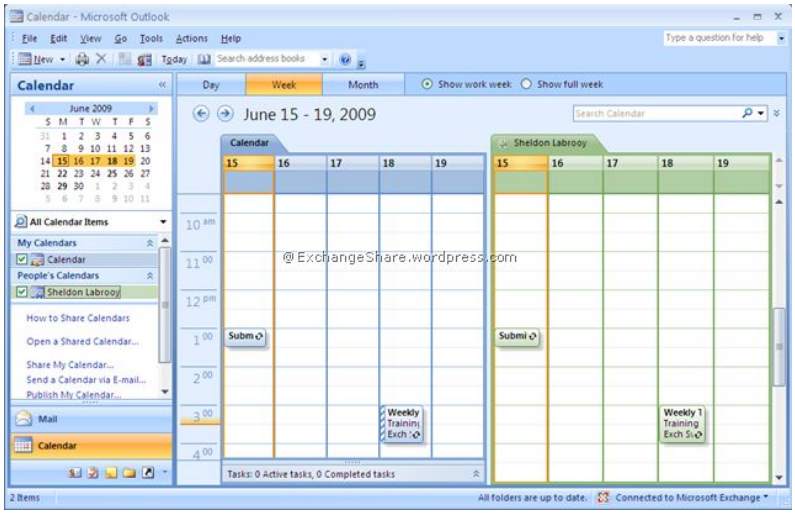
7. Collection of Raw Data

We made use of several mediums in gathering contextual data. During the interviews, we captured an audio recording to ensure we could review the interviewee's exact words when needed. We also kept notes during the interviews, and on a limited scale, used diagrams for clarity.

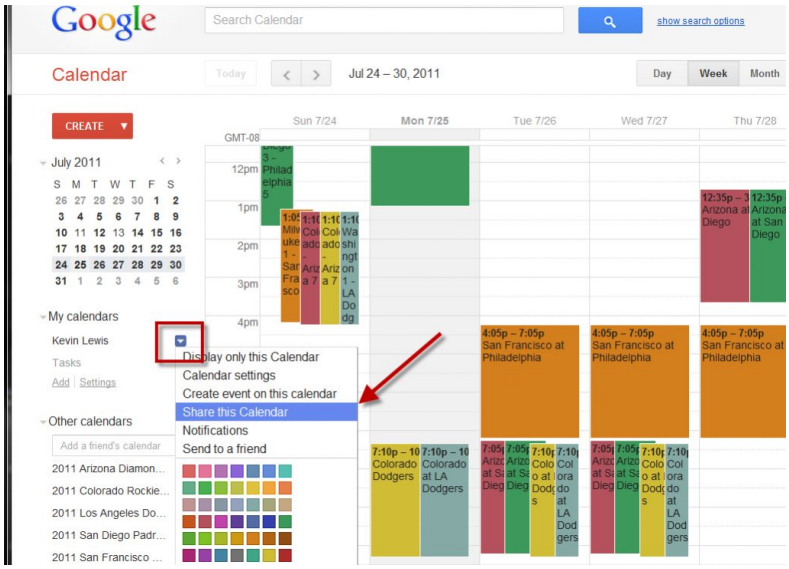
8. Work Artifacts

We did not obtain images of the Banner system, but we can show you what an Exchange (Outlook) Calendar and Google Calendar look like:

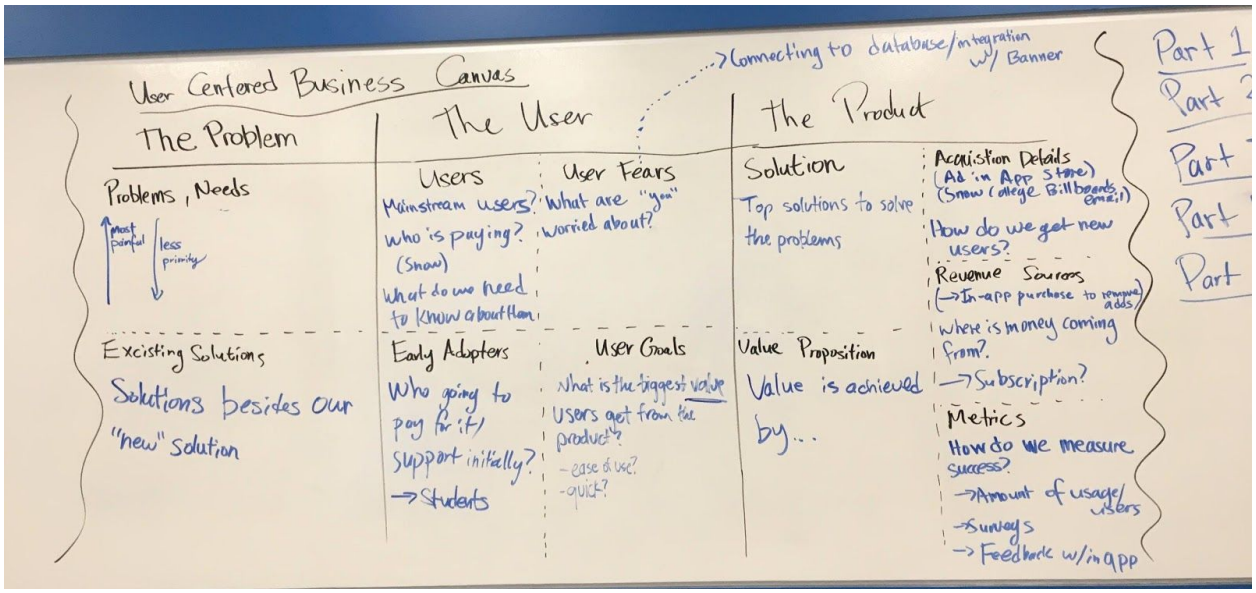
Microsoft Outlook (Exchange) (image from: https://exchangeshare.wordpress.com)



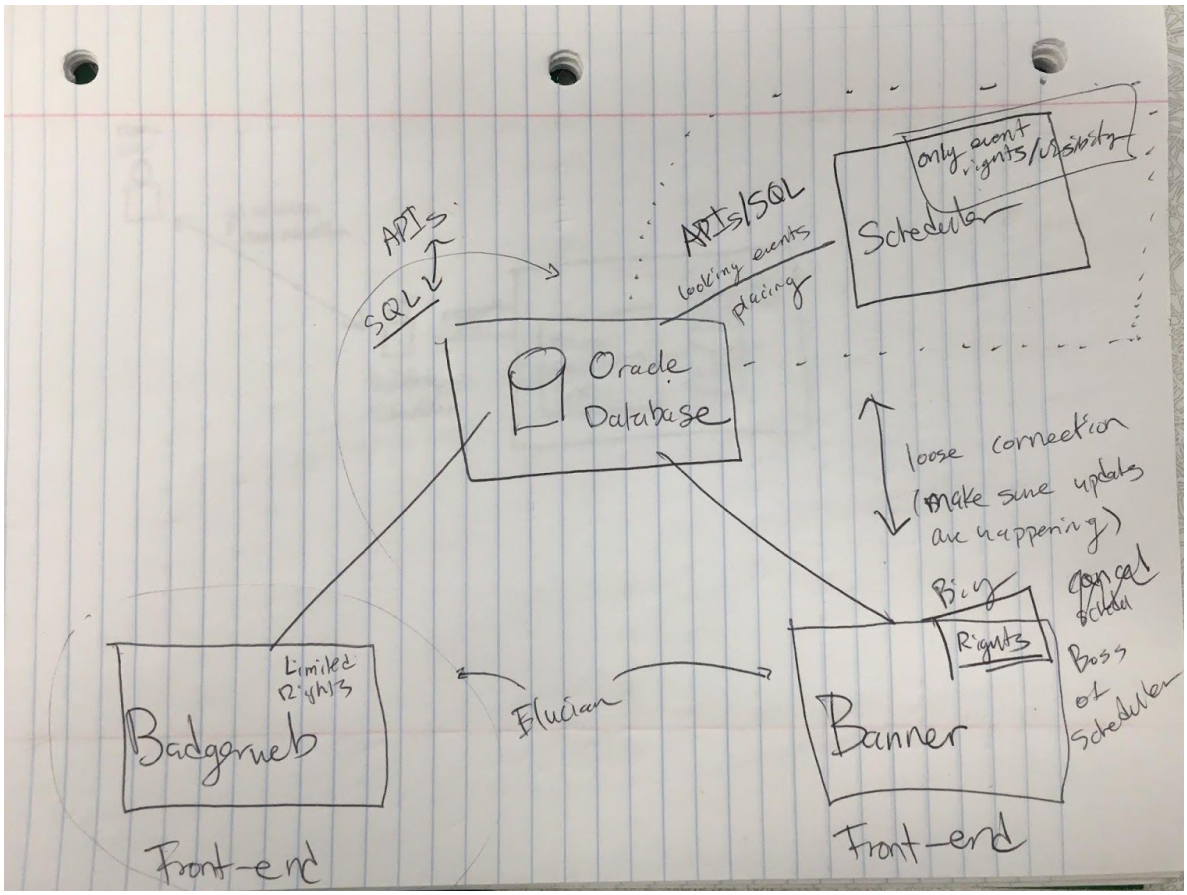
Google Calendar (image from http://cdblog.centraldesktop.com)



9. Photos (see WAAD)



10. In-field sketches



11. Sample Task Data

Events can usually be scheduled within one minute

Events are labeled as a different types

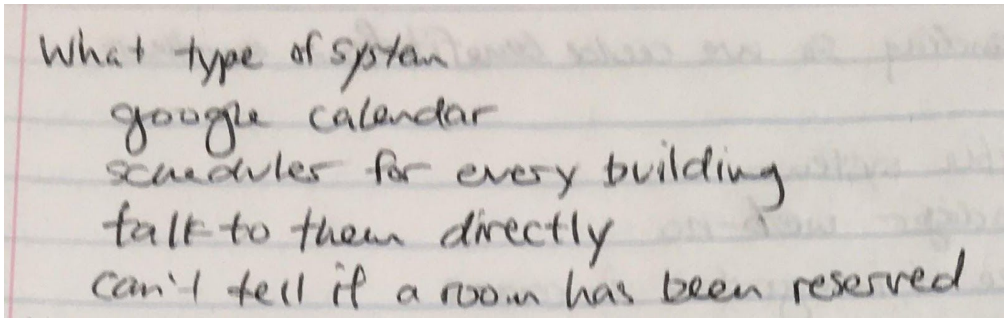
Dates are entered

Times they want

Room wanted

Conflict Management is built in

Each department schedules their own classes



(From our interview with Ty, Nathan and Ammon)

12. Raw Data and Corresponding Activity Notes

Show samples (a dozen or so) of your raw data notes and the corresponding work activity notes you extracted.

Ty - As far as I know, from what I've been told, there is a google calendar, and that is it. So every building controls their own scheduling. There is a scheduler, person, for every building that you can talk to.

[I1 00:27] As far as I know the current scheduling system consists of a Google calendar.

[I1 00:30] Every building is scheduled independently of the others by a building scheduler.

Ty - Um, it's meh, it's meh effective because you can get the room reserved, and they can get things setup for you, and it's nice cause if someone tries to kick you out you can say uh, uh, uh, I have a reservation. And you can keep the room, but it's really frustrating when you want a room and you don't know if it's reserved or not, and it's kind of a pain to have to go up to the second floor, northwest corner of the building and talk to Mike and say "Hey is this room reserved?" So I mean it kind of works, but it's hard to communicate. People don't know or not unless they've recently reserved something. It's less than mediocre.

[I1 00:57] There’s no way for a user to know which rooms are available and which are reserved.

[I1 01:39] It's really frustrating when you want a room and you don't know if it's reserved or not.

[I1 01:26] The current system is somewhat effective because you can get the room reserved, and you hopefully won’t get kicked out if you have a reservation.

[I1 01:42] It's kind of a pain to have to go up to the second floor, northwest corner of the building and talk to mike and say "Hey is this room reserved?" So I mean it kind of works, buts it's hard to communicate.

Nathan - Yeah so if I look at it and ask like, "oh what are the rooms," and then I check and see if anyone reserved it, and just walked up the stairs, it's not that difficult. It doesn't really matter which room it is for the most part, some of them are bigger than others, but like that could be information that the service would provide. Let's say like this room has, how many seats in it.

[I1 16:30] I want a uniform and consistent interface so the experience is the same wherever you access the system.

[I1 22:58] I think there should be a website available so we can make reservations from anywhere.

[I1 24:00] I want to know when a room is vacant.

13. WAAD Process

For each activity we did in the contextual inquiry phase we had recordings we were able to go back and listen to. We extracted the work activity notes from these recordings and any of

the corresponding notes we took during the interview and workshop sessions. We decided to throw all the work activity notes into an online program to simulate having post it notes for each activity note. We then met together as a group and sorted all the work activity notes together into different bins and created a tree structure of organized work activity notes.

14. WAAD Work Pictures

We did not have any pictures of us at hard work, but the WAAD will reflect us doing so!

15. Photos of WAAD

How the current system works

Outside Business Scheduling

Reservation auto-cancelling

Notifications

Room Details/condition

Not Needed

Display Vacancy

Ensure Privacy

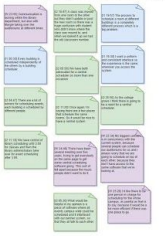
Reservation made sucessfully

Maintaining Control

Computer Solution

Allow Help Reservation

Unity/Consistency



Scalability

Simple

Product Cost

GiveUser Control

Access Methods

Event Prioritization

Quick Reservations

Design Needs

How the current system works

[I1 00:45] You have to talk to the building scheduler to schedule anything.

[W 29:17] We made separate google calendar for each room that we schedule.

[I2 01:50] Banner is housed on top of an oracle relational database

[I1 01:42] It's kind of a pain to have to go up to the second floor, northwest corner of the building and talk to mike and say "Hey is this room reserved?" So I mean it kind of works, buts it's hard to communicate.

[I2 04:36] Each department schedules their own classes.

[I2 17:55] I like the fact that the system is in a relational database and would like that to stay the same.

[I2 01:06] For an event we schedule it in our banner system, and there is a little component in banner helps us with scheduling.

[I1 03:10] The process of reserving a room just ended up being word of mouth, I ended up talking to like six different teachers to find out if anyone was planning on using that room.

[I1 00:27] As far as I know the current scheduling system consists of a Google calendar.

[I2 12:45] The Eccles center and activity center does all their scheduling through microsoft exchange.

[W 29:00] At the library we use google calendar, although we also use outlook for internal scheduling for staff.

[I1 09:38] I think there should still be someone to oversee everything, make sure things are running smoothly, make sure rooms are being used when they're reserved.

16. Major Work Roles

Major work roles:

- Registrar
- Student
- Faculty
- Building/Department Manager
- Outside Network
- Central Scheduler (Proposed flow model)

Machine roles:

- Database

17-21. Diagrams and Models

Our Personas:

Student

System User

The student of Snow College will be the one group of users of the scheduling system. They would like to reserve rooms for club meetings, study groups, etc.

Problems -Knowing how to schedule a room -Knowing which rooms are available -Getting kicked out of reserved rooms -Finding who to talk to to reserve a room	**Needs** -Needs to access information about room availability -Need information about how to schedule rooms and who to contact -Make reservations easily	**Goals** -Save time and effort by replacing the current system -Motivation: simplify the process -Have an overview of the scheduling system
Demographics -Snow college campus -Most are tech savvy -Interested in seeing a software implementation -Wide age range	**Context** -Use the software on a PC or mobile app -review current room reservations -need to be able to reserve room at the last minute	**Fears** -Fears that they will get kicked out of the room they reserved -Difficult to understand process of scheduling rooms

Registrar/Building Scheduler

Scheduling Manager

The scheduling manager possesses a complete knowledge of the current scheduling system and the underlying issues associated with it.

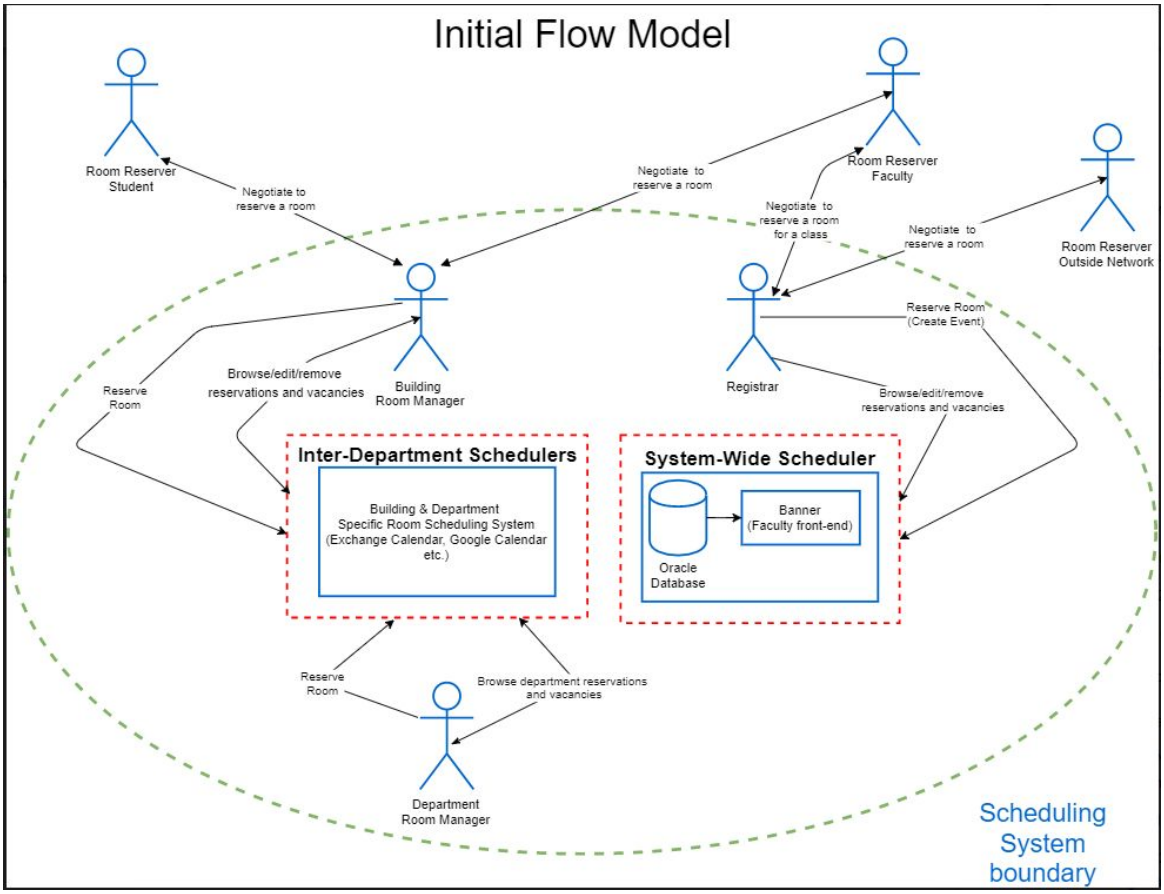
Problems	Needs	Goals
-Finding rooms that are available -having multiple people request the same room -Double booking a room if multiple people are allowed to schedule -Providing technical support for presenters -keeping track of all booked rooms	-A centralized scheduling system -Need a way to ensure rooms are never double booked -Need a way to maintain control over the rooms they manage -Needs a way to monitor currently reserved rooms and who needs technical support. -Needs a way to restrict access to certain "specialized" rooms	-To have a centralized scheduling system that also allows each building scheduler to maintain a certain level of control over the rooms in their building -Save time in the scheduling process -Have a better way to keep track of all room reservations and needs of the room reservers
Demographics	**Context**	**Fears**
-Employees in charge of managing rooms for campus buildings -Tech savvy or willing to receive training -Not interested in giving up scheduling control to a central campus scheduler	-Use google calendar, outlook, or banner scheduling system according to the building scheduling system. -Check in on presenters to teach them and ensure they are able to use the room technology. -Answers calls after hours if there are problems with the room.	-Double booking or even triple booking a room if multiple system are utilized -Receiving flack and being blamed for problems that are out of their control with the current system -Not being able to maintain control over their building schedule

Snow College Faculty

System User

The faculty members of Snow College will be one group of users for scheduling system. They would like to reserve rooms for classes, class activities, and events.

Problems	Needs	Goals
-Knowing room details such as, technology in room, room capacity, room setup -Knowing how to schedule a room -Knowing which rooms are available	-Needs to access information about room availability -Need information about how to schedule rooms and who to contact -Need the ability to make reservations easily -Need up to date information about the room in question (problems with room technology) -Need to be able to pick room that suits their needs	-Work less to schedule a room by saving time and energy required to do so -Simplify the process -Have more control over the choice of room
Demographics	**Context**	**Fears**
-Snow College faculty members, such as professors or snow college staff -May or may not be tech savvy -Wide age range of users and technological capabilities	-A faculty member who wishes to schedule a room must find and contact a room scheduling manager either through a phone call, email, or face-to-face conversation -No software is utilized by faculty members for the current system implementation	-That they can't find an adequate room for their needs. -That there are technical problems with the room that haven't been reported or addressed


Initial Flow Model
Room Reserver Student
Negotiate to reserve a room
Negotiate to reserve a room
Room Reserver Faculty
Negotiate to reserve a room for a class
Negotiate to reserve a room
Room Reserver Outside Network
Reserve Room
Browse/edit/remove reservations and vacancies
Building Room Manager
Registrar
Reserve Room (Create Event)
Browse/edit/remove reservations and vacancies
Inter-Department Schedulers
Building & Department Specific Room Scheduling System (Exchange Calendar, Google Calendar etc.)
System-Wide Scheduler
Banner (Faculty front-end)
Oracle Database
Reserve Room
Browse department reservations and vacancies
Department Room Manager
Scheduling System boundary

Section 4

Requirements & Design:

Generation of the Requirements and Beginning Design of the System

1. Current System Concept Statement

The Simplified Sckhaedgeuler (SS) provides simple and efficient room scheduling for large organizations. SS is easy to learn, and easier to use. With online access through our web portal, users are able to manage reservations throughout campus. Existing room schedulers and building administrators will be allowed to retain whatever measure of control they desire, or they can let SS handle it autonomously. Users will love the many built-in smart features, including email confirmations and reminders. Feedback and maintenance is also handled effortlessly, allowing users to report issues with reservations which will be instantly made known to management, and other room reservees. In short, the Simplified Sckhaedgeuler overcomes the challenges of traditional room management, allowing the process to be effortless and enjoyable.

2. Scope of Our Project

We began to trim and tailor our scope within this phase of the project. During our interview with the registrar and assistant registrar we realized a need to include the ability to

schedule not only events, but also classes. During our various interviews we also found the need for a central scheduler and would like to include that in the scope of our project.

The scope of our project will include a central scheduler who has complete control of the system and various sub-users of the system. We would like to have the current building manager retain some control over their building, but trim down their access according to their needs and the needs of the central scheduler. We would also like to provide access for faculty and students to be able to schedule certain rooms through a web page. We have not included the ability for outside business to schedule rooms within our scope because we found this is a rare occurrence.

3. Design Requirements

How we extracted requirements

From the WAAD, specific representative data items were selected, and using deductive reasoning, product requirements were derived. This worked very well, but the rigidity of this process can overcomplicate requirement extraction, especially when the person explicitly states a requirement.

Notifications

Our solution will include email or text communication with the user, and thereby send reminders about reservations, as well as notifications if the status of a room is changed, or issues are reported in the feedback.

[I1 08:27] A reminder about the reservation would be nice, so I don't forget. A text *message or something like that.*
[W 12:48] I would like notifications if the status of a room's attributes have changed.

Emails and Text Messages are common forms of reminders/notifications. The customer here states that they would like a reminder about the reservation. We can conclude that our solution should include email or text communication with the user, and thereby send reminders about reservations.
Because we are already employing email and/or text message notifications, and the user wants to be notified of changes in the room attributes, **we will ensure that the user is notified via email or text when any changes are made to a room's current status, or feedback is given reporting problems with the room or any of its equipment.**

Low-Cost

We will develop a low-cost solution, that we can market at a competitive price.

[I2 26:15] We are a small institution, we try and keep our costs low.

In order to keep its costs low, an institution needs to keep its expenses down. Therefore, **we should strive to develop a low-cost solution, that we can market at a competitive price.**

Room Details/Feedback

We will include a room details page which includes what equipment the room has. Our solution will allow room users to easily give feedback about any problems with the room or it's equipment, and we will cause that the room details page is instantly updated with any problems noted in the feedback.

[W 07:54] I want the room description to be kept up-to-date with what is broken, such as technology that has been complained about or issues with the room.

Details about the room would logically be shown before the reservation is made. The people most likely to notice problems with the room are those who use it. The status of the room could change quickly. Therefore, we should include a room details page which includes what equipment the room has. **We should allow room users to easily give feedback about any problems with the room or it's equipment, and we should keep the room details page updated with any problems noted in the feedback.**

Scalability

We will focus on scalability during development, and ensure our solution is efficient and lightweight.

[I1 12:54] Then that system would need to be very scalable to. Have to scale it very easily to incorporate new buildings.

Because the system we produce will need to scale, **we should focus on scalability during development, and ensure our solution is efficient and lightweight.**

Recurring reservations/Fast reservations

Our system will be able to create recurring reservations, and make reservations quickly.

[I1 06:22] When it's worked at its best we reserved a room for a meeting in the horseshoe room last year and we just went in and talked to whoever is in charge of scheduling at the GSC and they put us down every week at a certain time and we never had any conflicts. It only took about 2 minutes, no issues.

Because this was an example of success with the given system, we want to implement those things that made it successful. **We will allow our system to create recurring reservations, and make reservations quickly.**

Prioritization

Each reservation will be given a priority level, and allow higher-priority reservations take precedence.

[I2 14:59] Academic classes have priority for scheduling.

Because academic oriented reservations should take priority, **we will make sure each reservation is given a priority level, and allow higher-priority reservations take precedence.**

Manager Access

Our scheduler will allow for "Managers" to see everything as it happens, and have the choice to let the software handle the reservations, or give the manager the ability to approve/reject reservations for any, or all rooms under their jurisdiction.

[I2 18:53] It very hard to change because everyone has ownership in the part of campus that they are scheduling and it would be hard for them to give up their power. They feel responsibility for it and feel like they can take care of it better than a central scheduler.

Because users may resist relinquishing power, we can conclude that allowing them to retain some measure of control would appeal to them, and ease the transition. **Our scheduler will allow for "Managers" to see everything as it happens, and have the choice to let the software handle the reservations,**

or give the manager the ability to approve/reject reservations for any, or all rooms under their jurisdiction.
<u>Simplicity</u> **Our software interface will be simple and intuitive.** *[I2 29:15] Most of the software that's out there for scheduling, you have to do a lot of training on.* Because complex software requires a great deal of training, and the user would prefer to avoid training, **we will keep our software user interface as simple and intuitive as possible.**
<u>Reservations</u> **Our system will create a reservation record that will be used to manage rooms.** *[I1 01:26] The current system is somewhat effective because you can get the room reserved, and you hopefully won't get kicked out if you have a reservation.* Because our software needs to create reservations, **we will create a reservation record to track reservations made using our software.**
<u>Unity/Consistency</u> **Our scheduler will have a single point of access. User and administrator views will be similar.** *[I1 16:30] I want a uniform and consistent interface so the experience is the same wherever you access the system.* Because the user wants a consistent interface, **we will try to minimize and unify points of access, and keep the interface for users and administrators as similar as possible.**

No Native Outside Business Support
Our software will not include native support for reservations made by outside entities.

[I2 09:17] We don't have a ton of outside businesses coming in to use our rooms.

Because few outside businesses frequently make room reservations, **we will not handle that specific scenario.**

Web Access
Our solution will be used by clients and managers through a web portal.

[I1 22:58] I think there should be a website available so we can make reservations from anywhere.

Because most if not all of our target users will have access to the internet, and all administrators will have internet access, **we will use a web portal as our solution's point of access.**

Public Vacancy List
Our scheduler will have a live viewable vacancy list for each room.

[I2 21:45] I would like to see a vacancy list that anyone can view.

Because users of our system will need to see vacancies before reserving a room, **we will include a live display of vacancies viewable by all users.**

Optional Hidden Details
We will provide the option for any reservation to have its details hidden, and the room simply seen as 'reserved' by other users.

[I2 23:18] We live in the world of protecting privacy, the federal privacy act of 1974, so every time something happens we're stopping to ask "Is this going to violate anyone's privacy?"

Because of the potential issues due to privacy concerns, and because the institution is bound by the federal privacy act, **we will provide the option for any reservation to have its details hidden, and the room simply seen as 'reserved' by other users.**

4. Models and Rationale

User Classes: We identified user classes to see where our work roles intersect and what class of users our system needs to cater to.

Work roles: We wanted to determine our work roles for this system to gain a better understanding of who was involved with the scheduling system.

Personas: For many of the work roles we identified, we decided to create a persona that further explains the work role we are trying to understand.

Social Model: The social model shows the different social interactions within the workplace and outside the workplace. This diagram shows the feelings and the concerns of all involved with this new system, SS.

Flow Model: In order to show the "flow" or the interaction and order of things when using our software. It shows what person is allowed what access, etc. It shows the systematic process between people and system.

Hierarchical Task Inventory Diagram: We created this diagram to identify tasks involved with each work roles. This will help guide our design process by ensuring we are designing our system to be able to do the tasks needed by each user.

Usage Scenarios: The construction of usage scenarios helped us identify barriers within the current system that we needed to address within the design phase.

Artifact Model: The system we will be implementing will consist of several disparate parts that must communicate effectively. The artifact model allows us to see the associations between these parts, and identify further potential barriers.

Omitted Models: There were a few types of models that we did not include as we felt we were able to express our points with the above mentioned models. Some of the models that we did not include were a Physical Model (Work Environment Model) and an Information Object Model. If you look at the models that we included, you can see a full picture and story of the usage and the design of our software.

5. User Models

User Classes

- **Managers:** These people are highly trained individuals who work with the system on a daily basis. They have varying level of administrative abilities. The goal of a scheduling manager is to maintain control of the various rooms available to reserve and make sure user’s needs are met.

- **Event/Reservation Creators:** These people are users of the system and may or may not have a familiarity with the technology. Their goals is to create a room reservation according to their needs.

Work Roles

Primary Roles

- **Reservees/System Users:** Includes all those who will use the system to make a reservation*(Has Sub-roles)*.
- **Managers:** All those who are given jurisdiction over any portion of a building, building, or group of buildings*(Has sub-roles)*.
- **Administrator:** A single highly trained individual, with full access to the entire system. This individual controls the level of access for all other system users.

Sub-Roles

- **Registrar(Manager):** The registrar is an experienced user and is in charge of scheduling classes throughout campus. This person has a high level of access for scheduling classrooms.

- **Building Manager(Manager):** The building manager will maintain a certain level of control over their building as needed. They are able to view scheduled rooms, remove user access to certain rooms, deal with problems associated with rooms, and remove certain reservations.

- **Faculty(System User):** The faculty members of Snow College will have general

computer skills. They Will use the web page to reserve rooms for classes, class activities, and events.

- **Students(System User):** The students of Snow College will be another group of users of the scheduling system and also have varying levels of computer skills. They would like to reserve rooms through the web page for club meetings, study groups, etc.

Mediated Roles

- **Outside Businesses:** Not included in our scope. These users will be routed through a manager or the administrator, who will make the reservation on their behalf.

Personas

Administrator

Administrator

The System Administrator has been thoroughly trained and possesses a complete knowledge of the scheduling system and the underlying issues associated with it.

Problems	**Needs**	**Goals**
-Keeping all rooms operational -Keeping scheduling software running smoothly -Mediating disagreements -Handling erroneous reservations -Ensuring the system runs smoothly	-A centralized scheduling system -Need a way to maintain control over all rooms and the system managing them -Needs a way to restrict access to certain "specialized" rooms -Needs the ability to override changes made by any other users -Needs a way to control privileges of other users	-Allow the Administrator to override changes made by any other users -Allow the Administrator to assign and control Manager privileges. -Allow the Administrator to view reservation history and Manager behavior. -Allow the Administrator to modify system behavior.
Demographics	**Context**	**Fears**
-Employee who has experience in room management. -Employee who has experience in software management -Employee with good communication skills -Reliable -Tech savvy or willing to receive training -Responsible and preferably well liked.	-Use and maintain the scheduling system -Monitor manager behavior -Be available to mediate and correct system issues -Answers calls after hours if there are problems with the room.	-Receiving flack and being blamed for problems that are out of their control with the current system -Not being able to maintain control over everything -Not knowing how to solve a problem.

Manager

Scheduling Manager

The scheduling manager possesses a limited knowledge of the current scheduling system and the underlying issues associated with it.

Problems	**Needs**	**Goals**
-Keeping room details and status up-to-date -Mediating disagreements -Providing technical support for presenters -Keeping track of all booked rooms	-A centralized scheduling system -Need a way to ensure rooms are never double booked -Need a way to maintain control over the rooms they manage -Needs a way to monitor currently reserved rooms and who needs technical support. -Needs a way to restrict access to certain "specialized" rooms	-To have a centralized scheduling system that also allows each building scheduler to maintain a certain level of control over the rooms in their building -Save time in the scheduling process -Have a better way to keep track of all room reservations and needs of the room reservers
Demographics	**Context**	**Fears**
-Employees in charge of managing rooms for campus buildings -Tech savvy or willing to receive training -Responsible	-Check in on presenters to teach them and ensure they are able to use the room technology. -Answers calls after hours if there are problems with the room. -Help mediate disagreements and solve problems	-Receiving flack and being blamed for problems that are out of their control with the current system -Not being able to maintain control over their building schedule

Reservee

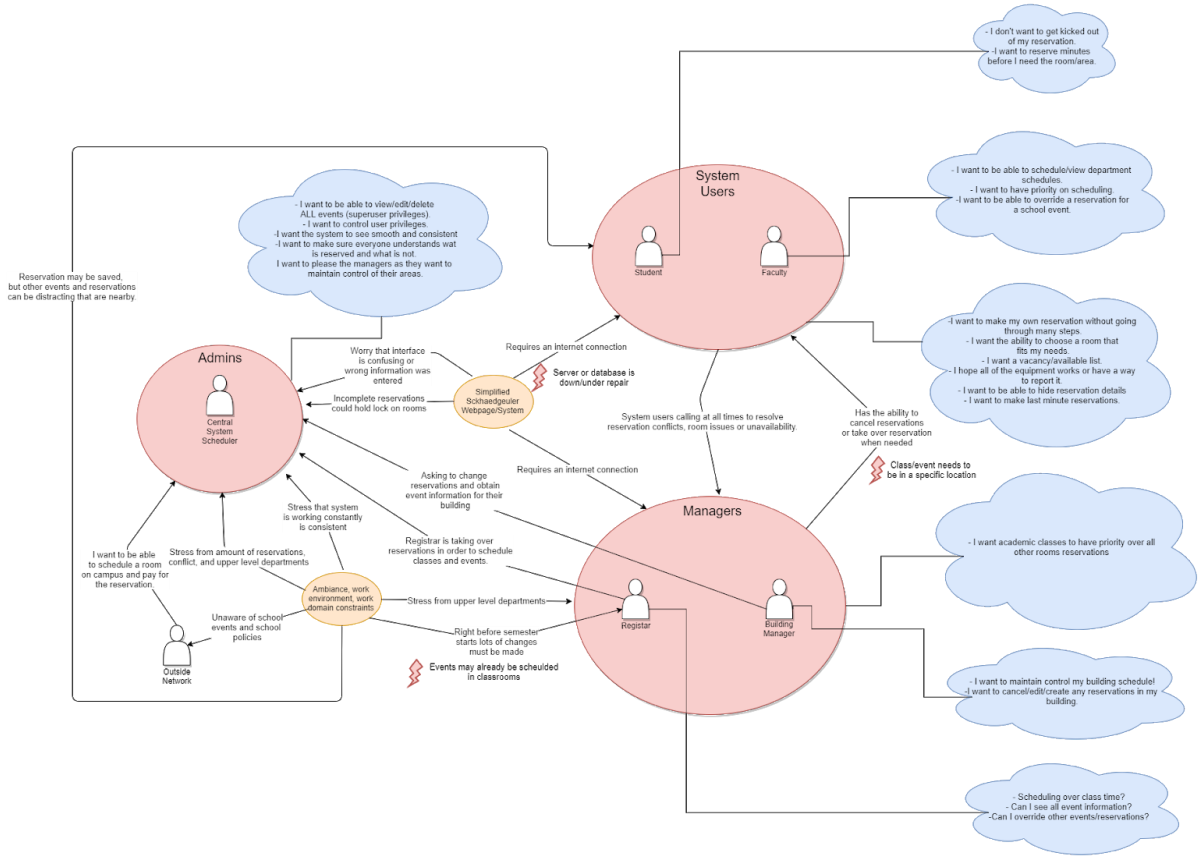
System User

The reservee needs to make a room reservation. They would like to reserve rooms for club meetings, study groups, etc.

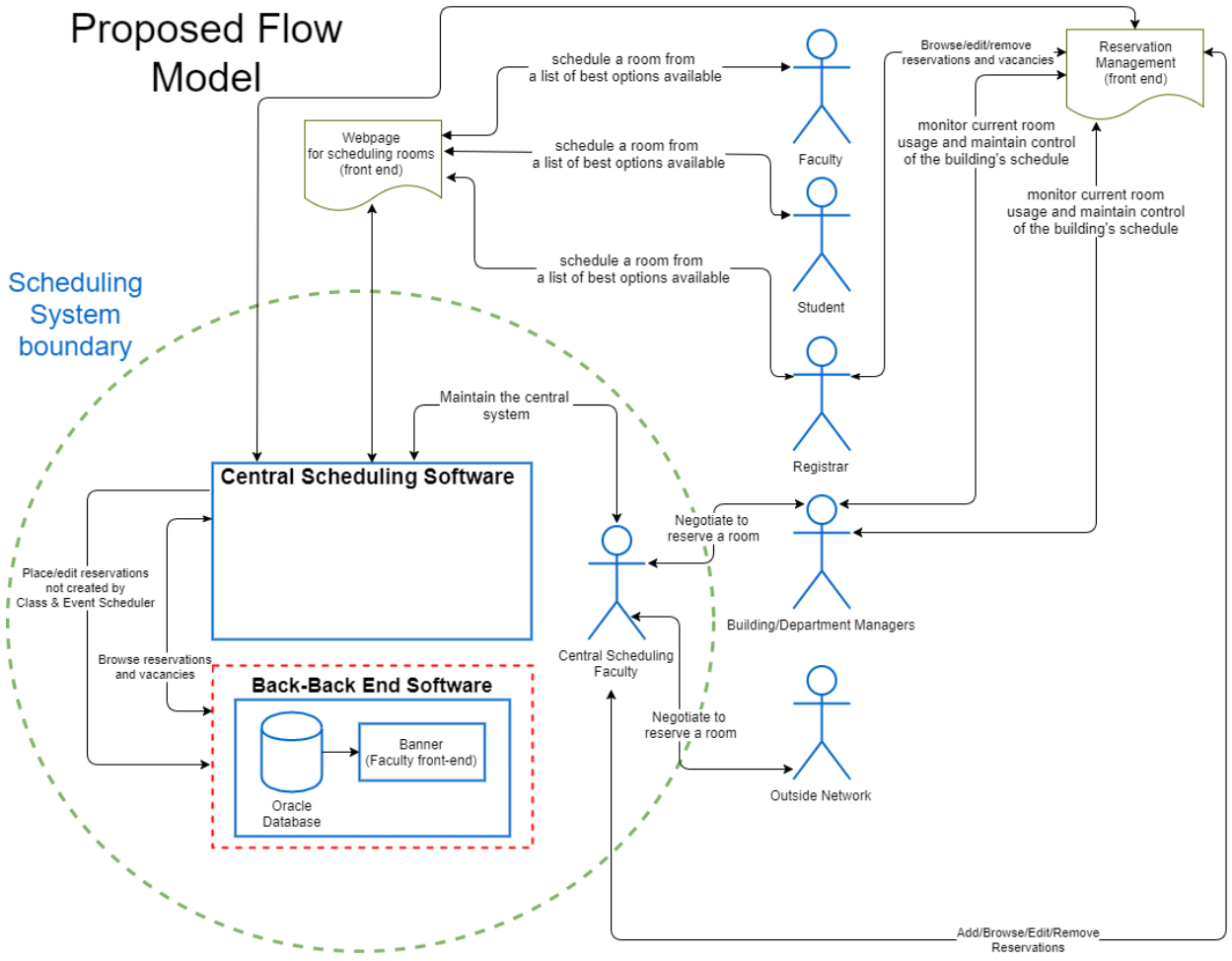
Problems -Knowing how to schedule a room -Knowing which rooms are available -Getting kicked out of reserved rooms -Finding who to talk to to reserve a room	**Needs** -Needs to access information about room availability -Need information about how to schedule rooms and who to contact -Make reservations easily	**Goals** -Save time and effort by replacing the current system -Motivation: simplify the process -Have an overview of the scheduling system -Ease of access
Demographics -Snow college campus -Most are tech savvy -Interested in seeing a software implementation -Wide age range	**Context** -Use the software via a web portal -review current room reservations -need to be able to reserve room at the last minute	**Fears** -Fears that they will get kicked out of the room they reserved -Difficult to understand process of scheduling rooms -Fear of speaking to someone to make a reservation

Social Model

SS Social Model



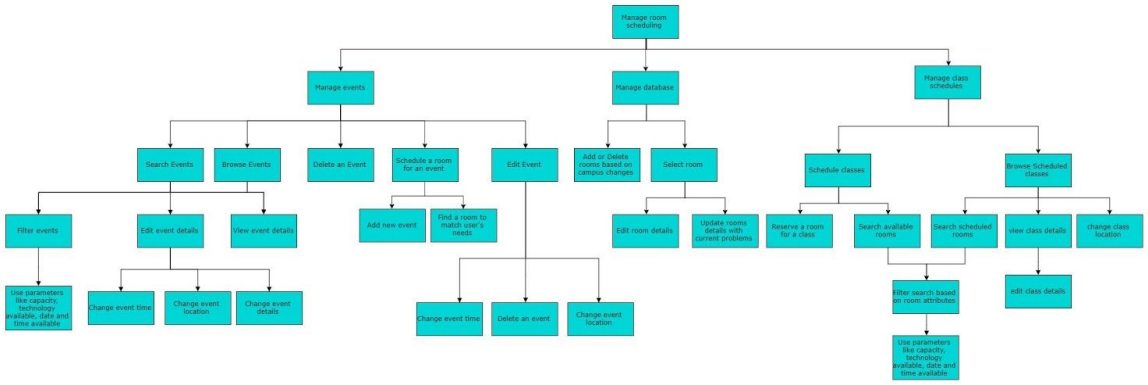
6. Usage/Flow Model



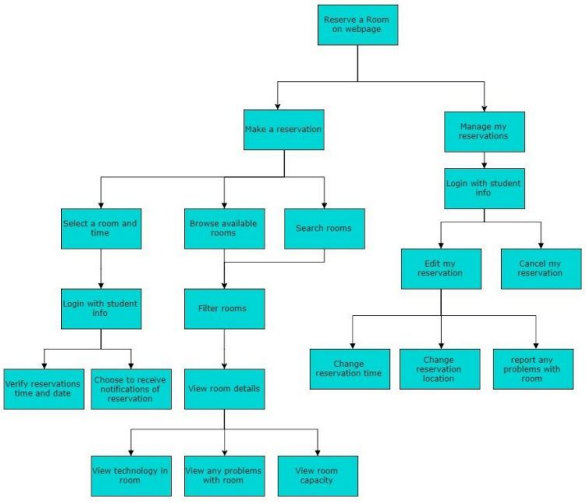
Hierarchical Task Inventory Diagram

We have three different Hierarchical task inventory diagrams for our scheduler. Similar to the book, we found many work roles had mutually exclusive task sets, and therefore we created three separate HTI diagrams.

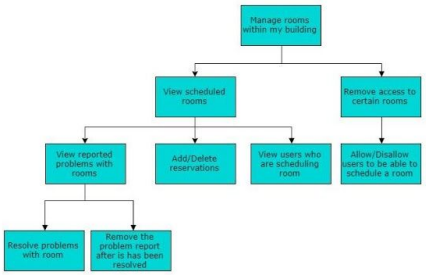
Central Scheduler



Reservation Makers (Student or Faculty)



Building Manager



Usage Scenarios

Usage Scenario about a group of students using the “as is” system:

During class one day a group of students are assigned a project together. Alex and his group members plan a schedule for their group meetings and need to find a place to hold their group meetings. They agree that the library would be the best place to hold their meeting as they know there are study rooms and conference rooms available to use.

With their first meeting coming up, Alex visits the library early in an attempt to find a room suitable for a meeting with a large group of people(). The group also has certain technological requirements for the room so he has to check that each room also meets their technology needs (). He walks around the library and is able to find 3 rooms that will suit the needs of their group, unfortunately they are all occupied at the moment () and so he is unable to obtain a room for his group.

The group ended up using a small room without any of the technology they needed and it didn’t even have enough chairs for all the group members () so they had to keep the meeting short and were unable to get through the amount of material needed for that meeting.

For the next group meeting Alex wanted to be prepared by attempting to schedule a study room at the library, thinking this was a possibility. He went to the library days ahead of the next meeting and asked the front desk employee for information about how to schedule a room for a group study session. The employee

didn't have information about how to schedule a room (), but they were able to lead Alex to a manager who did know about room scheduling. The library room manager told Alex that there was no system setup () for the study rooms in the library, they were first-come first-served, but if he wanted to schedule a conference room he could work with the manager to find a time that would work for their group. Alex contacted his group members and found a time that would work for them all, then he returned to the room manager at the library to try and schedule a room at that time. Unfortunately there were no available conference rooms at that time. Alex had to communicate back and forth between his team members and the library manager many times () before he was able to schedule a room that fits his group's needs. The group is happy but Alex leaves with a feeling that there has to be a better way to schedule a room.

Envisioned Usage scenario for Simplified Sckhaedgeuler

During class one day a group of students are assigned a project together. Alex and his group members plan a schedule for their group meetings and need to find a place to hold their group meetings. They agree that the library would be the best place to hold their meeting as they know there are study rooms and conference rooms available to use.

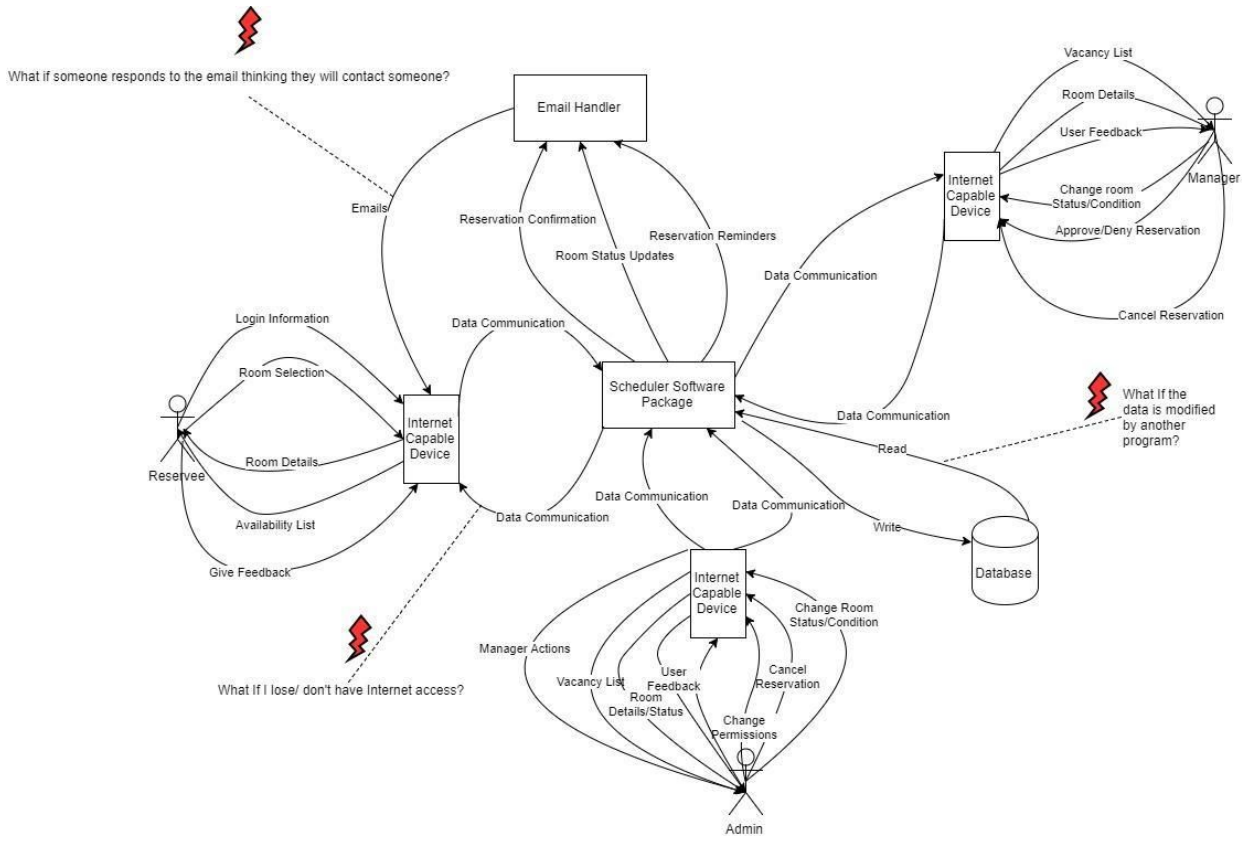
While the group is discussing which time works best for meeting each week, Alex pulls up the Simplified Sckhaedgeuler web page and begins a search to find all the room on campus that will fit his group's needs. Alex is able to filter his search according to rooms that hold a capacity of at least 8 people and also contain the technology their

group will need for their study session. He comes up with a short list of 4 different rooms across campus that fit his description. He is able to click on each room and view the schedule for each. He presents this information to the group and right away they are able to schedule a room that matches their needs. They are able to schedule the room once a week on tuesday nights, for a total of 3 weeks. The group, now having a solid room reservation, is able to begin working on their project without any problems.

7. Work Environment Models

Artifact Model

Because our system does not contain many physical artifacts, the Artifact Model contains few ‘physical ’artifacts and is very similar to the flow model, however it does provide a unique perspective.



8. Barrier Summary

Trigger	**Goal**	**Barrier**
Room is reserved by someone	Find a room that is suitable	Room is not suitable for our needs
Rooms are all taken	Find a room that is available	There are no rooms available when we need one.
Room scheduling is a process done by few select people	Be able to schedule my own room	There is no information about how to schedule a room
The process of scheduling a room has many steps	Make the process more simple	There are many steps to go through to make a reservation
I cannot pick a room that fits my needs	Have the ability to pick a room based on certains attributes	I am unable to pick the room, so it may or may not fit my needs
I cannot reserve a room if I have no internet access	Provide other ways to reserve a room	No internet access available
I forget to check my email for notifications	Provide other ways of notifying users.	Notification email is responded to but no one is checking that inbox
Database is not up to date with new changes	Update database with any changes made to the system	Database data is modified by other software
Class needs to be scheduled for the future in a room that has been reserved for the future	Override reservation and notify System User	Events may already be scheduled in a classroom when making class schedule

Power is lost, database needs updating, database is corrupted	Get services up and running as quickly as possible	Server or database is down/under repair
Class or event needs a specific location that is already reserved	Override reservation and notify System User	Class/event needs a specific location

Section 5

Design:

Generation of the Design Concepts and Ideas for the System

1. Updated System Concept Statement

The *Simplified Sckhaedgeuler* provides an all-around solution to room scheduling for the Snow College campus. From students to building managers our software adapts to fit each user's needs:

- Experience a consistent and easy to use web interface.
- Finding a room for last minute study sessions is no longer a problem.
- Searching for the "right" room has been simplified, users can filter search results to find the room of their dreams.
- Academics take priority! No more getting kicked out of your reservation.
- Managers will maintain control of each building and receive up-to-date feedback about room issues from users.
- View and report issues with a room instantly.
- Never forget a meeting again! Sign up for notifications to receive reminders about your upcoming reservations and events to which you've been invited.

Our software helps all overcome the challenges of traditional room management, allowing the process to be effortless and enjoyable.

2. Our Tailoring of This Project

One obvious way we tailored the activity is in the omission of a physical model. Since our product is software only, we cannot accurately depict it with a physical model. The tailoring of our project can also be seen by our inclusion of three personas. Our product will be used extensively by three very distinct groups, and we could not find a single persona that accurately represented all of these diverse perspectives. We chose to include three personas, one representing each of these distinct user roles. Likewise, we had to create storyboards depicting events that might befall each of our personas, or people like them.

We began our project with the ideation phase. We met together as a group and did some brainstorming, keeping our personas in mind as we did this activity. We also did some sketching as a group and many sketches individually that we presented to the group for review. Through ideation and sketching our design began to emerge. We created a mental model diagram to help us gain a better understanding of the user's mental model and how well our mental fit the user's perspective. Then we began to develop a conceptual model through sketching to map the mental model to a conceptual representation.

Overall, as we would be users of this system and know that atmosphere of the institution and what it would take and what other users want, we were able to incorporate design features that would please all different types of users and needs.

3. Our Personas

In order to meet the needs of our users, we began by creating real personas for whom we could target our design. As the book suggested, we started off with several ‘candidate’ personas, and tried to narrow them down to one that would represent our users. We narrowed it down to three personas: Paul Jordan, Jonathan Steel, and Mary Smith. We were unable to eliminate any of these three, as they were so different, and each represented a distinct group who would be interacting with our product. Paul, Mary, and John were all three present in our minds as we engineered the user experience of the Simplified Sckhaedgeuler.

- Paul is a typical college student. He is a music major, working part time at a pizza place, and is involved with several group projects in multiple classes.
- Mary is the Library administrator at Snow College. As such, she is in charge of the rooms in the library. This includes handling reservations and managing equipment.
- John is employed by Snow College as the reservation System Administrator. John’s responsibilities include managing the reservation system in general, overseeing managers, and mediating problems.

4. Ideation & Sketching

Ideation

For ideation our team met in the the Computer Science classroom and collaboratively brainstormed ideas for our project. We focused on the 13 main points we had extrapolated from the Work Activity Affinity Diagram (our ideation bin from Project #3), and began by individually writing and sketching our ideas for the personas on the board under those 13 sections. After

brainstorming individually, we came back together and began to explain our ideas to the other groups members.

During our ideation review we had the design-informing models in the back of our mind to make sure we covered all the needs that users had already expressed. We also thought about the barriers related to the user we discovered in our design informing models, and did our best to resolve, minimize or avoid them. We asked questions about ideas and added on to existing ideas and even came up with a few new ones as a group. One of the hardest things we had to be careful to not do is to not critique each other's ideas and would remind ourselves to stop if a question turned into a critique.

Even in our ideation phase, we found that many of our ideas were better expressed with sketches. These simple sketches were all included in our final sketches in one form or another, and they served as a starting point for our more inclusive sketches.General ideas, interactions, flows and descriptions fit into diagrams and flows for our group.

Sketching

The transition from ideation to sketching was a fluid one. We were able to express the design ideas that came up during ideation through sketches. Sketching served as the primary foundation for our conceptual models and helped us build an understanding of each of our different mental models as designers. Sketching also brought out many new ideas and possible solutions to user pain points.

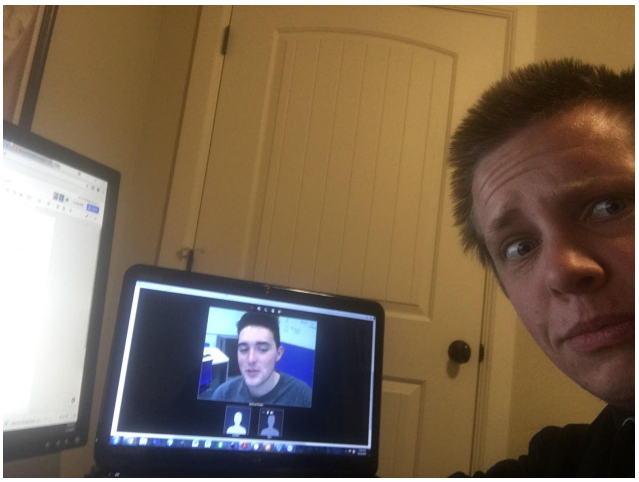
5. Our Workspace

We had two main “workspaces” one being our classroom and the other being virtual (through online collaboration). For the classroom we met at times we could have the room mostly to ourselves, free from distractions. The large whiteboards became our design canvas and we quickly filled up the whiteboards with our ideas. We also used paper and pencil in order to communicate ideas and shared them through online file sharing. This workspace became a place where we could bounce ideas around and do collaborative brainstorming without the concern we would be criticized. This workspace encouraged the flow of ideas and each team member brought a different perspective to the table which encouraged a variety of ideas.

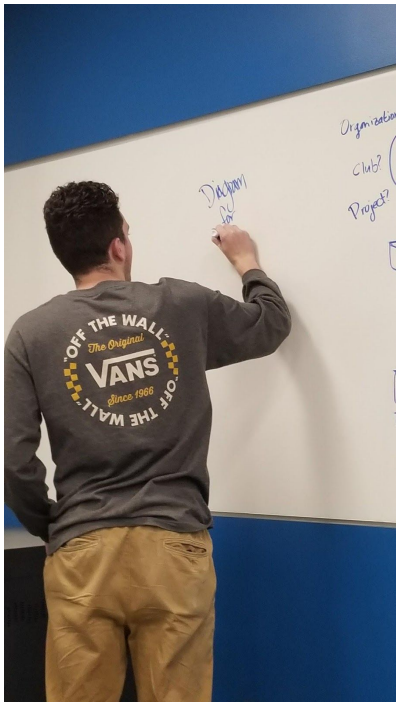
Our virtual workspace became a place we could communicate our ideas while away from each other. As busy students we couldn’t always afford the time required to meet in person but with Google Drive and other various document sharing software we could maintain conversations and ask each other questions or review design ideas that came up between our physical meetings. This workspace allowed our project to continually move forward.

6. Our Team at work

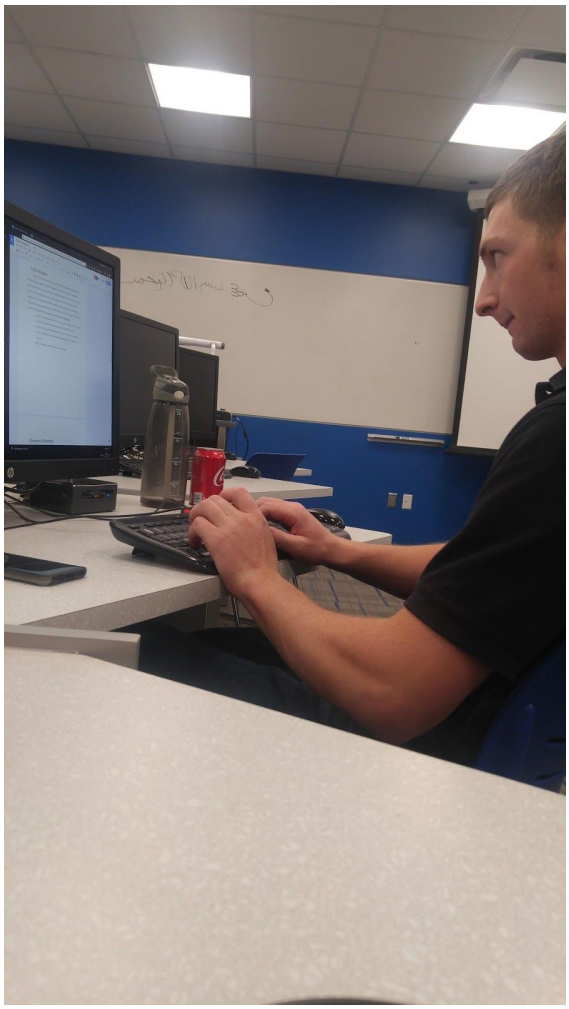
We met many times as a team during this phase of the project. We met in person and virtually to make sure we had time to communicate our ideas and work on our design together.



Alex using TeamViewer to meet virtually and collaborate with Jackson and Leedan



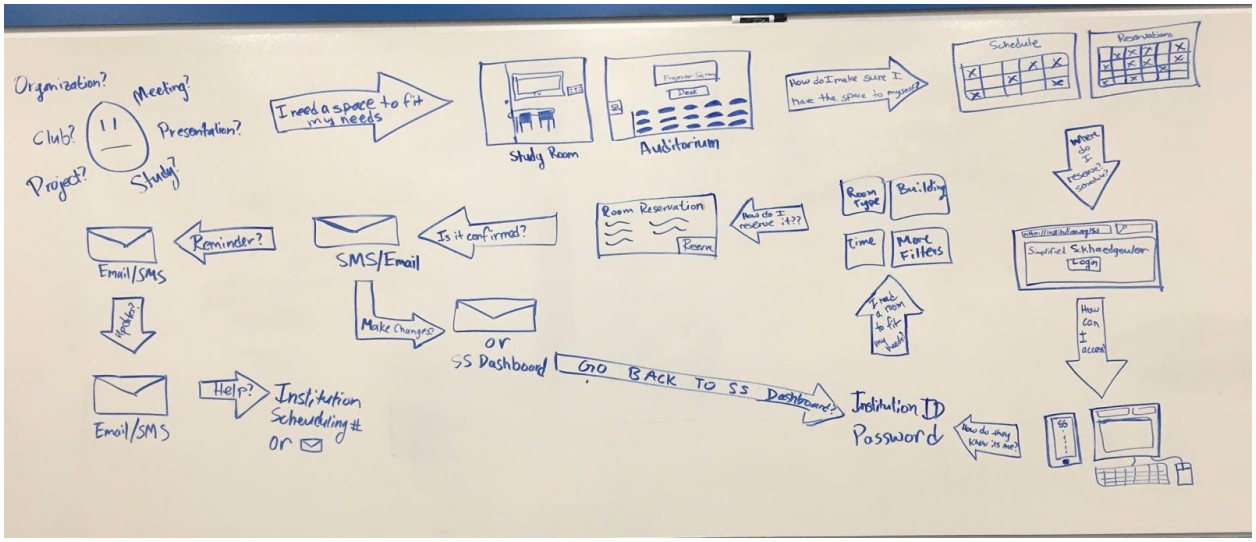
Jackson sketching away on the whiteboard



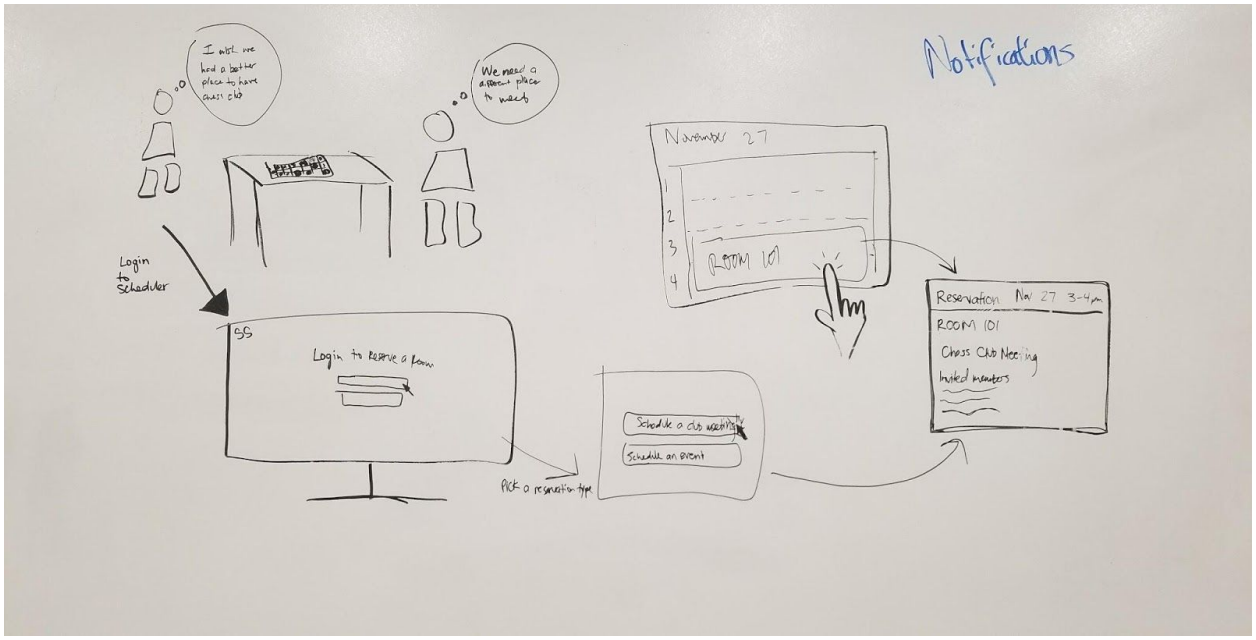
Leedan working on the project using virtual tools and collaborative means (GSuite)

7. Sketches

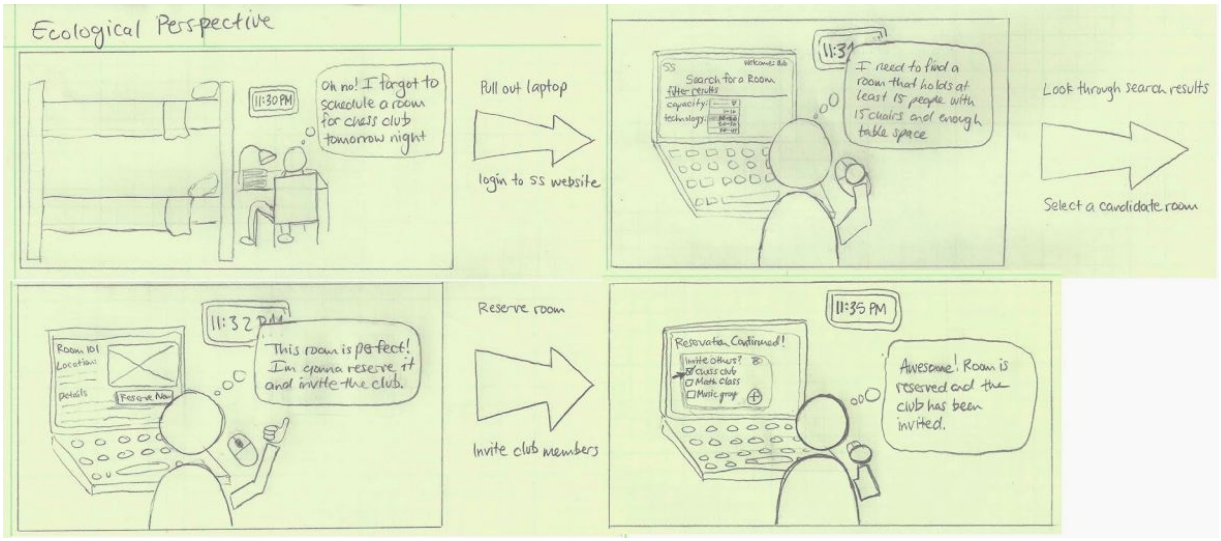
Here we included a few of the sketches from our project:



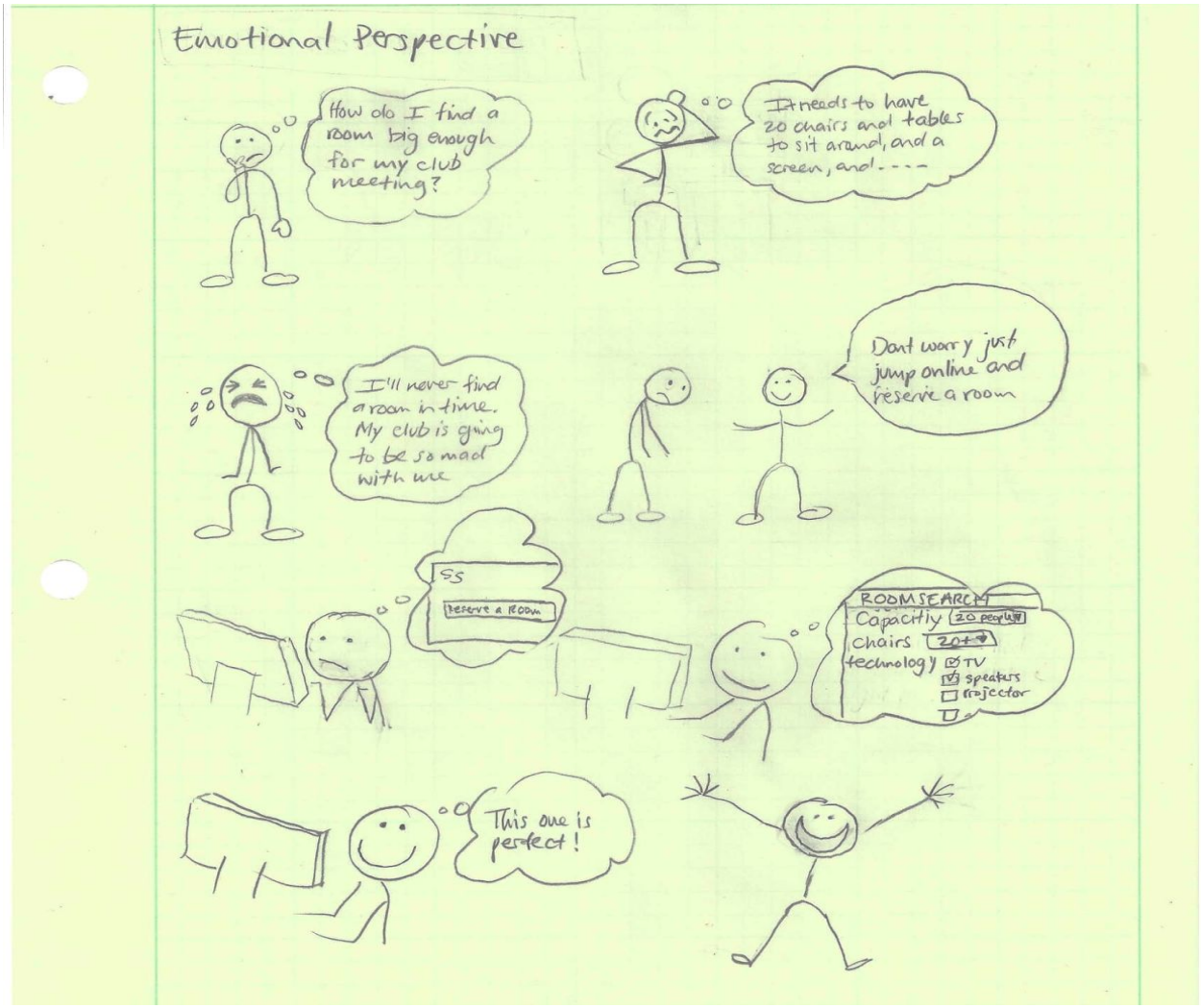
Whiteboard Sketch



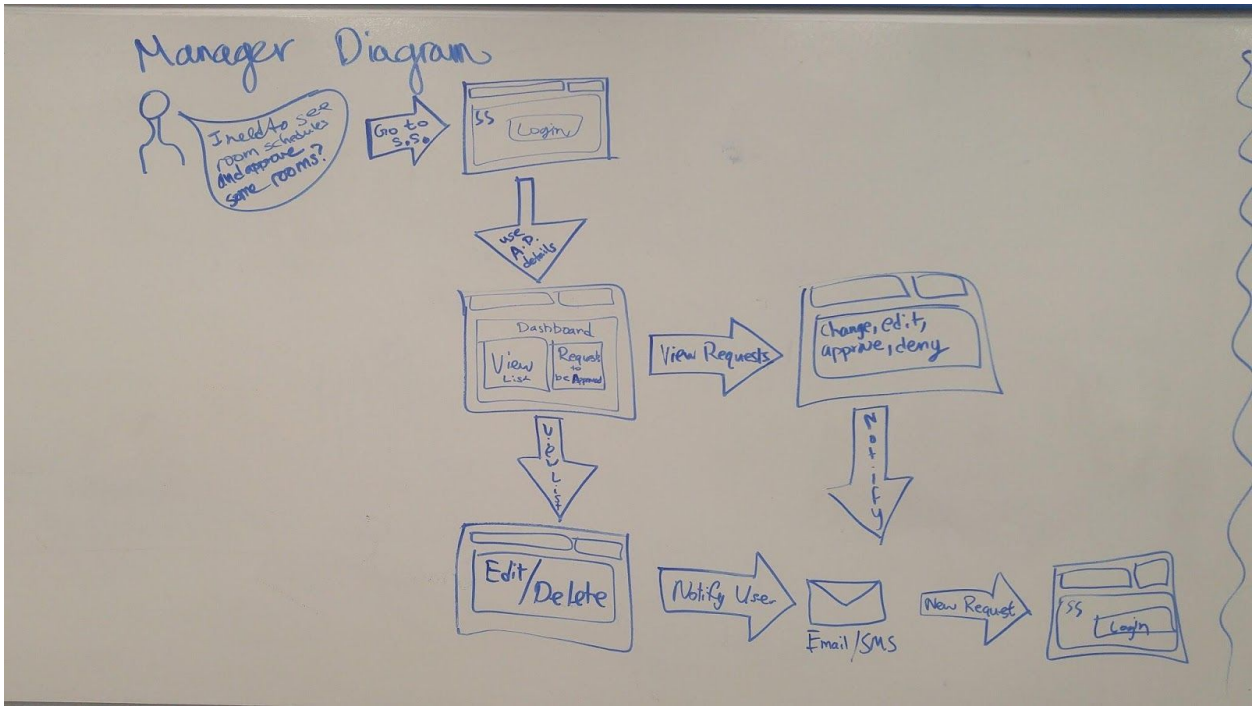
Another Whiteboard Sketch



Quick ecological sketch in storyboard style



This sketch focused on the emotional perspective during the process of reserving a room.



This sketch focused the process a manager would have using *SS* and the communication managers have with normal system users.

8. Physical Mockups

We did not create any physical mockups for this phase of the project, it did not seem necessary.

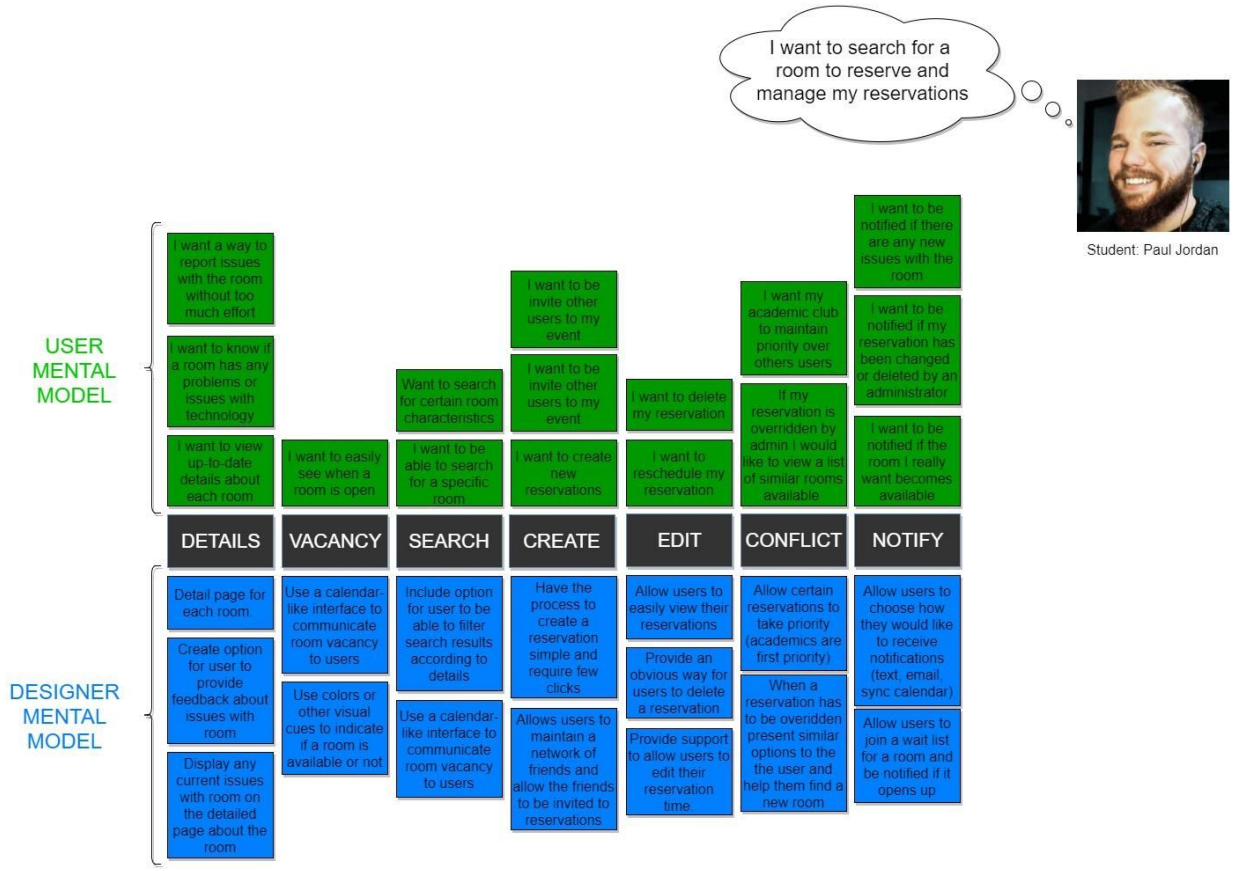
We felt we could adequately portray our ideas in other ways as our software is web based we

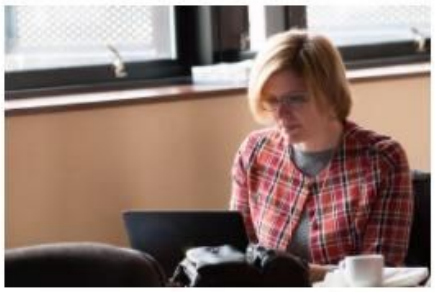
are not designed the devices connecting to the internet.

9. Mental Models and Conceptual Design

Mental Models

We read about a technique that could help us diagram our design mental model and map it to the users mental model. We used our contextual data design-informing models to fill o out this mental model diagram. This technique allowed us to visualize the mental models and fill in any missing gaps.





I want to manage the rooms in my building

Building Manager:
Mary Smith

REQUEST	VIEW	NOTIFY	FEEDBACK	PRIORITY
I want to be able to approve or deny certain requests	I want to view high priority event so I can prepare the room as needed	I want to immediately know when there is an issue with a room	I want to view all current reported issues	I want to be able to override low priority reservations to make space for a higher priority event
I want to close down certain rooms to requests only	I want to track room usage and users who last used room	I want reminders of high priority reservations	I want users to report room issues so I can deal with them sooner	I want some events to have priority over others
	I want an overview of all building reservations			
Allow building manager to control access to certain room	Provide a daily/weekly overview of building reservations	I want to send out a notification to the manager of high priority meetings	Provide a section for user to report issues or problems with rooms and its equipment	Add an attribute to each reservation for priority (hidden from or accessible to user)
Provide capability to easily allow users to generate requests and for the building manager to approve or deny with one click	Provide a way for the building manager to track room usage statistics	When a problem is reported with a room immediately send a notification to the building manager	Provide a portal for the manager to access the feedback to track and resolve these issues	Allow manager to remove and override low priority reservations and approve or deny requests from users to assert their priority
	Provide a simple to understand interface that shows reservations and visual cues for high priority reservations			

I want to override lower priority reservations and maintain control of the campus schedule

System Admin:
Johnathan Steel

MAINTAIN CONTROL

I want to remove certain rooms from public availability (IVC rooms, the planetarium, auditoriums)

I want to be able to override any reservations

Allow the admin to have super user capabilites

Allow admin to remove certain rooms from public reservation search

GRANT PERMISSIONS

I want maintain permission lists for some rooms and keep reservation access limited to those users

Allow the administrator to create a permission list for certain rooms and only allow users on that list to be able to reserve a room

Provide a simple and easy way to add users to a permission list and allow users to request access and have the admin approve or deny the request

VIEW

I wan to easily view different room details and costs associated with reservations of those rooms

I want a quick overview of the schedule for each building

I want to quickly and easily view event details so I can answer questions from others

Allow admin to view and track room access

Provide a daily overview of important events scheduled

Have the option of maintaining a cost table for certain room that charge for reservations

PRIVACY CONCERNS

I want to hide details for events scheduled that need to maintain privacy

I want to maintain privacy for the system users

Provide a way for users to hide details from public view

Provide support for admin to maintain user privacy through permissions and masking certain details from the public

Conceptual Design

"A mental model is the representation that a person has in his mind about the object he is interacting with. A conceptual model is the actual model that is given to the person through the design and interface of the actual product." (Susan M. Weinschenk. 2011. 100 Things Every Designer Needs to Know About People)

“A designer’s mental model is a vision of how a system works as held by the designer. A user’s mental model is a vision of how a system works as held by the user. It is the job of conceptual design to connect the two.” (Rex Hartson. 2012. The UX Book)

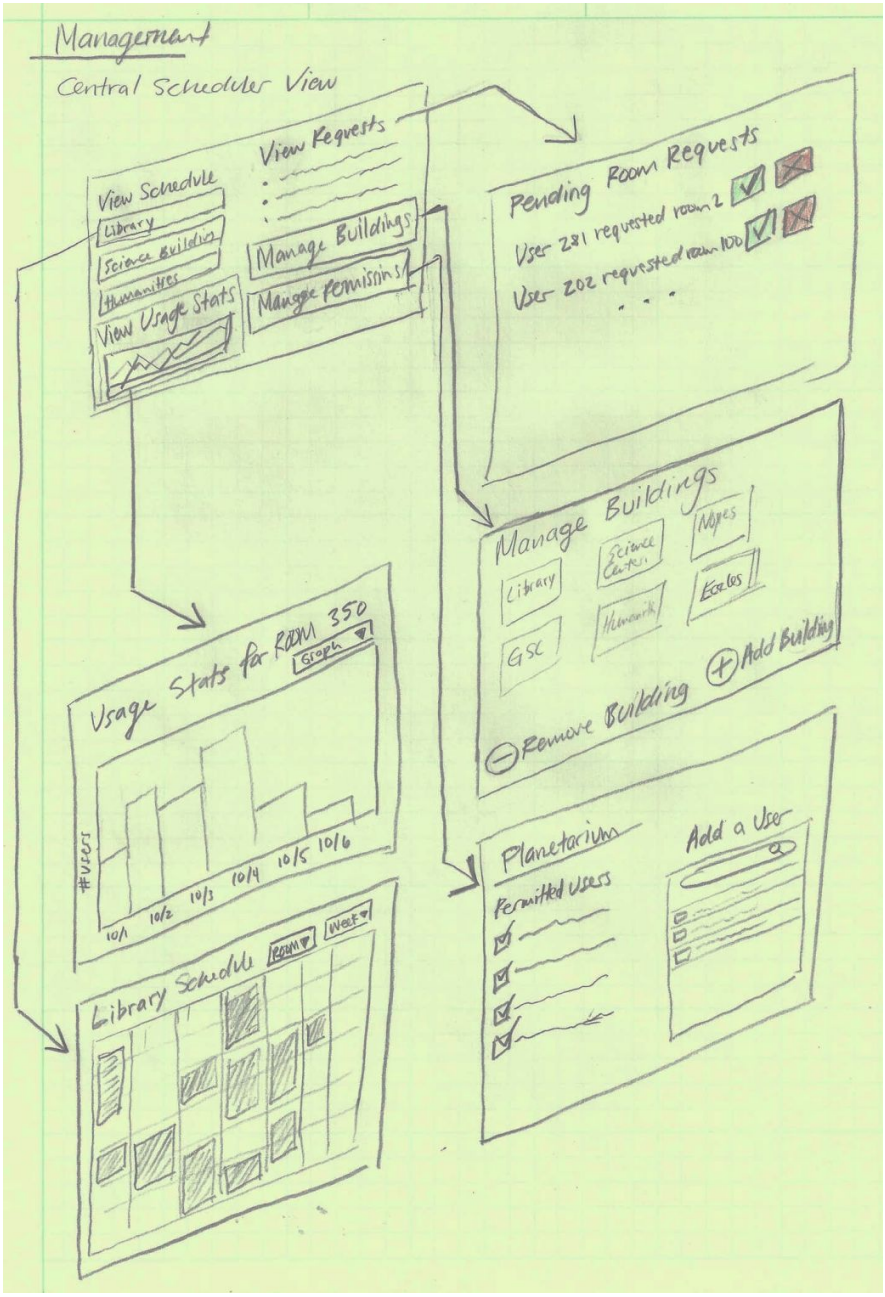
The conceptual design phase in our project acted as a map from our mental model, as designers, to the mental model of our different personas. We took the mental model of each persona and began sketching some conceptual models to match up. During sketching we referred back to design-informing models and our mental model diagram making corrections along the way to ensure they matched up.

Metaphors Used in Conceptual Design

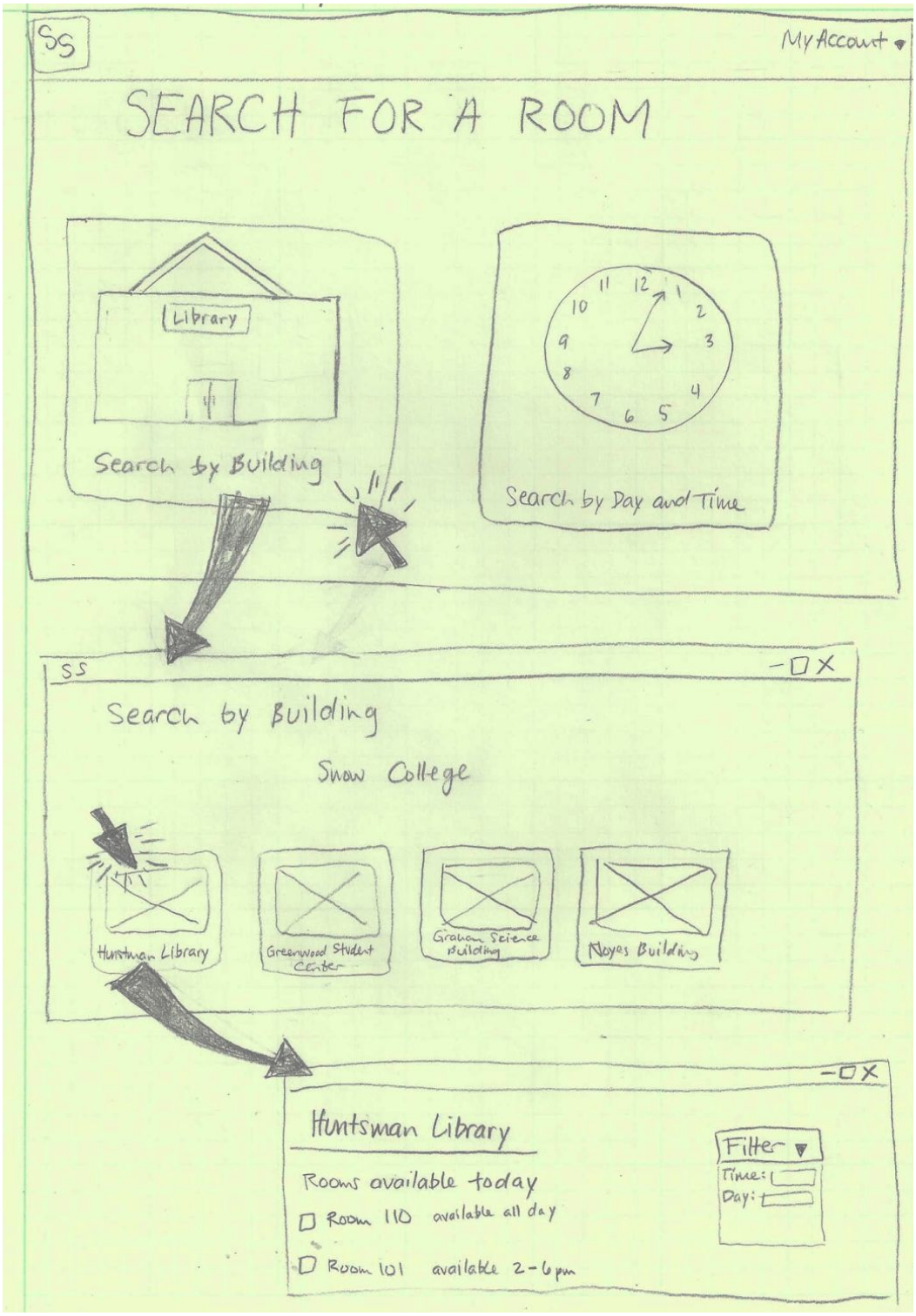
	Ecological Perspective	**Interaction Perspective**	**Emotional Perspective**
Student	The Simplified Sckhaedgeuler is like an easy-to-use filing cabinet with the schedule of each room on campus.	Finding a room is as easy as shopping on Amazon, and creating a reservation is as easy as writing your name on the door.	When you reserve a room with the Simplified Sckhaedeuler, it's as though you went and inspected the room personally, and wrote your name on the door. You'll always know exactly what you're getting.
Manager	The Simplified Sckhaedeuler is like having an assistant who does all the interacting with students, and tells you only as much as you need to know.	The Simplified Sckhaedgeuler can turn the difficult job of room management, into nothing more than reading a report of what it's done for you.	Like having your best friend as a co worker, the Simplified Sckhaedeuler will take on a ton of your workload, and keep you in the know.
Administrator	The Simplified Sckhaedeuler is like a collection of digital calendars, where the administrator can at last have all the control necessary to make sure things run smoothly.	The Simplified Sckhaedeuler is a bird's eye view of every room on campus, accompanied by the power to change it.	Like a finely tuned machine, the Simplified Sckhaedeuler enables you to do your job well while you're working, and keep going on it's own when you're not.

Conceptual Sketches

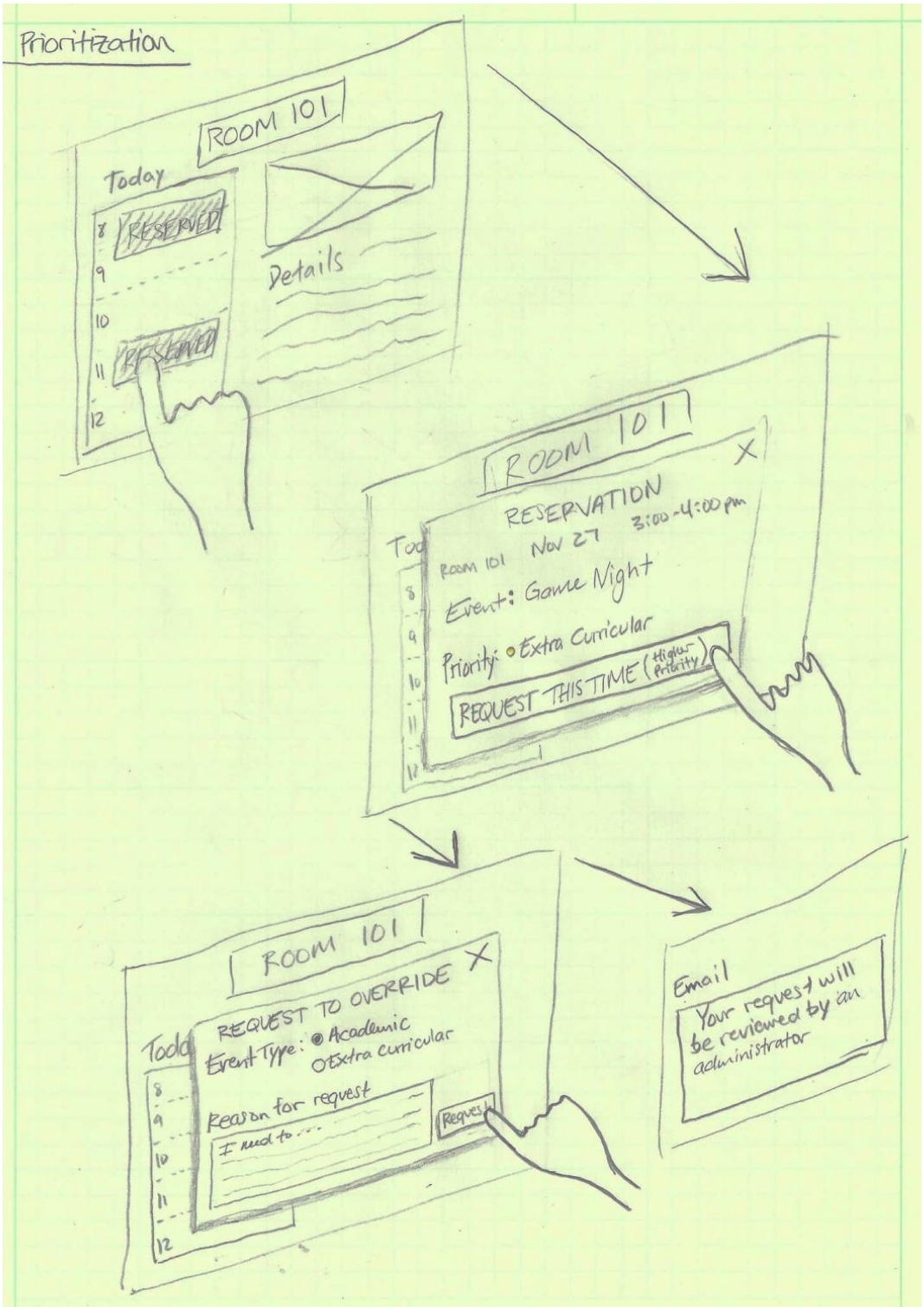
We created sketches to match with each of the personas. The following pictures are a few of these conceptual sketches we drew.



Early conceptual sketch of the managers view.



Conceptual sketch focusing on the student perspective.



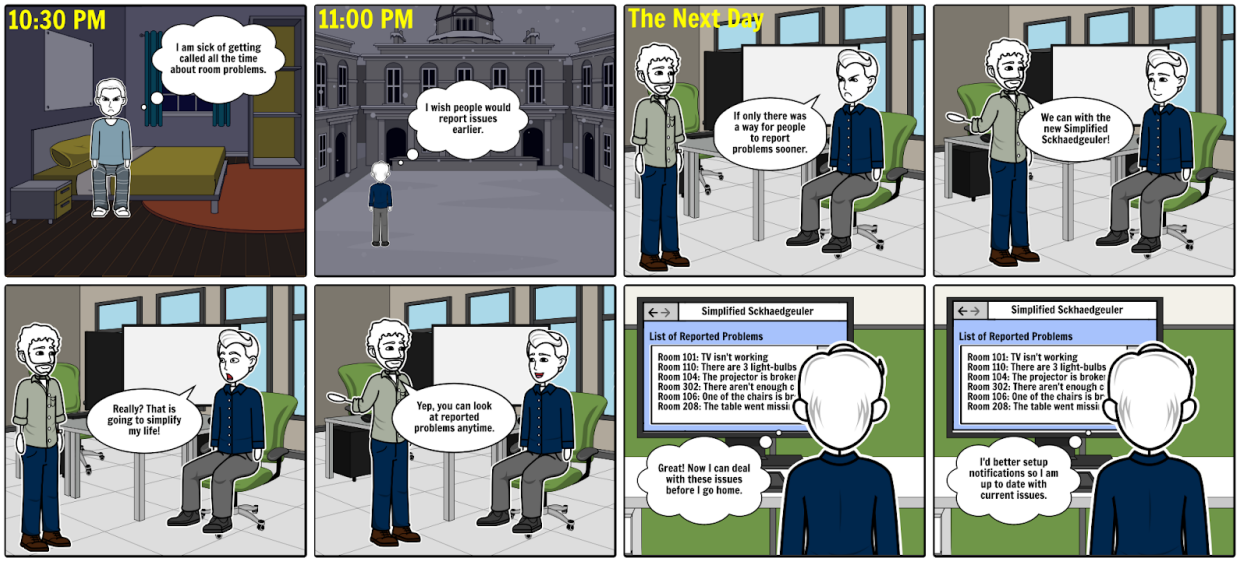
Concept for dealing with reservations of different priorities from the student perspective.

10. Storyboards

These storyboards were created for a few different users to help us gain a better understanding of the different perspectives of each respective persona. There is a storyboard for a building manager, student, faculty member, and system administrator. The transition from one frame to another is guided by the thought and speech bubbles. We are able to more fully visualize the user experience through these storyboards.

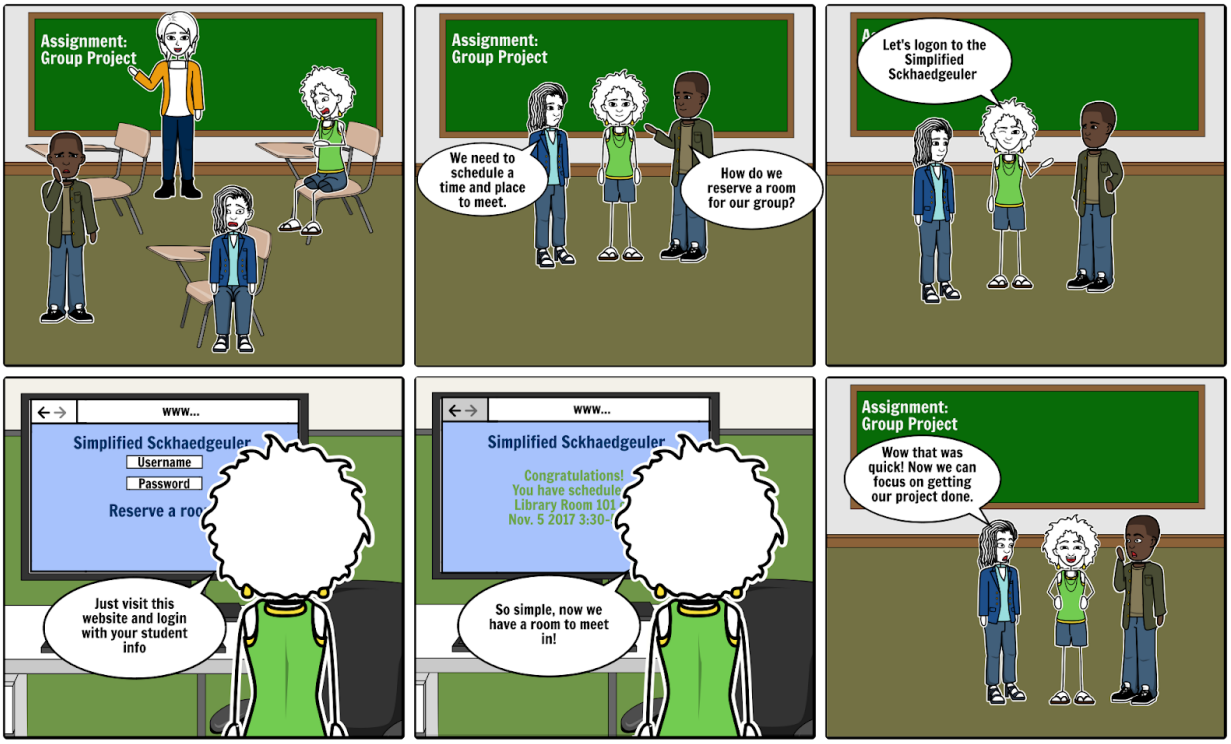
Building Manager

This storyboard attempts to depict the frustration a building manager goes through when trying deal with room issues in their building and how our software can solve this problem.



Student

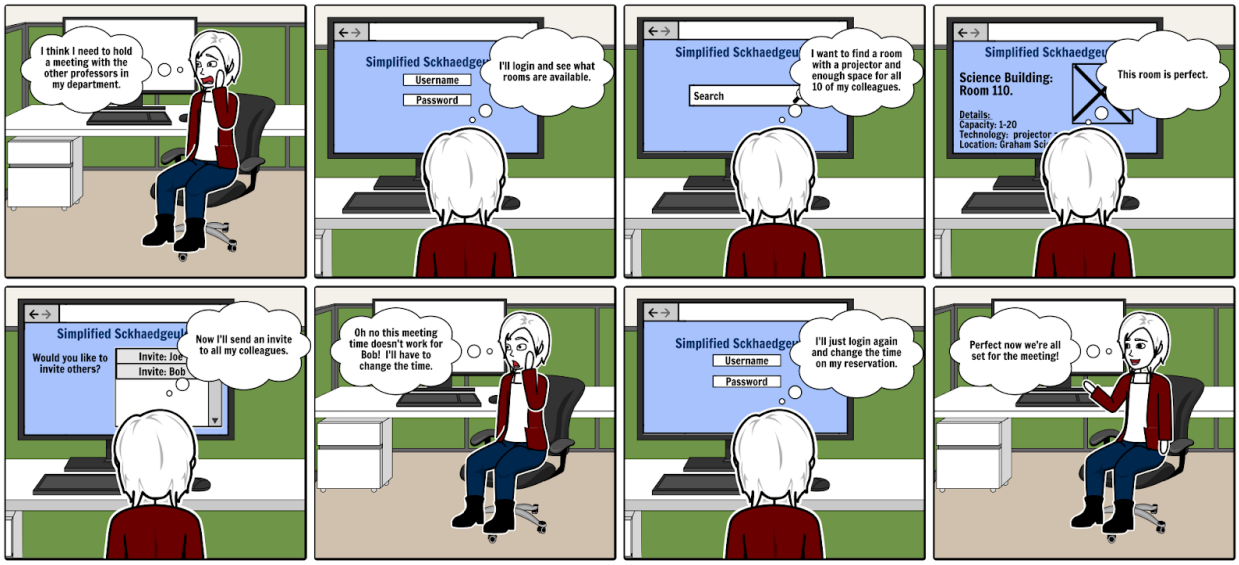
This storyboard depicts a student's perspective of a need to use the scheduling software to schedule a room for a group project. It is a high level storyboard that show interaction with the envisioned system.



Create your own at Storyboard That

Faculty

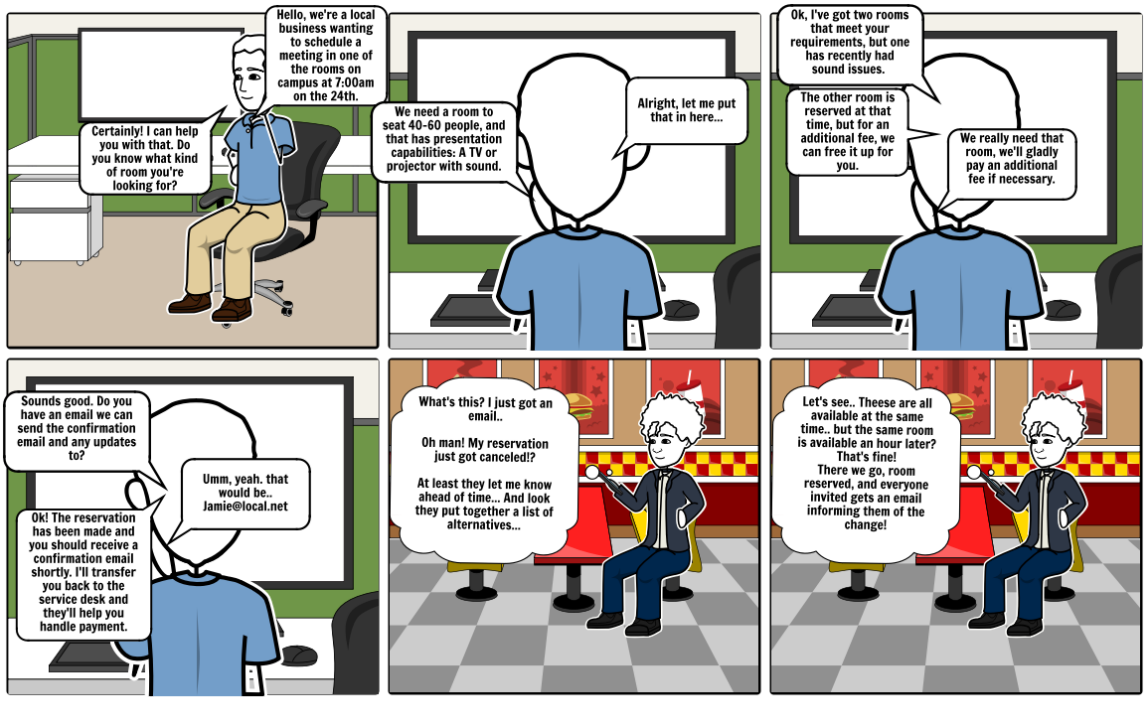
This storyboard contains a depiction of a possible scenario a faculty member might go through to use the envisioned software.



Create your own at Storyboard That

System Admin

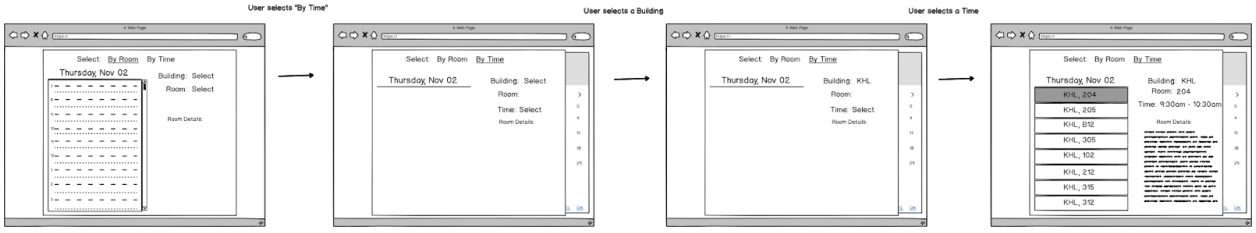
The following storyboard demonstrates some of the features of our system that are only available to the system administrator. It also shown how outside business reservations are handled without specific support for them being built into our product.

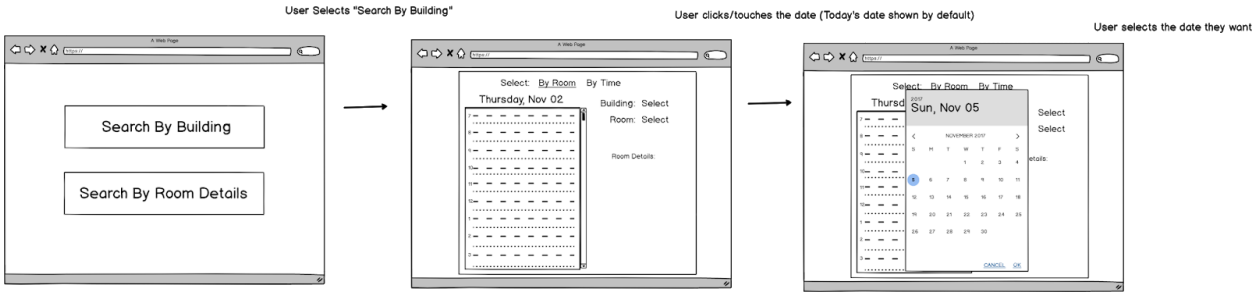


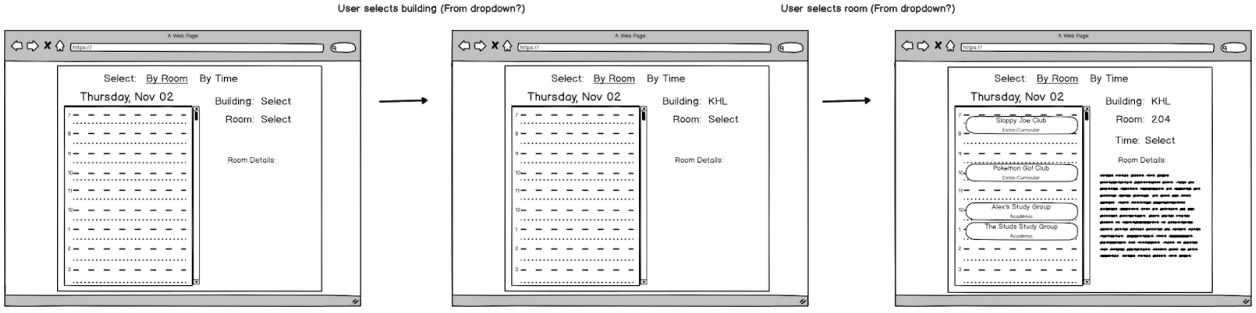
Create your own at Storyboard That

11. Wireframes

The wireframes we used were designed principally around the student, and their view as they made a reservation. It was difficult to envision a design that would allow the student to search for a satisfactory reservation based on different constraints, specifically date, room, and time. The following wireframes demonstrate these use cases. The wireframes will be continued to be worked upon on the next project.







12. Our Design Process

Techniques used

Communication between team members was of extreme importance during this phase. Our main forms of communication were in-person during meetings, comments on our in-progress documents online, virtual meetings and keeping up with each other through text messages. We were in constant communication and met often to work on our design.

We also divided up different parts of the process to work on individually. We assigned things such as sketches and storyboards out to different individuals. We each worked on our own section individually, and then during our meetings we would review each team member's work and make any necessary additions or changes.

Virtual meetings became a necessity during the weekends as we were not always within close enough proximity to meet in person. We used TeamViewer software and collaborated/shared documents and files using G Suite (Google Docs).

In addition to communication, we also used other tools (listed in the appendix) that helped create different types of diagrams within our project. We also used each other; from our experiences as users for so long with software that doesn't work well and that does, we knew partially of how the users really would feel when coming to use a product like ours.

Lessons Learned

I think we really began to understand what an undertaking it is to actually design a new product. It requires constant communication between team members and the need to constantly refer back to our contextual analysis to make sure our design matched up with the user's needs.

-AT

I learned the importance of designing with the persona in mind. I feel as though many of the features I had originally thought to include were either omitted, or drastically changed as I thought about the needs of a specific persona. When we used the specific design details we extracted from our Work Activity Affinity diagram, that was brilliant.

-LJ

I learned that my ideas are not always the right ideas. How I thought the software should work wasn't always the best idea. I learned that I might think that I am thinking of the user when I design, however, there are many things that I am forgetting. When working in a team, many more ideas and thoughts can be expressed better I could simply in my own thoughts. I learned that the ideas from the interviews and workshops we did a while ago really do apply to the design that we did in this project.

-JP

Insights gained

I think we felt like the design phase of this project was a bigger undertaking that we first realized. Our initial tendencies were to jump right over the ideation and sketching and move right into the conceptual design. We had to be extra careful to control this tendency which sometimes required looping back to the beginning and doing more ideation and sketching to make sure we covered all our bases. I think if we were to do this project again we would realize the importance of early ideation and intensely focus our first few meetings around ideation sketching to really bring out more creative ideas and ignore our existing mental models we had at that stage. Looking back to the beginning, our initial mental models from the first activity to now are extremely different and we began to realize the importance of overall process from contextual inquiry up until now.

-AT

The biggest thing I would do differently would be to avoid thinking about the product as a whole at the beginning, and treat each problem separately before combining them into a single product. I would also place a higher importance on thinking about what design decisions will make the product ‘familiar’ to the user, even when they haven’t used it before.

The biggest surprise for me was when we realized that recurring reservations should be approved by the manager. After we realized this it made a lot of sense, and there were a lot of things advocating that approach, but it wasn’t what I had originally envisioned.

-LJ

This project was definitely different for me. It is different that any other project that I have had to do in my previous education. I have seen design and different aspects of doing so in the past, but this project opened my eyes into how design is done in the world today. The biggest surprise for me would probably be the process. Going from ideation and brainstorming, to sketching (which is still hard for me) to wireframes, personas and the conceptual design behind them. Part of this is still confusing to me, but as I get more applications to use this process, I believe I will understand it better.

It was unexpected, unlike other projects, we couldn’t really do this project’s steps in any order that we pleased. It had to be done in a specific order or some parts would not align with each other or would not make sense. If I was able to do this project again, I would schedule a long session to be with my group where we do *all* the steps together so we can get better input from each other on what the software should look, feel and give to the users.

-JP

Section 6

Prototype:

Generation of a Prototype

1. System Concept Statement

The *Simplified Sckhaedgeuler* provides an all-around solution to room scheduling for the Snow College campus. From students to building managers our software adapts to fit each user's needs:

- Experience a consistent and easy to use web interface.
- Finding a room for last minute study sessions is no longer a problem.
- Searching for the "right" room has been simplified, users can filter search results to find the room of their dreams.
- Academics take priority! No more getting kicked out of your reservation.
- Managers will maintain control of each building and receive up-to-date feedback about room issues from users.
- View and report issues with a room instantly.
- Never forget a meeting again! Sign up for notifications to receive reminders about your upcoming reservations and events to which you've been invited.

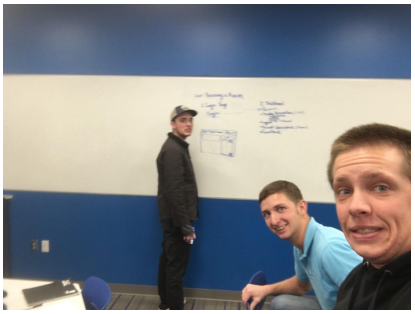
Our software helps all overcome the challenges of traditional room management, allowing the process to be effortless and enjoyable.

2. What We Included

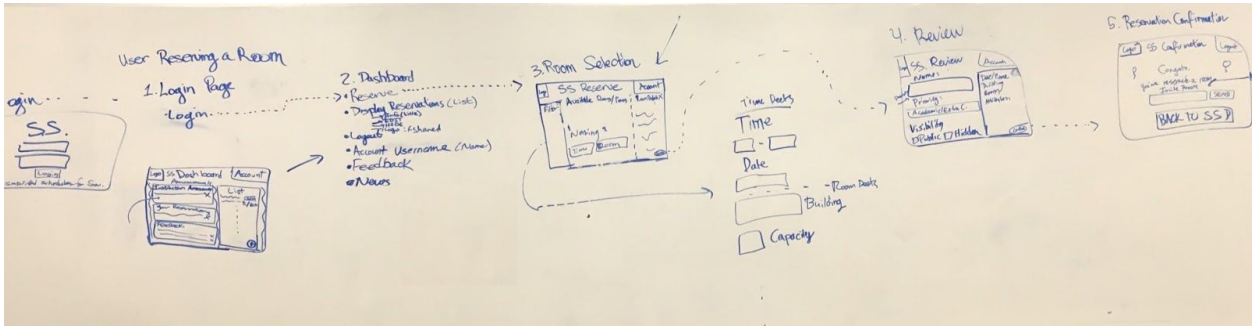
For this project, our group met many times and talked together about the different scenarios that we could have our users go through. We decided to include the following items (as seen in step 3) within our project as we felt that it was the most relevant and most appropriate to our project. The scenarios and tasks that we chose to wireframe were based off of needs and concerns of our interviewees and workshop participants in our earlier projects. This allows them to see that our product does indeed solve these issues they needed solved.

3. Process of Building

This project was different than any of the projects we have done before, and required the inclusion of all previous activities up to this point. This project is where all the ideas from

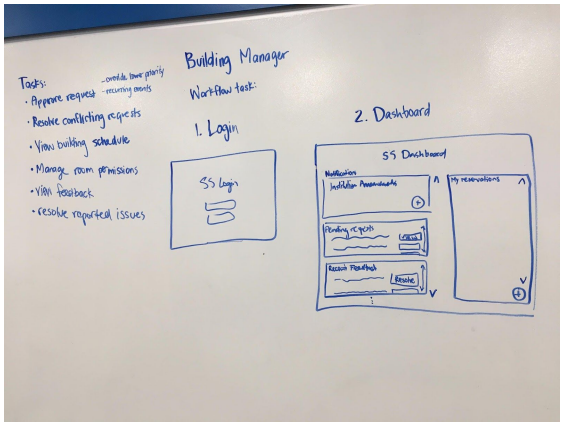


previous project start to come together into a single idea. To start out this project, we took ourselves to a whiteboard and began to create a workflow for each persona. We began by drawing ideas for our wireframes on the board and iterated through many different versions before coming to a common consensus. We focused on one main task for each persona and drew a quick idea of what the wireframes would look like for each persona. We wanted to keep the interface as consistent as possible between the users, so we reused many of the same concepts and layouts throughout all the wireframes we created.



For the system user persona the task we decided to represent was the process of reserving a room. We drew the process on the whiteboard (shown above) and then took those ideas and used a wireframing software called balsamiq to turn those sketches into wireframes. Leedan also created an html mockup of the website for the student persona, to allows us to see what the system would look like in a web browser. [Link]

For the Building Manager we went through a similar process, the task we decided to focus on for this persona was to resolve conflicting reservations and to view and resolve room feedback left by users. We created wireframes to represent these workflows with balsamiq software. When users leave feedback about issues they had while using the room, it automatically pops up in the building managers notification feed and they can view the feedback straight from the dashboard. Then they will either move the issue to pending or resolve it immediately depending on what the issue was.



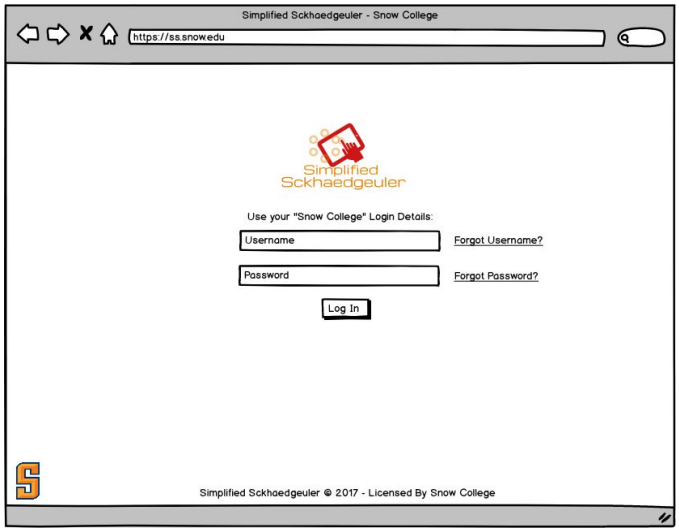
For the System Administrator persona we chose to give this person the task of resolving a conflict that occurs between a newly created outside business reservation that would need to override an existing reservation. The admin is in charge of resolving conflicting room requests and we created the wireframes that allows the admin to go through this process. For an outside

business to make a reservation they must do it with the system admin and when the admin creates a new reservation that conflicts with an existing one, the software will automatically detect this and allow them to decide which reservation to keep.

4. The Prototype:

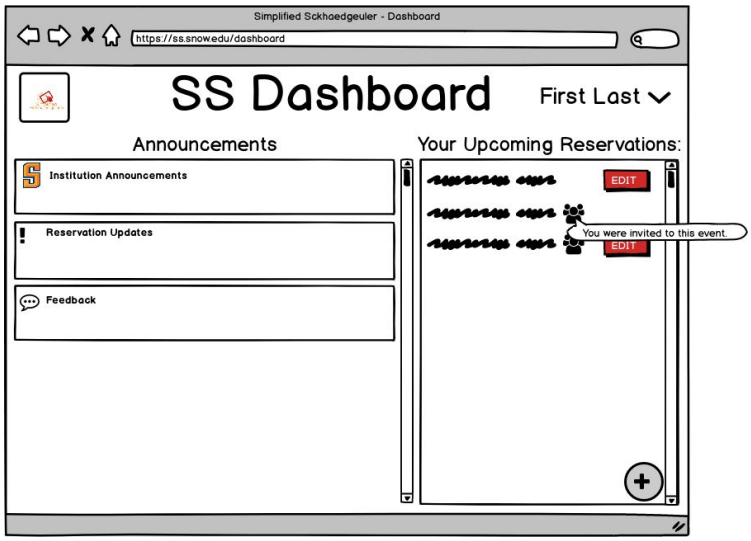
Below we have included our wireframes and described the flow between each wireframe. There are 3 workflows included for each person: system user, building manager (2 tasks shown here), and system admin.

System User - Create a room reservation

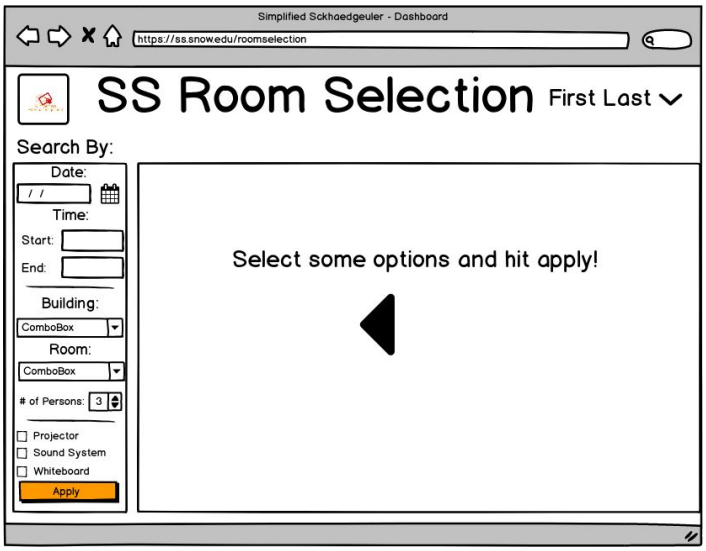


This is the Login page. It is the first thing that the user will see when attempting to use the Simplified Sckhaedeuler. This will be the same for all users of the system. Users will enter their credentials, and be taken to the system dashboard, which will vary by type of user. (Administrator, Manager, or Student)

Functionality is also included for resetting/recovering a lost username/password.

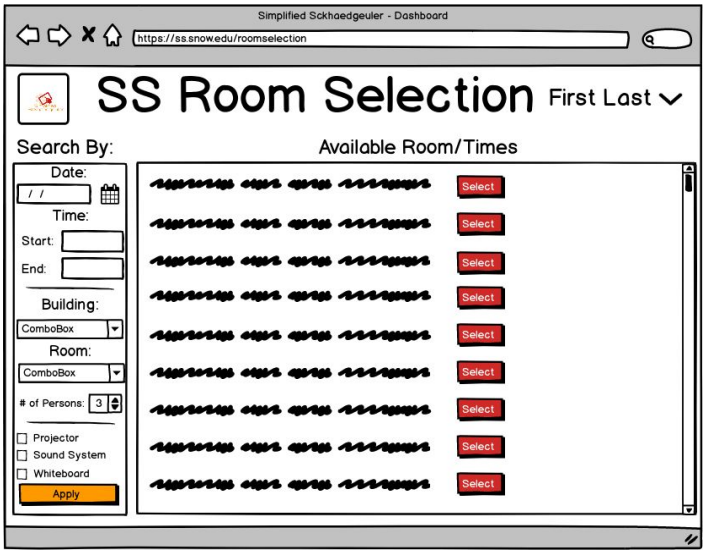


This is the student dashboard. On the left students can see notifications from the organization, updates about their reservations, and be prompted to give feedback regarding previous reservations.
On the right students can see any upcoming reservations, both those they have made, and those they have been invited to.
By clicking the '+' icon, they can add a room reservation.

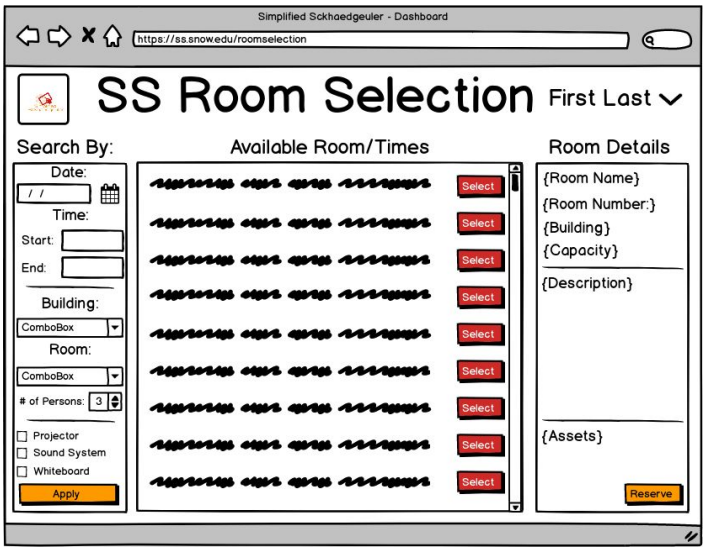


In the upper right corner, they can click on and manage profile info.

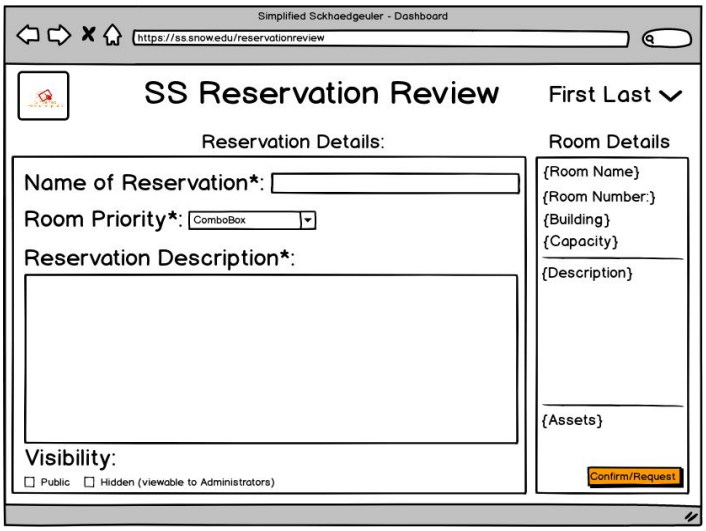
This page is accessed by the student user upon clicking the '+' icon from the dashboard. By filling in the various fields, on the leftmost pane, the user can search for available rooms. Based on the fields entered, the results pane will show different results.



This page shows the results after the user has made various selections in the filter pane. The user may now select from the list of results to view room details, or add filters and click apply once more.



This page shows the results of selecting one of the rooms resulting from the filtered search. Details are now shown on the details pane, and the user has the option to reserve the selected room.



This page results from the user selecting “Reserve”: from the previous page. The user will now enter a name for the event/reservation, select the type of event (thus determining its priority) and optionally a short description of the reservation/event.

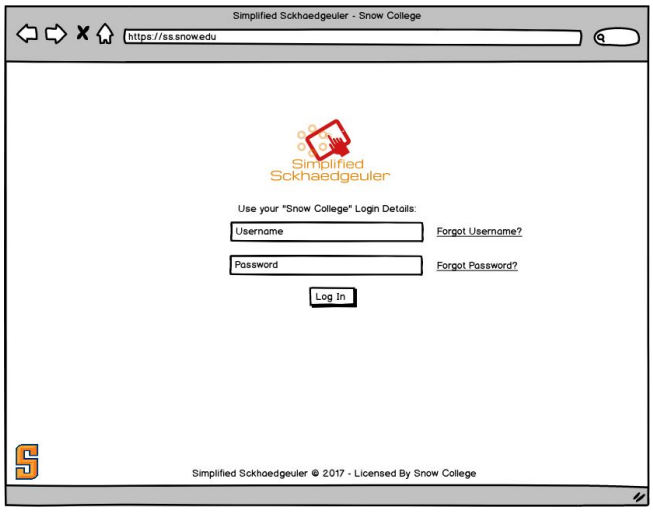
The user will also be given the opportunity to mark the event details as private, and they will no longer be visible to other users.

The reservation can then be finalized. (Submitted or requested as appropriate)

After having selected confirm or request on the previous page, the user is taken to this page. Here the user is prompted to check their email to view the room confirmation, they can also enter the email addresses of individuals they would like to invite to their reservation. They also have the option to go directly back to the dashboard, or logout.

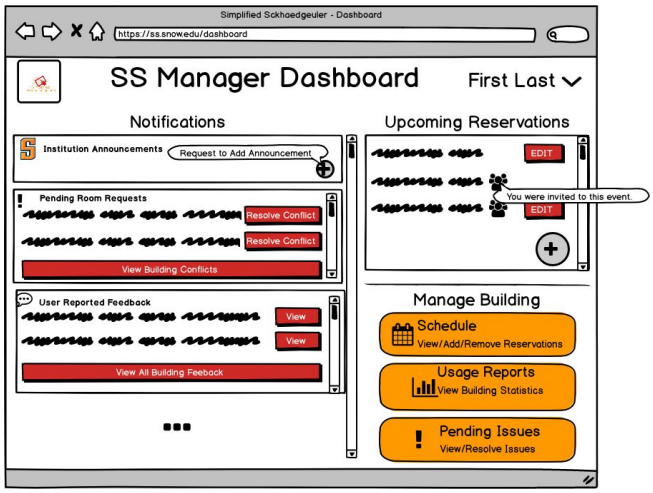
If the user has chosen to invite others to the reservation, they are taken to this page after entering their emails. The user can now choose to return to the dashboard, or logout.

Manager - Approve Request to Override Reservation



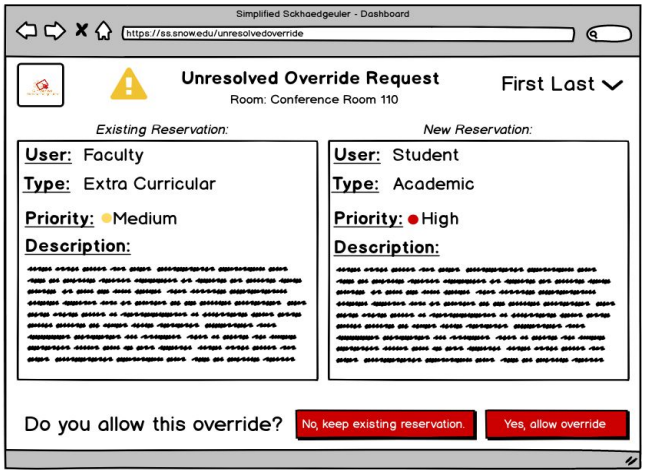
This is the Login page. It is the first thing that the user will see when attempting to use the Simplified Sckhaedeuler. This will be the same for all users of the system. Users will enter their credentials, and be taken to the system dashboard, which will vary by type of user (Administrator, Manager, or Student).

Functionality is also included for resetting/recovering a lost username/password.



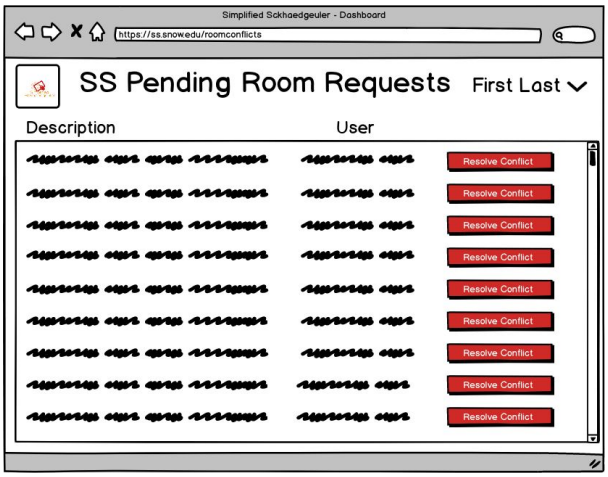
This is the Manager dashboard page. On the left notifications are shown, including institution announcements and a button to make a request for an announcement to be made (needs system admin approval). Requests made by users and awaiting approval are also shown, as well as feedback given by users about rooms.

On the right the manager can see upcoming reservations, and see links to various manager activities, including scheduling, reports and pending issues.



From the dashboard, if the manager has clicked to resolve a specific conflict in pending room requests, they are taken directly to the conflict resolution page for that specific conflict.

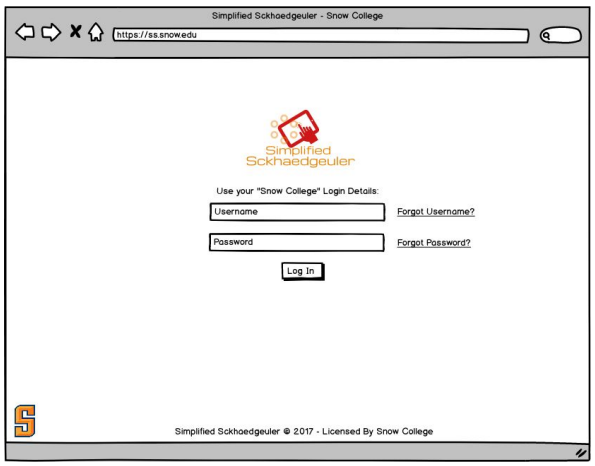
The conflict resolution page displays the conflicting reservations, and allows the manager to select whether the existing reservation should be kept, or overridden by a new reservation.



If the manager selects the generic “View Building Conflicts” from the dashboard, the manager is taken to a page showing all conflicts for the building, and by selecting one of the conflicts, is then taken to the conflict resolution page (see last wireframe)

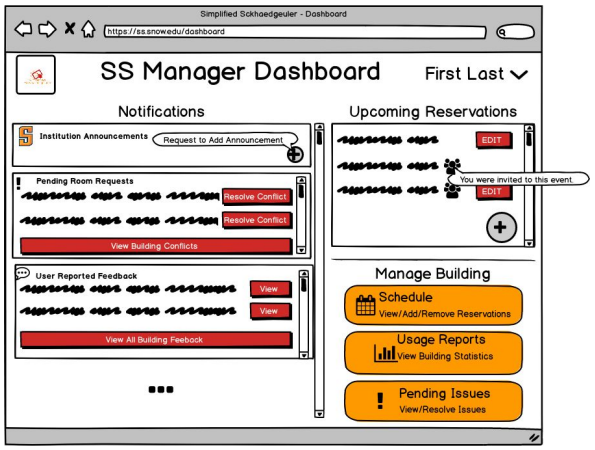
This page is displayed after a manager had resolved a conflict. By selecting “Resolve Others?” the manager is taken to the page showing all conflicts in the building. The manager can also choose to return to the dashboard, or logout.

Manager - Review/Resolve Room Feedback

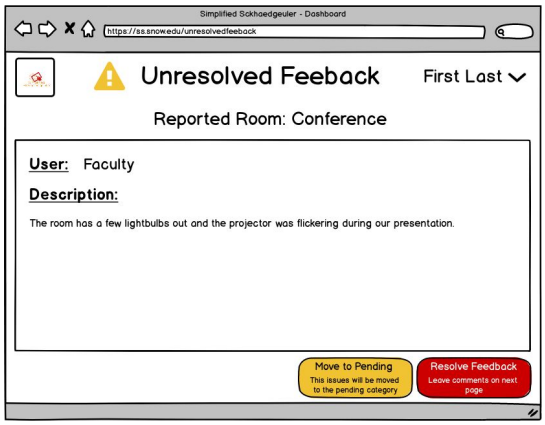


This is the Login page. It is the first thing that the user will see when attempting to use the Simplified Sckhaedeuler. This will be the same for all users of the system. Users will enter their credentials, and be taken to the system dashboard, which will vary by type of user. (Administrator, Manager, or Student)

Functionality is also included for resetting/recovering a lost username/password.

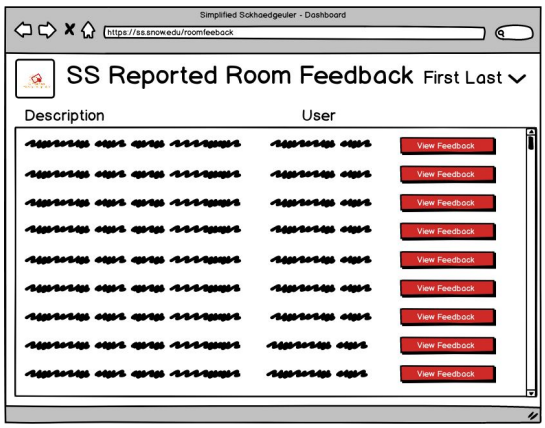


This is the Manager dashboard page. On the left notifications are shown, including institution announcements and a button to make a request for an announcement to be made. Requests made by users and awaiting approval are also shown, as well as feedback given by users about rooms.
On the right the manager can see upcoming reservations, and see links to various manager activities, including scheduling, reports and pending issues.

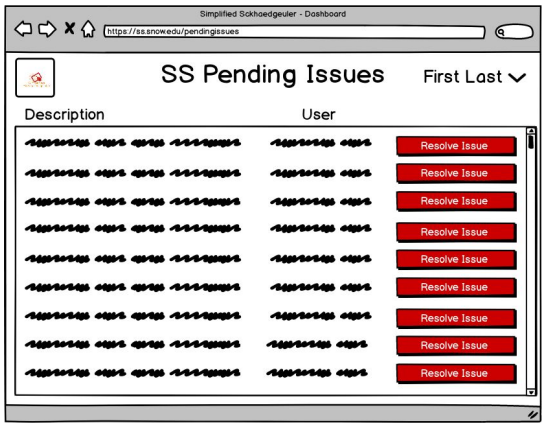


From the dashboard, if the manager has selected ‘view’ from the user reported feedback section, the manager will be taken directly to the unresolved feedback page.

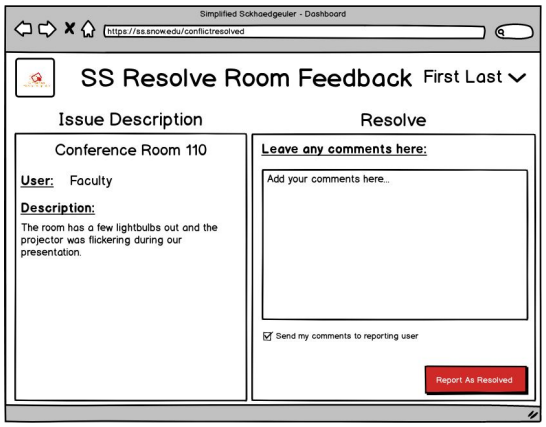
From the unresolved feedback page, the manager can see all details regarding the report, and choose to either move the issue to pending(viewed but not yet resolved), or mark the issue as resolved.



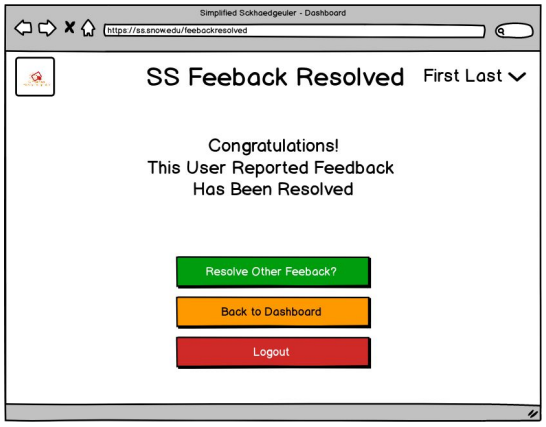
If the manager selects the “View all building feedback” link on the dashboard, they will be taken to a page showing all feedback. The manager can then select a specific feedback report, and then be taken to the unresolved feedback page (see last wireframe).



From the dashboard by clicking “Pending Issues” or by clicking “Move to Pending Issues” on the Unresolved Feedback page. It will display all pending issues.

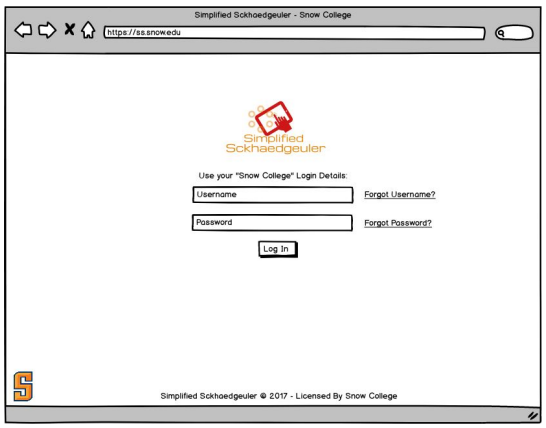


From the Unresolved Feedback Page or the Pending Issues pages, the manager can select the issue, view all information about the issue, write any comments about the issue and/or it’s resolution (optionally sending these comments to the reporter of the problem) and finally mark the issue as resolved.



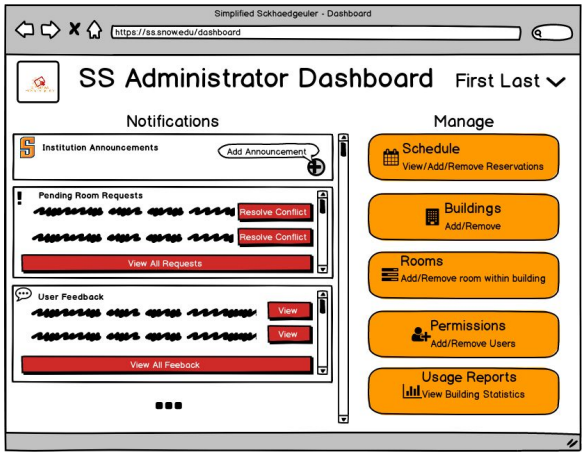
The manager is then taken to the feedback resolved page, where they are presented with the options to resolve other feedback, return to the dashboard, or logout.

System Admin - Override with a Paid Room Reservation

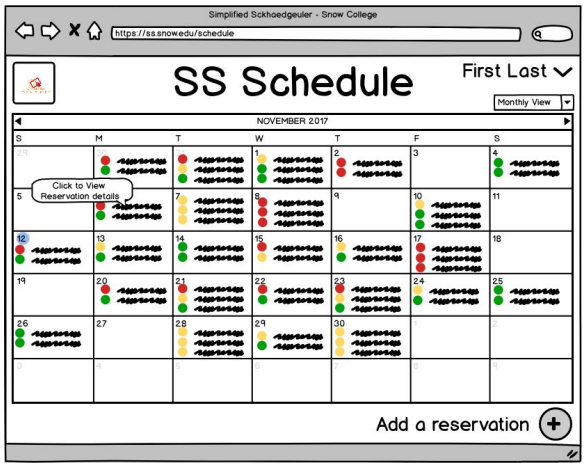


This is the Login page. It is the first thing that the user will see when attempting to use the Simplified Sckhaedeuler. This will be the same for all users of the system. Users will enter their credentials, and be taken to the system dashboard, which will vary by type of user. (Administrator, Manager, or Student)

Functionality is also included for resetting/recovering a lost username/password.

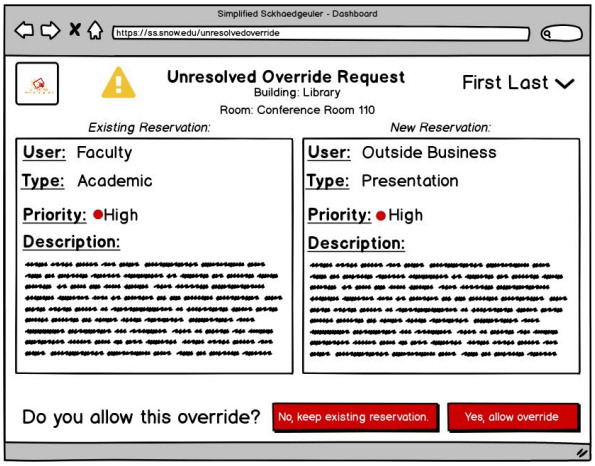


This is the System Admin dashboard. From here the admin can see and add institution announcements, resolve room requests and feedback like managers can, and select from admin tasks such as managing the global schedule, manage buildings, and rooms, manager permissions, and see usage reports.



By selecting the “schedule option”, the admin is taken to the schedule page and can see a calendar with all current reservations (The view of this calendar can be changed using the dropdown). The admin can click on a reservation to see it’s details. The admin can also add a reservation.

Note: Between this last wireframe and the following, the process is *identical* to how a system user would reserve a room so we did not include all these extra wireframes here. Just imagine we had the system admin add a reservation for an outside business, just like the student added a reservation.



If the scheduled reservation is in conflict with an existing reservation, the admin is taken to the conflict resolution page. The admin can then review the information about both reservations, and choose whether or not to override the existing reservation.

The admin is then taken to the conflict resolved page, and choose whether to return to the dashboard, or logout.

5. Pilot Testing Specifications:

a. For our pilot test we created three different scenarios.
    i. For the first scenario, we created a scenario for a “System User.” System users are basic users that have basic functionality of the system (to make reservations). We asked the tester in this case to make a reservation of any type they wanted. A simple reservation confirmation/request is what we were looking for.
    ii. For the second scenario, we have the Manager. A manager could be over a building, or a registrar. The manager has two different tasks that they could complete.
        1. First, the manager would process feedback given by those after reserving a room. The manager would have to decide to move the feedback to pending issues, or to mark the feedback as resolved depending on the severity of the feedback.
        2. In the second option, the tester would need to resolve a room conflict/override request. The tester needs to find the request to override a reservation and decide which to keep based on priority and if the request is legitimate.
    iii. For the final scenario, we had the System Administrator. The System Administrator has all access to the system and resolves upper conflicts and requests made by managers and system users. The tester in this scenario will place a room reservation for a paid outside user of the institution over another appropriate reservation at the institution currently.

Pilot Testing Results:

Alex Pilot Test

Student Test

[Video Link]

I (Alex) conducted a quick pilot test with of my 3 family members. For the first test I had my younger sister, Jayda, pretend she was a snow college student and go through the task of reserving a room. These were the directions she was given:

> **Student Directions:**
> Task description: As a snow college student you need to reserve room for your group study project.
>
> 1. Login to the scheduling website
> 2. Add a reservation
> 3. Select room options and apply search filter
> 4. Select a room
> 5. Reserve that room
> 6. Confirm reservation
> 7. Invite friends
> 8. Logout

Even with this quick pilot test I was able to gain some valuable insight into the user's mind. She commented on different things that were confusing to her and I made changed to the prototype accordingly.

Possible changes to make:

- She was confused how to create a reservation so I think we could change the prototype slightly to make it more clear how to add a reservation. All we have now is a + button to create a new reservation. We could add a description to this button and maybe we could make it bigger to draw the eye to it or change the color.

- She was also confused about about what the invite field was, I wasn't sure if this was because she didn't read the whole description or because it was just a confusing page. We will have to review and see if we can make this page easier to understand.

Building Manager Test

Video Link

I had my mom, Alicia, pretend to be a building manager and go through the process of viewing feedback reported by users, and had her resolve that feedback. These are the directions she was given.

> **Building Manager**
> **Task description:** As the library building manager you are tasked with resolving issues reported about library rooms. Please follow these direction to resolve a reported room issue:
>
> 1. Login in to scheduling website
> 2. View all the user reported feedback for your entire building
> 3. View just one of the reported issues
> 4. Resolve the feedback
> 5. Report feedback as resolved
> 6. Logout

She provided some useful feedback and I used that feedback to make some change to the prototype.

Possible changes to make:

- She was confused about what the resolve conflict button would do and if it she would be able to leave her comments. One solution could be to change the text on that button to tell the user that they would be able to leave comments on the next page so they weren't left wondering what that button would do and if that was the end of the conflict reservation process.

- She did mention that after using the software once or twice she felt like it would be more obvious to use, but we don't necessarily want the learning curve to be to steep, so we need to figure out a way to mitigate that issue.

System Administrator Test

Video Link

I had my dad, Trent, pretend to be the system admin and had him go through the process of resolving a conflicting room request. These are the instructions he was given:

> **System Administrator**
> **Task description:** As the Snow College system administrator one of your tasks is to resolve room schedules. Please follow these directions to view conflicting room requests and resolve the conflict.
>
> 1. Login to scheduling website
> 2. View all conflicting room requests
> 3. Select a conflict to resolve
> 4. Please resolve this conflict according to your discretion as the Snow College Administrator.
> 5. Logout

After his pilot test I made some initial changes and then we met as a group later and the prototype has since changed a lot.

Possible changes to make:

- After reviewing the workflow we wanted to pilot test with the group, we changed around the whole process. I was missing a few key tasks in my wireframe that we had to add. I felt like even though we changed the flow of resolving conflicts, I was still able to use the some of the comments he made to create a better wireframe
- The feedback I received from this test was still very useful and we used it while redesigning the workflow of this task.

- One of the biggest things I noticed was that for these users to figure out the initial workflow was confusing, and maybe we could resolve this issue by adding more descriptive buttons.

Leedan Pilot Testing

Student User test

Video Link

The user is a previous Snow college student. She performed the requirements on a laptop, and the website did not perform as well as expected. Regardless, she was able to make the reservation successfully, although there were some points at which she struggled.

Instructions:

· Login

· Add a reservation

· Enter some given filters

· Select the first result

· Make the reservation

From the test, it was clear that not all of our users will know to use the plus symbol to add a reservation.

It's also noticeable that we will need to improve upon the filter forms in implementation.

According to the comments made during pilot testing we were able to update our wireframes accordingly to create an easier flow for the users and make the process more obvious and hopefully we are ready for the evaluation stage.

Section 7

UX Evaluation and Reporting:

1. System Concept Statement

The *Simplified Sckhaedgeuler* provides an all-around solution to room scheduling for the Snow College campus. From students to building managers our software adapts to fit each user's needs:

- Experience a consistent and easy to use web interface.
- Finding a room for last minute study sessions is no longer a problem.
- Searching for the "right" room has been simplified, users can filter search results to find the room of their dreams.
- Academics take priority! No more getting kicked out of your reservation.
- Managers will maintain control of each building and receive up-to-date feedback about room issues from users.
- View and report issues with a room instantly.
- Never forget a meeting again! Sign up for notifications to receive reminders about your upcoming reservations and events to which you've been invited.

Our software helps all overcome the challenges of traditional room management, allowing the process to be effortless and enjoyable.

2. Our UX Inspection Process

Our inspection process focused on determining the level of usability of our prototypes. We built three prototypes, one for each of our three main personas. We conducted a design walkthrough with our evaluators, encouraging them to think aloud as they navigated through our prototypes. We filmed each evaluation recorded the screen as they were interacting with the prototype.

We began each evaluation with an introductory script. The script introduced each evaluator to our prototype and allowed us to determine the background of each person evaluating through a series of contextual questions. After reading the script, each evaluator was given a set of three main tasks to complete, each task was from the perspective of a different persona. They were then asked to step through these tasks without and help from the design team. After completing the tasks, we asked each user to answer a list of ending questions. The questions focused on how they felt while using the prototypes, such as what they liked and especially anything they disliked. We ended the evaluation by asking them to fill out a survey about their experience and then thanked them for their help.

Evaluation videos

MT Evaluation: https://youtu.be/pXKWYFX2hcU

TB Evaluation: https://youtu.be/TZqOjbYQn28

NH Evaluation:

Part1: https://youtu.be/1Zmi2DDgTpo

Part2: https://youtu.be/BRvGP0Go55M

Part3: https://youtu.be/f2-JmzMFu44

Part4: https://youtu.be/8U-Jb-O1_tY

Screen Recordings

TB: https://youtu.be/t9TrH_z2Ops

NH: https://youtu.be/OT2luCPTOSo

MT: https://youtu.be/oFqxf3CqDxU

AR: 1. https://youtu.be/-Xqiv90RC_Y

2. https://youtu.be/oJdGYsGIx9o

3. Key Tasks

We prepared three main tasks to drive our inspection. Each task was written from the perspective of our three personas: A Snow College student, building manager, and system administrator. While creating these tasks we also created and expected path for each task so we were able to compare our mental model with the user's mental model in a quantitative way.

Student Task

You are a Snow College student who was just assigned a group project. You are given the task of reserving a study room in the library. Your group wants to meet Nov 21 at 3:30 pm. There are 5 of you in the group, so you need to find a room with at least 5 chairs, they also want a TV or projector in the room. You will also need to send invites to your group mates.

Manager Task

You are a building manager for a college. Part of your responsibilities include handling requests students have submitted to override an existing reservation. Today we need you to resolve one of these conflicting requests. Academic meetings are given priority over extracurricular activities.

System Admin Task

You are the system administrator for a college. Part of your responsibilities include handling reservations by outside businesses. Today we need you to make a reservation for one of these outside businesses. The business has requested a room to seat at least 20 people, and has a projector. They will have their one hour meeting at 6:00 pm on December 4th. They are paying for the room, so they have priority over any existing reservations.

4. Found UX Problems

We were able to extract the a list of problems from the evaluations we held. By combing through the evaluation data and recordings, we noted each problem as it was mentioned and we were able to compile a weighted list of problems. Each problem is weighted according to the number of times is was mentioned throughout all the evaluations. The table containing our list of problems is one the next page.

Problem	Times Mentioned	Where Mentioned
ALLVIEWS: The software showed already reserved rooms by default!	4	MT 14:07, MT 14:44, MT 15:15, MT 16:19
ManagerView: Pending issues was misleading. Couldn't find room conflicts.	7	TB 11:47, TB 13:38, MT 9:00, MT 9:31, MT 10:50, NH2 0:20, NH4 0:15
AdminView: Expected to have a business-level priority	2	TB 16:15, MT 13:36
StudentView: Didn't really understand what/why "visibility" option	3	TB 8:28, MT 6:26, NH 4:04
Student View: Didn't understand priority	2	TB 7:52, MT 6:02
All Views: Why recursive link to homepage?	1	TB 5:50
AdminView: Expected an "any" option for building filter	1	TB 15:34
AdminView: User hesitate when presented with Invite Friends for business reservation	2	TB 16:47, NH3 0:38
User View: Expected info after clicking on Collaboration icon	1	TB 5:01

User View: Didn't understand what feedback was	1	TB 5:30
StudentView: Didn't understand reservation description field	1	MT 6:09
AdminView: Clicked "rooms" attempting to create a reservation	1	NH3 0:0
AllViews: Didn't understand friend invite functionality	1	AR
AllViews: Placeholder Data wasn't sufficient.	4	TB 18:05, TB 19:19, TB 13:15 NH4 2:13
AdminView: Expected some fields to be omitted for business (eg. details to be always hidden)	2	TB 16:23, NH3 0:28
ManagerView: Didn't know if student would be notified of changes	1	MT 10:25
AllViews: Reservation button was hard to find/too small	1	NH4 1:35
StudentView: Didn't understand the purpose of the "room" filter	2	TB 9:42, MT 4:47
Student View: filter bar, there's a lot of stuff	1	TB 6:16
AllViews: User made a mistake, and wants "go-back" functionality	1	MT 10:02
AllViews: Expected a new page after filters were applied	1	AR
AdminView: User expected to be able to click on calendar day.	1	MT 12:46
ManagerView: Dashboard layout was a problem	5	TB 13:51, TB 19:38, TB 19:57, AR, NH4 0:56
StudentView: Too Many Clicks	1	MT 7:18
AdminView: Dashboard was confusing	1	AR
StudentView: User wanted social Media Integration	1	TB 10:00
AllViews: Flow was a problem	1	TB 17:57

5. Problems selected for Cost-Importance Analysis

We chose to use all the problems listed below to perform cost analysis. Instead of narrowing down the selection before performing analysis, we performed cost-importance analysis on all of our main problems to help us determine priority in a more objective way.

Problems Selected

- ALLVIEWS: The software showed already reserved rooms by default!
- ManagerView: Pending issues was misleading. Couldn't find room conflicts.
- Student View: Didn't understand priority
- User View: Didn't understand what feedback was
- AdminView: Expected an "any" option for building filter
- StudentView: Didn't understand reservation description field
- AdminView: Clicked "rooms" attempting to create a reservation
- AllViews: Placeholder Data wasn't sufficient.
- AdminView: Expected to have a business-level priority
- StudentView: Didn't really understand what/why "visibility" option
- All Views: Why recursive link to homepage?
- ManagerView: Didn't know if student would be notified of changes
- AdminView: User hesitated when presented with Invite Friends for business reservation
- User View: Expected info after clicking on Collaboration icon
- AllViews: Didn't understand friend invite functionality
- AllViews: Reservation button was hard to find/too small
- StudentView: Didn't understand the purpose of the "room" filter
- Student View: filter bar, there's a lot of stuff
- AllViews: User made a mistake, and wants "go-back" functionality
- AllViews: Expected a new page after filters were applied
- AdminView: Expected some fields to be omitted for business (eg. details to be always hidden)
- ManagerView: Dashboard layout was a problem
- AdminView: User expected to be able to click on calendar day.
- StudentView: Too Many Clicks
- AllViews: Flow was a problem
- AdminView: Dashboard was confusing
- StudentView: User wanted social Media Integration
- StudentView: Can't the software make assumptions to speed things up?

6. Cost-Importance Explanation and Table

To perform cost-importance analysis, we added a solution to each problem listed and estimated a cost involved with fixing each problem. We also weighted each problem according to its importance. Using the cost and importance columns we were able to calculate a priority ratio. Then we chose to sort the table according to the priority ratio, we did this for all problems but the top one, which we considered to be of the highest priority (must fix), because it compromised functionality, so we kept it as our highest priority. All members of our team had a part in deciding what was most important in our table.

COST-IMPORTANCE ANALYSIS

Problem	Importance	Solution	Cost (Hours)	Priority Ratio	Priority Rank	Cumulative Cost	Resolution?
ALLVIEWS: The software showed already reserved rooms by default!	M	Add an option on the room page to display available rooms and all rooms	5	M	1	5	Fix now
ManagerView: Pending issues was misleading. Couldn't find room conflicts.	5	Remove the pending issues button as it is redundant and only serves to confuse	0.5	10000	2	5.5	Fix now
Student View: Didn't understand priority	3	Add a quick description here about the different priority types.	0.5	6000	3	6	Fix now
User View: Didn't understand what feedback was	5	Add "fake data" to this section to further users understanding	1	5000	4	7	Fix, time permitting
AdminView: Expected an "any" option for building filter	3	Add an "any" option in the building dropdown	1	3000	5	8	Fix now
StudentView: Didn't understand reservation description field	3	Make the label more descriptive	1	3000	6	9	Fix, time permitting

AdminView: Clicked "rooms" attempting to create a reservation	3	Make the label more descriptive	1	3000	6	9	Fix now
AllViews: Placeholder Data wasn't sufficient.	5	Add "fake data" to prototype and not just squiggly lines.	2	2500	7	11	Fix now
AdminView: Expected to have a business-level priority	1	Add another priority level	0.5	2000	8	11.5	Fix, time permitting
Line of Affordability (12 person-hours 2 working days)							
StudentView: Didn't really understand what/why "visibility" option	1	Add a quick description about visibility. Maybe legal disclaimer here	0.5	2000	9	12	Wait until next version
All Views: Why recursive link to homepage?	1	Remove the recursive link	0.5	2000	10	12.5	Wait until next version
ManagerView: Didn't know if student would be notified of changes	3	Add a message that tells the manager the student has been notified	2	1500	11	14.5	Wait until next version
AdminView: User hesitated when presented with Invite Friends for business reservation	1	Remove this option for the business reservation case.	1	1000	12	15.5	Wait until next version
User View: Expected info after clicking on Collaboration icon	1	Add a mouse over description to this icon	1	1000	13	16.5	Wait until next version
AllViews: Didn't understand friend invite functionality	1	add a quick description about the invite function	1	1000	14	17.5	Wait until next version
AllViews: Reservation button was hard to find/too small	5	redesign the reservation button to make it more clear	5	1000	15	22.5	Wait until next version
StudentView: Didn't understand the purpose of the "room" filter	3	Re-evaluate the filter to make it more clear to the user	5	600	16	27.5	fix, time permitting
Student View: filter bar, there's a lot of stuff	3	Redesign the filter to make it more clear to users	5	600	17	32.5	Wait until next version

AllViews: User made a mistake, and wants "go-back" functionality	3	Provide an undo button or back button	5	600	18	37.5	Wait until next version
AllViews: Expected a new page after filters were applied	3	make the transitions smoother between clicks	5	600	19	42.5	Wait until next version
AdminView: Expected some fields to be omitted for business (eg. details to be always hidden)	1	Change the view to the user if they are creating a business reservation	2	500	20	44.5	Wait until next version
ManagerView: Dashboard layout was a problem	5	This would require a complete redesign of the manager dashboard	10	500	21	54.5	fix, time permitting
AdminView: User expected to be able to click on calendar day.	3	Add the option to add a reservation by clicking on a calendar day	8	375	22	62.5	Wait until next version
StudentView: Too Many Clicks	3	Re-evaluate the flow based on evaluation data	10	300	23	72.5	Wait until next version
AllViews: Flow was a problem	3	Re-evaluate the flow using the evaluation feedback and expected path vs actual path data	10	300	24	82.5	fix, time permitting
AdminView: Dashboard was confusing	1	Redesign the admin dashboard according to evaluation data	10	100	25	92.5	Wait until next version
StudentView: User wanted social Media Integration	1	Add the abililty for users to import their social media contact	10	100	26	102.5	postpone indefinitely
StudentView: Can't the software make assumptions to speed things up?	1	Have the software remember certain user data to speed up the interaction	10	100	27	112.5	Fix on next version

7. Conclusions of Cost-Importance

We thought the cost-importance analysis was a really helpful exercise. It allowed us to detect the problems in our design and figure out what we should fix first and which things we could wait to fix.

The first thing that one notices when looking at the above table is the cumulative cost if all items were to be fixed at the current moment. This can really explain that not issues and problems within a product can be fixed all on the same “round.”

The next thing that we noticed is we had a good Line of Affordability. Below that line, we found most of our issues could wait until the next version. We didn’t have any extremely critical fixes that we were unable to schedule.

8. How We Tailored the Scope

For this project we tailored our scope according to the three personas. We didn’t include support for anything outside personas. The evaluations only tested a small subset of our prototype functionality. We wrote 3 tasks that we felt would test a wide enough range of our prototypes so that the results from the evaluation would be useful to us. We only supported one task for each persona but we tailored each task so they would have to step through a wide variety of screens, thus getting each screen the most exposure to potential users. We didn’t think of other users that might use our software in the future.

9. What Worked and What Didn’t

The first evaluation we held did not go to plan quite as well as we would have hoped. We had everything all set up: a webcam, screen recorder, script in hand, and tasks prepared. Unfortunately the webcam decided to stop and start recording according to its own desire, so we got a bunch of short clips from the first evaluation, and no recording at all for the second one we held. Fortunately we were able to learn from these technical difficulties and correct for them in the next evaluations we held.

The last two evaluations we held went very smoothly because we were able to iron out the kinks and all our technology worked correctly. I think the last two were even more helpful because we had more practice with holding evaluations, and we were able to ask more insightful questions as the evaluation was happening.

We recorded the screen for all of our participants, but overall, we felt that the thinking out loud technique with the participants was more effective than seeing where they clicked on the screen. However, it would be nice to see to use eye-tracking software as we can see what parts of the page the user looks at first over another.

10. UX Evaluation to the Design Team

The evaluations we held were directed towards the design team as well as the product manager. In order to make our product successful, we wish to address our evaluations and the following summary to these executives.

Simplified Sckhaedgeuler

For this project we created a situation in which to test our product, *Simplified Sckhaedgeuler,* in its prototype form. We created a script and tasks for users to complete as they used the prototype. They also used the prototype in each form, as a normal system user, a building manager and a system administrator. After completing the tasks, we asked the testers to complete a survey and answer some general questions. From this evaluation, we were able to find some problems and wish to address these with you.

All of the problems of usability and in the prototype are listed earlier in this report, however, these were the main problems that should be addressed first:

ALLVIEWS: The software showed already reserved rooms by default!
ManagerView: Pending issues was misleading. Couldn't find room conflicts.
Student View: Didn't understand priority
User View: Didn't understand what feedback was
AdminView: Expected an "any" option for building filter
StudentView: Didn't understand reservation description field
AdminView: Clicked "rooms" attempting to create a reservation
AllViews: Placeholder Data wasn't sufficient.
AdminView: Expected to have a business-level priority

Some possible solutions could include:

ALLVIEWS: The software showed already reserved rooms by default!	Remove rooms from the list that are not available
ManagerView: Pending issues was misleading. Couldn't find room conflicts.	Change icon/text of pending issues or add conflict to pending issues menu, or simply add a room conflicts button on the dashboard.
Student View: Didn't understand priority	We could add a help icon and explain, or show the different priority options to the tester in the future
User View: Didn't understand what feedback was	We could add a help icon and explain, or change the wording of the products
AdminView: Expected an "any" option for building filter	Show different dropdown options to testers in the future (also change name to “Room Type”
StudentView: Didn't understand reservation description field	We could add a help icon and explain (maybe some grayed out text that says *i.e. Club meeting*)
AdminView: Clicked "rooms" attempting to create a reservation	Change icon/wording of icon in the administrator dashboard
AllViews: Placeholder Data wasn't sufficient.	Make sure in the next test to have “fake data” inserted into the prototype to make it more real
AdminView: Expected to have a business-level priority	Add option for a business-level priority, show priorities

In conclusion, we suggest the above problems and solutions in the next iteration of design of the prototype and the final version of this product release. We learned much from this evaluation, including the frustrations the user may have when using our software. From the evaluations, we hope to improve our software to be at a functional level and perform better than its competitors by creating the best user satisfaction ratings on the market.

Section 8

Appendix

Reading

Hartson, R., & Pyla, P. S. (2016). *The UX book: process and guidelines for ensuring a quality user experience*. Amsterdam: Morgan Kaufmann.

The Secret to Designing an Intuitive UX. (n.d.). Retrieved November 01, 2017, from https://uxmag.com/articles/the-secret-to-designing-an-intuitive-user-experience

Christina Wodtke, Curious Human Follow. (2013, November 04). Conceptual models & Mental Models. Retrieved November 01, 2017, from https://www.slideshare.net/cwodtke/conceptual-models-mental-models

Visual Thinking. (n.d.). Retrieved November 04, 2017, from http://www.xplaner.com/visual-thinking-school/

Resources

- Computer Science Classroom (Whiteboards, markers, computers)
- Paper and Pencil for sketches
- Google
- G Suite (For online collaboration)
- Balsamiq (Wireframe Software)
- http://draw.io (Diagramming Software)
- Storyboard That (Storyboarding software)

- ➢ Mobility Labs (Persona Template Generator)
- ➢ TeamViewer (To hold virtual meetings)

Prototypes (clickable PDFs)

- Scenario 1 (System User)
- Scenario 2 (Manager)
- Scenario 3 (System Administrator)

These are included with this document.