



Project #4

Operation: Confidence

Design

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Design Phase Overview

Using the analysis of user needs and the design-informing models to explore and think critically about user interactions and functional system requirements, we developed a primary design persona, designer's and user's mental models, and a conceptual prototype design for the mobile LMS "*Operation: Confidence*."

1. Project Concept Statement

Excerpt: "*Operation: Confidence*" will serve as a repository for annotated, self-created, and self-selected resources. Using these resources, it will offer a collaborative space for connecting residents, experts, and instructors. This system will connect to the cloud and to INOVA's intranet and has a push function for updating resources. We envision surgical residents improving their understanding of surgical procedures, increasing their passing rate on their exams and, thus, their confidence level in the operating room.

2. Our Approach

Team E intends for the design to improve resident experience by giving them easy-access resources that can strengthen their foundation of knowledge. We identified the main persona, using her work, life, and study habits as our main focus. After brainstorming possibilities for the look, feel, and interactions of the mobile app using data from our contextual analysis and view from the primary persona, we grouped these ideas based on similarities and eliminated redundant ideas. We then went through a possible interaction with our ideal mobile application, sketching potential screens as we went along. We took these ideas to the stakeholders (the residents). Understanding that at this point there were many ideas that needed to be pared down, we asked for the residents' priorities and tailored the scope of the project to reflect what would be most useful to them. We originally identified that the design will provide residents access to vetted resources aligned to their personal calendar, an ability to connect with other residents or experts, and an option to develop professional goals. After meeting with the client, we came back together to discuss how our design needed to change. We decided to eliminate the discussion forum and goal-setting aspect to better concentrate on what would be most useful to our resident: high-quality resources she can study before tackling her next big surgery.

3. Design Persona Development

Process

Our candidate personas came directly from the user classes identified in the user model. These include *Education Director, Attending Surgeon, Operations Manager, Simulation Technologist, Chief Resident, and Post-Graduate Year (PGY) 1 Resident through PGY 4 Resident*. From here, we consolidated personals with similar goals. For instance, the chiefs and PGY 2 Podiatry or PGY 4 General Surgery Residents are concerned about providing vetted resources for teaching the younger residents, or uploading their notes to help the younger residents. The primary persona then needed

to be an individual who is still in the process of preparing for boards and learning clinical skills but also responsible for mentoring lower-level residents. The PGY 4 General Surgery Resident has a foot in both worlds of teaching and learning, so design choices catering to this primary persona would work for the other personas.

Candidate Personas

1. ASTEC Administrator
 - a. Education Director
 - b. Operations Manager
 - c. Simulation Technologist
2. Attending Physician
3. Resident
 - a. General Surgery
 - i. PGY 5 Resident – Chief
 - ii. PGY 1-4 Resident
 - b. Podiatry
 - i. PGY 3 Resident - Chief
 - ii. PGY 1 and 2 Resident

Goal-Based Consolidation

1. *ASTEC Administrator*

Oversees the operations of the surgical training center. Would like to find ways to track resident progress. Would like to maximize ability to support teaching staff with curriculum development.
2. *PGY 4 General Surgery Resident*

Is concerned about upcoming board exams. Aware that he/she will have to take on the responsibility for teaching lower-level residents.
3. *PGY 1 Podiatry Resident*

Is new to the residency program. Still learning to juggle the extreme time demands. Is somewhat intimidated by higher-level residents. Is definitely intimidated by the attending surgeons. Has little experience in clinical practices and needs a lot of guidance from instructors. Has to refer to external material often to understand procedures and anatomy.

Primary Persona: Dr. Jane Blake



Personal Life and Habits

- 33 years old
- Married
- 4 year old daughter, 2 year old son
- Walks to work
- Plays video games
- Enjoys competition

Professional Practice

- PGY 4 General Surgery Resident
- Applying for fellowships
- Accesses SCORE curriculum on a weekly basis
- Would like to specialize in plastic surgery
- Enjoys working with specialists in her field
- Interested in mentoring younger residents

Technology Use

- Uses free, inexpensive, and INOVA/ASTEC-provided resources, as well as some from medical school: QStream, YouTube videos, research literature, textbooks, mobile surgical applications that cost less than \$5
- Has cell phone at all times
- Too many passwords in her life

Time Demands

- Works 80 hours a week
- Has an hour per day available for study

Dr. Blake's constant challenge is balancing home and professional responsibilities. She has extraordinary demands on her time. She keeps her cell phone with her at all times and regularly uses it for study and review. She desires a single portal to access content that is related to her study needs that has a simple interface with quick access to content.

4. Ideation and Sketching Process

Metaphors

Overall organization (ecological metaphor) is similar to putting things on the fridge with magnets, tacking up important items on a bulletin board, or writing down information on a whiteboard/chalkboard.

Some examples of interaction metaphors are as follows:

- To-do lists (materials to review before sessions and standards assessment)
- Letters to answer (feedback assessments)
- Photo album (multimedia resources)
- Binder/folder/bookshelf (electronic presentations and document resources)

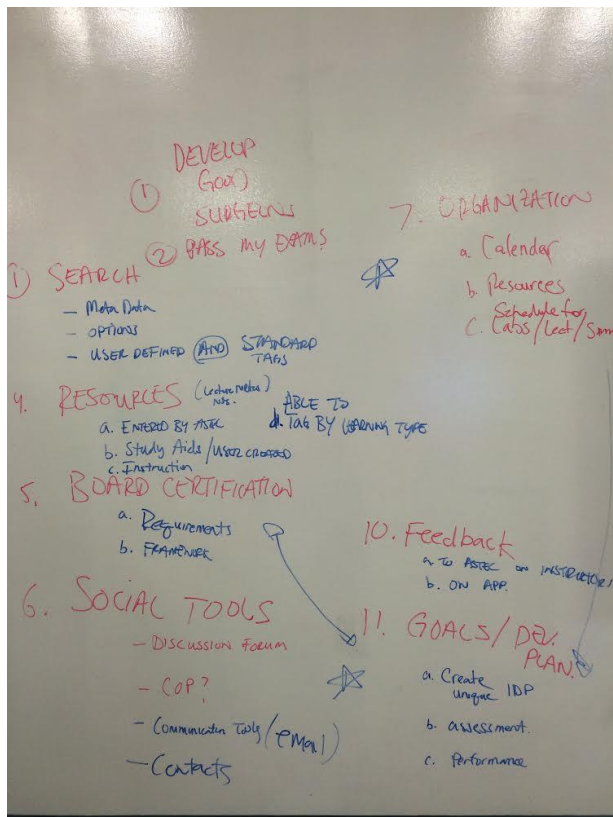
- Calendar (class/lab/simulation schedule)

Examples of emotional metaphors are as follows:

- Artwork/"Look What I Did at School Today" (created content)

Process

Figure 1. The beginning of ideation brainstorming.

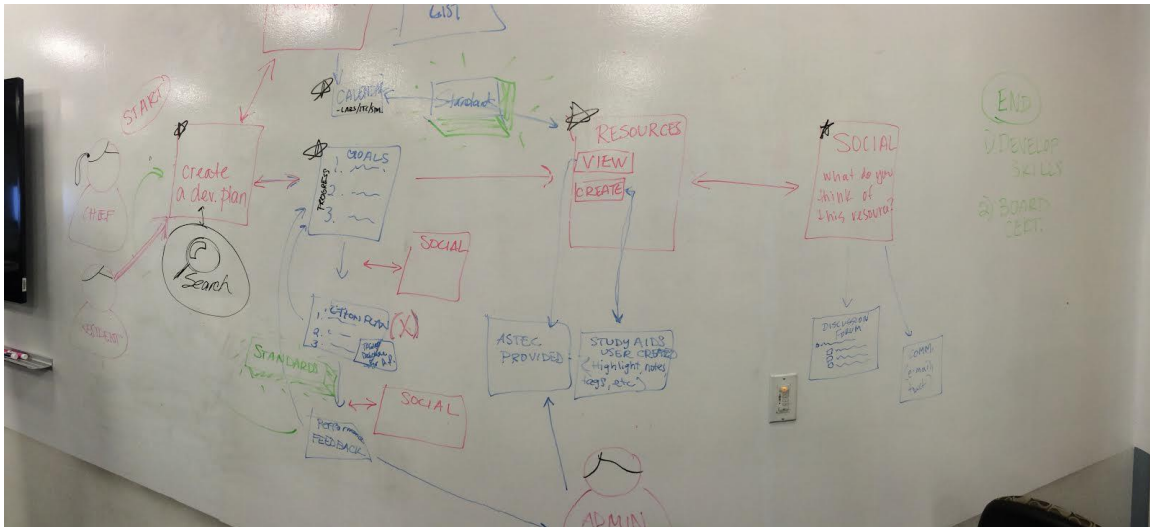


Team members began by sketching personas and ideas independently, using the information and insights gained from previous analysis and ideation models. At a face-to-face meeting, sketches and initial design ideas were presented (see sketches and team Blackboard blog “Initial Design Idea” for examples).

Using a whiteboard to create the initial designer’s mental model, the team brainstormed content and usage needs drawing from the materials that we initially created and from insights that occurred during the whiteboard process. The team then sorted and reorganized the information, categorizing them according to commonalities in usage and type of content.

After content was parsed and organized around the designer’s and user’s mental models, a preliminary conceptual design was developed on a white board visualizing the hierarchy of the access to information relative to the needs identified.

Figure 2. The beginning of mapping the Designer’s Mental Model.



The initial design model was presented at a meeting with a podiatry chief resident and a podiatry second year resident for their perspective on our interpretation of the needs presented and the design solutions proposed. The input from the residents was presented to the team for integration into the final design model. From here, we developed a second conceptual design, mapping the designer’s mental model to the user’s mental model (See section 9), to guide the storyboarding and wireframe.

5. Workspace and Materials

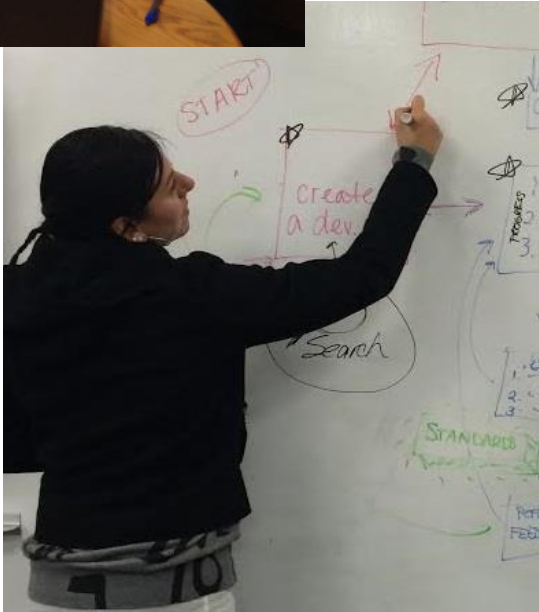
Initial designs were created on computer and by hand on paper. Paper sketches were photographed and added to the team’s document archive.

Team whiteboard activity occurred in a classroom on the campus of George Mason University.

Team members completed subsequent development individually and uploaded to the team’s document archive for inclusion in the final document.

6. Photos at Work

Figures 3-5. The team working on ideation brainstorming and mapping the mental model.



7. Selected Sketches

Sketches of features of design in the three perspectives: ecological, interaction, emotional.

Figure 6. Sketch of the login screen.



Figure 7. Sketch of screen used to set up goals and study aids. Since beginning this process, this portion of the app has been removed.

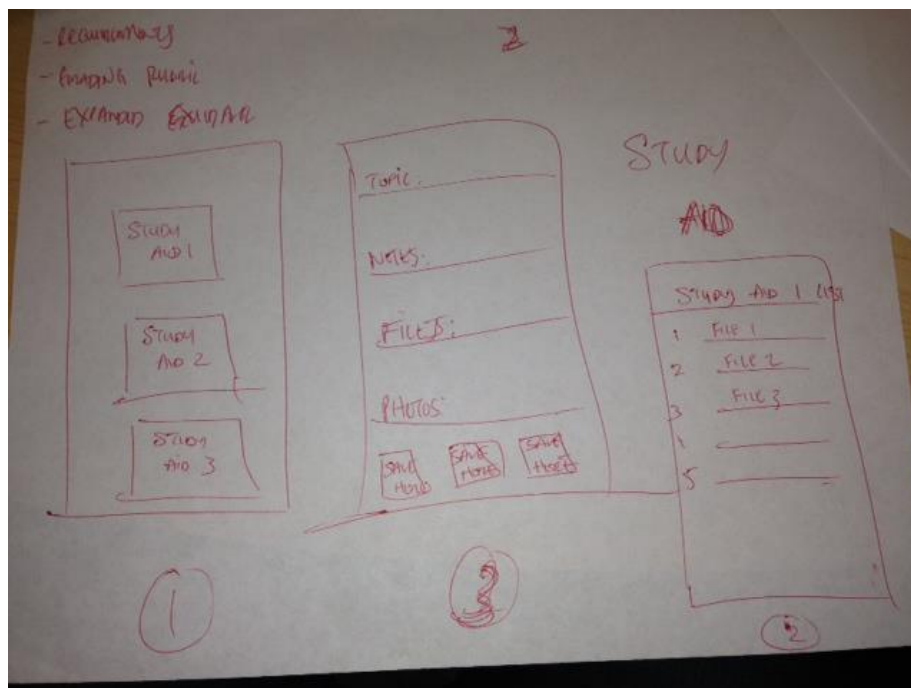


Figure 8. Sketch of video resources and corresponding discussion forum on those resources.

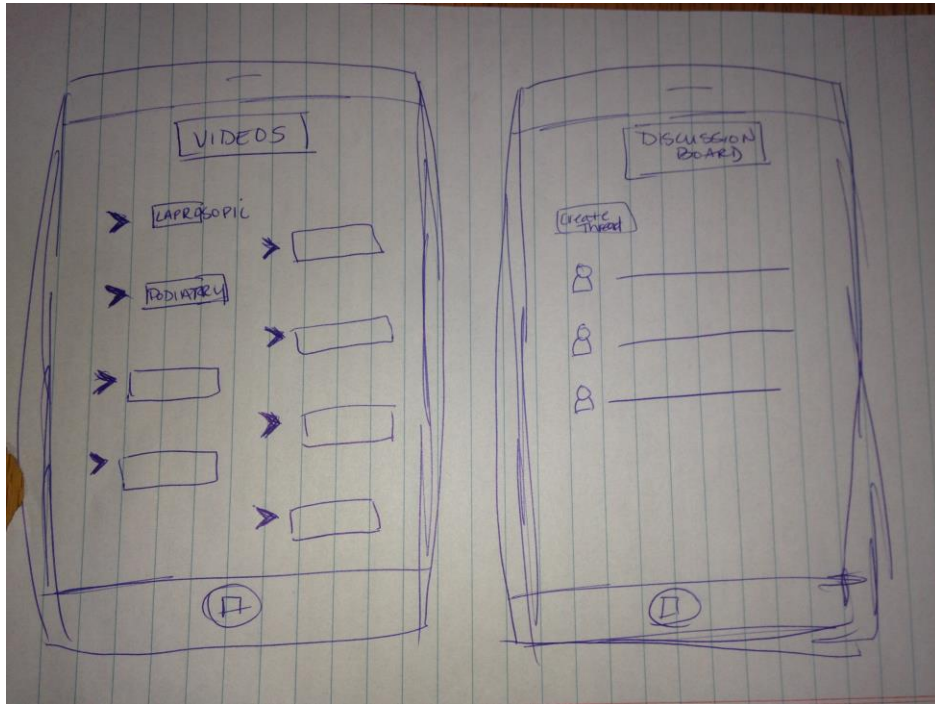


Figure 9. Sketch of general layout of app.

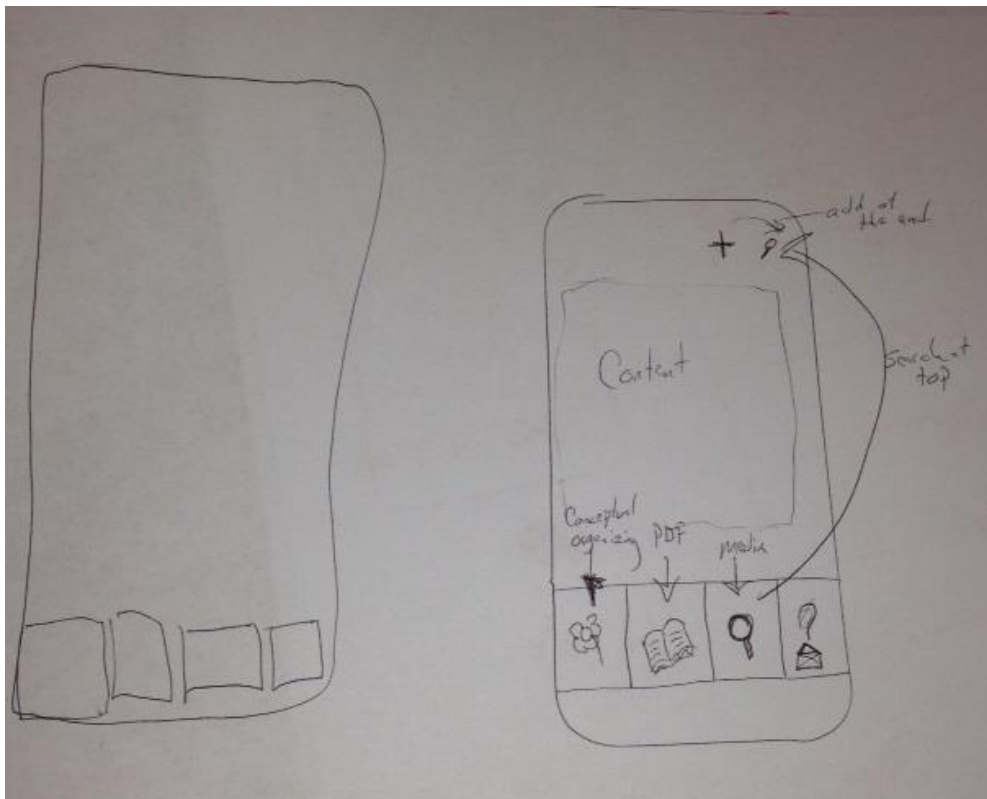
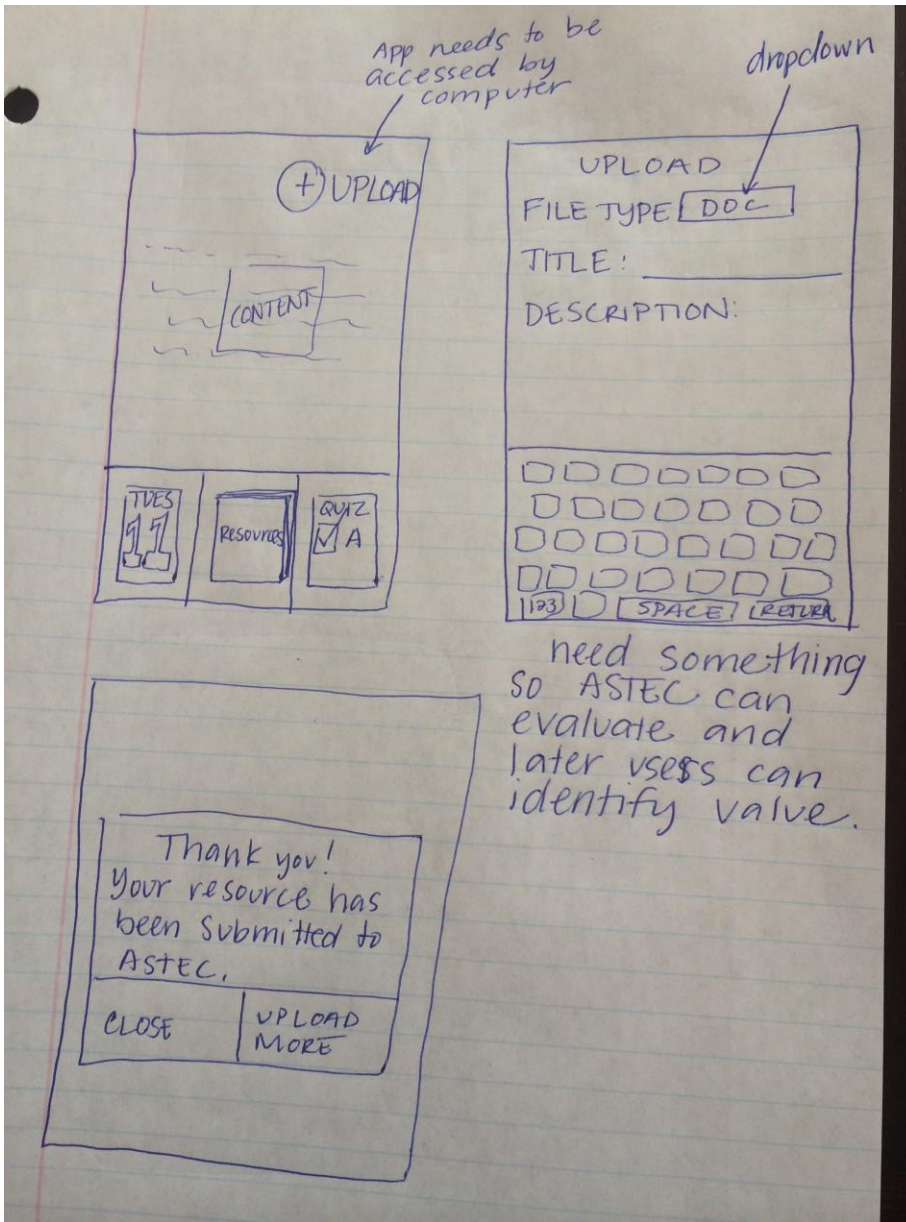


Figure 10. Sketch of the upload screen for created content.



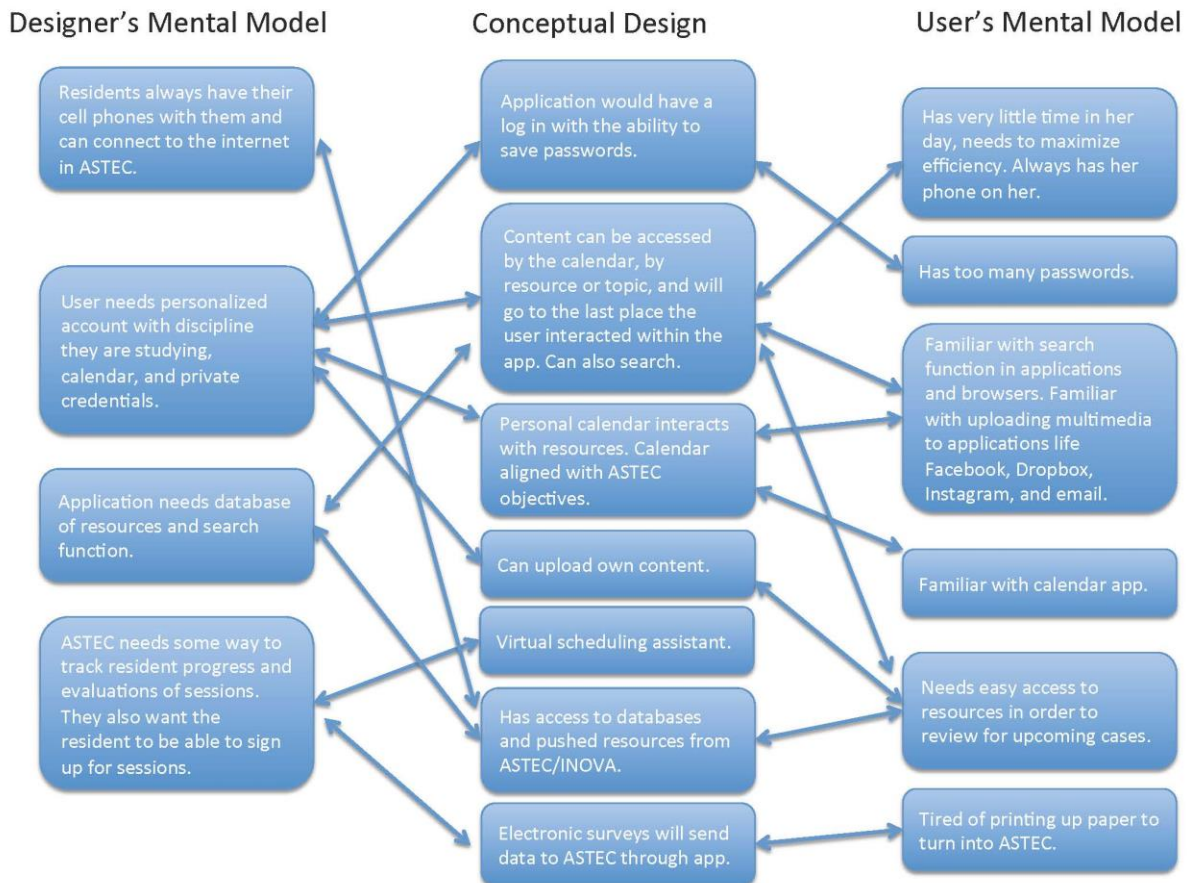
need something so ASTEC can evaluate and later users can identify value.

8. Mockups

Since this is a mobile application, mockups consist of designs of screen layouts that are included below under “Wireframe Development.”

9. Mapping from Designer to User

Figure 11. How our design requirements and the user’s work and life activities developed into the conceptual design.



Ecological Perspective

Because the residents do not regularly use tablets but do use their phones, a phone based mobile application (small screen) has been envisioned. This application would need to interact with INOVA’s intranet as well as a database located on a server in ASTEC.

Interaction Perspective

When a user sets up an account they will include which discipline they are studying. This will determine which calendar and subsequent sets of objectives will drive the content of the app.

The app will provide the ability to save and remember sign in protocols (passwords) for chosen online resources.

From the home screen, the user will be able to access the content either through the calendar, which will list upcoming ASTEC sessions, by surgical subject directly, or by most recent activity.

From this point the user will have access to whatever portals or materials that have been provided by ASTEC or that the user has saved to the app. This will include links to ASTEC assessment – which will have indicators of completion.

An interactive scheduling system will be integrated into the app that will give residents the ability to schedule and record their practice activities in the ASTEC center. This information will be provided by the scheduling system to ASTEC so that the progress and activity of individual residents can be tracked.

Emotional Perspective

This application is a one-stop-shop for users who need vetted resources linked to learning objectives. Instead of using textbooks, not having access to lecture materials, or spending hours searching for research literature and accurate multimedia, the user can access all their resources through this database.

In order to give the user a sense of ownership in the application, all content that the user access can be organized according to the user's specifications or work method. This will be achieved by a system that allows the user to link found materials to the subject of their choosing.

This design will be customizable to the user, so that it fits the way that the user studies and organizes information. A utility will be in place that will allow the user to create her own subject categories. Users will also have the ability to search. Tagging content with their own identifiers will also make the content searchable in ways that the user will determine and control. When the app is launched, it will present to the user the last screen they accessed or used – a virtual assistant that remember what they have been doing.

A user will be able to push highly valued content that is discovered back to ASTEC for addition to ASTEC's resource library. ASTEC and the instructors/chiefs will need to approve it prior to addition to the library. In this way, content will be constantly refreshed and revised. Also, a system will be in place to remove resources as they become out of date.

A personal calendar will also exist in the system so that users can set alerts and reminders of upcoming deadlines.

10. Storyboard Development

To develop our storyboard, we considered user feedback from the system requirements, user personas, mental models, and the group's initial ideation and sketching. Central to our storyboard is understanding not only how our user will use the system, but also understanding our user's day-to-day real world experience.

Within the overall storyboard (refer to Figure 12), we highlight one specific interaction: the calendar feature. With this feature, our user can navigate from the home page to the calendar interface. Our user is thinking about all the lectures, labs, and training they need to attend next week. He/she selects the calendar button to open up a personalized calendar view. On this view, he/she is able to interact with the system by creating events and viewing a personalized calendar schedule. Once our user plans their schedule, they now feel more organized and prepared for the week ahead.

The storyboard represents the transition between our ideation and our wireframe. It illustrates an early progression of ideas and thoughts.

Figure 12. Digital storyboard.



Click the link to view the storyboard:
<http://www.screencast.com/t/RxXd3Mfz>

11. Wireframe Development

The following is a high-level view wireframe of our app, followed by a more detailed look at each tab and sub-tab of the app.

Main Layout

Three Basic Tabs (At the bottom)

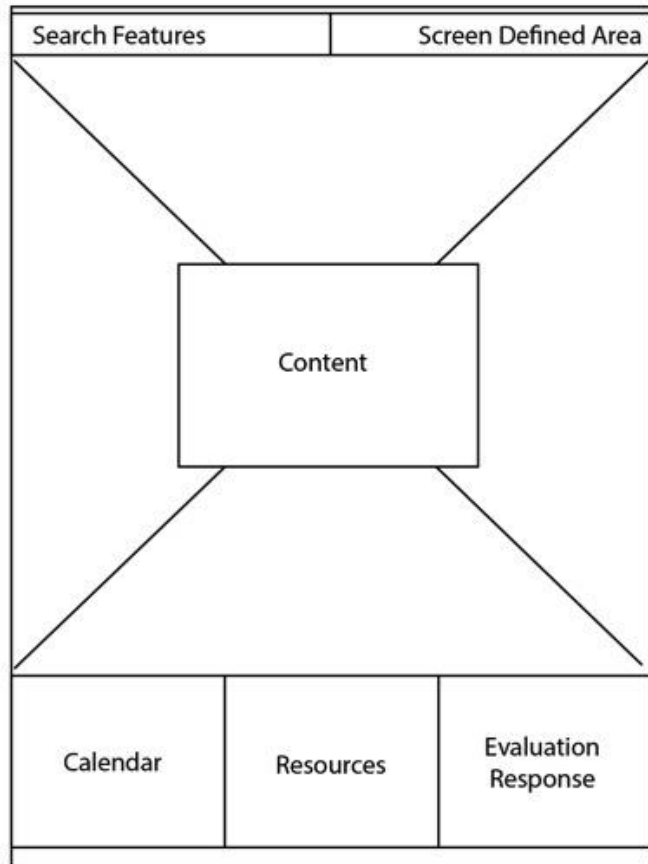
- Calendar
- Resources
- Evaluation Response

Two Interaction Areas (Top)

- Search Feature
- Screen Defined Area
 - The nature of this interaction will change based on the screen.

Navigation

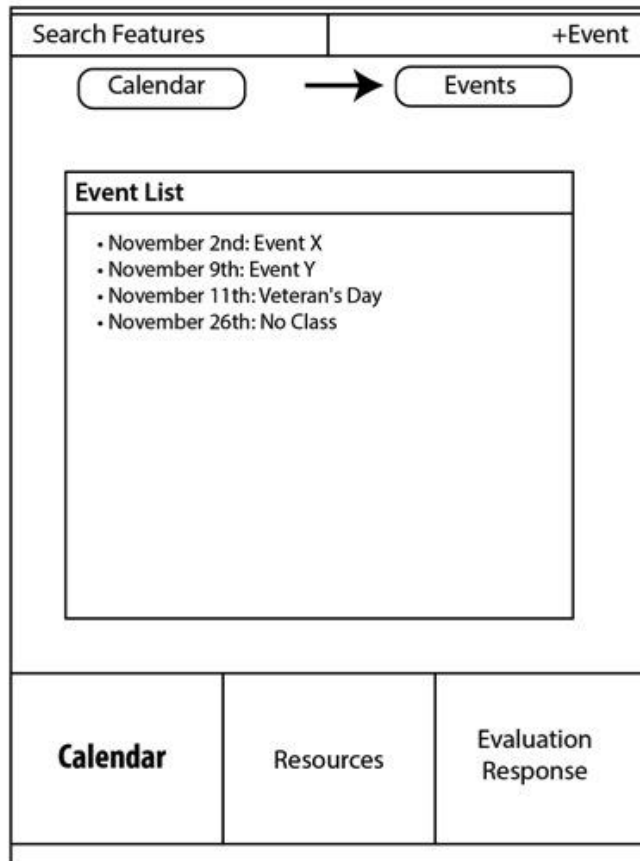
- Users will be able to navigate between screens using the tab buttons at the bottom.
- Sub-tabs will appear at the second-level top to allow for additional navigation



Calendar: Events

Events

- Allows users to look at all events in a list format.
- Users will be able to add events with the +Event button at the upper right corner



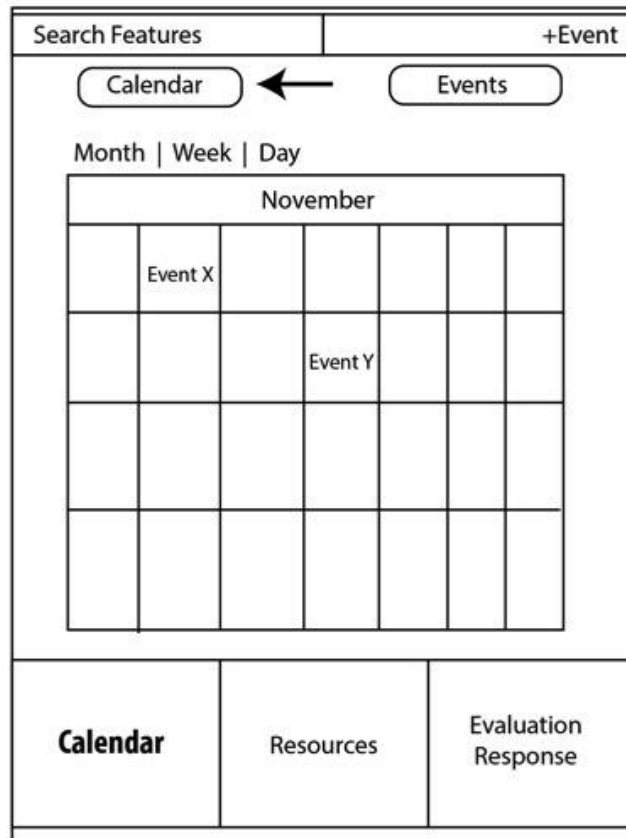
Calendar: Calander

Two Sub-tabs Tabs (Second level top):

- Calendar
- Events

Calendar

- Offers monthly, weekly, and daily breakdown of schedule with all ASTEC related events included
- Allows user to add events to the calendar with the +Event button in the upper right corner



Calendar: +Events

Add Events

- When users press the +Event button in under the Calendar tab, a pop up menu will ask them to enter in information needed to enter an event
- Pressing Submit in the popup window will close the window.

Search Features

Calendar ← Events

Add an Event Submit

Event Title:

Event Date:

Event Time:

Description

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Calendar Resources Evaluation Response

Resources: Pushed Resources

Two Sub Tabs (At second level top)

- Pushed Resources
- User Uploaded

Pushed Resources

- Pushed Resources will be sent and organized by the administration/instructors. It will included vetted pdfs, videos, study aids, lesson notes, etc. Content will be organized in folders created by the adim/instructors.
- These resources will open in a new window

Search Features

Pushed Resources User Uploaded

↑

Instructor/Administration generated folder

- [.PDF Document](#)
- [.Youtube video hyperlink](#)
- [.Diagram.png](#)
- [.Word Document: Notes from Instructor](#)



Collapsible Folders
.....

Calendar **Resources** Evaluation Response

Resources: User Uploaded

User Uploaded Resources

- Users will be able to upload their own resources, including pdfs, videos, study aids, lesson notes, etc. Content will be organized in folders created by the user.
- These resources will open in a new window
- Users will utilize the button in the upper right corner to access these features

Search Features		+ Upload Content
Pushed Resources		User Uploaded
↑		
 User generated folder <ul style="list-style-type: none">• PDF Document• Youtube video hyperlink• Diagram.png• Word Document: Notes from Instructor		
 Collapsible Folders		
Calendar	Resources	Evaluation Response

Resources: Upload Content

User Uploaded Resources



- When users press the Upload Content button, a popup window will direct them to what they need in order to add content.
- Users may choose between uploading an image from their image library or hyperlinking to a webpage or online document.
- Users will be able to tag items, place them in a folder, or create a new folder.
- As this project develops, other options may become available.

Search Features		+ Upload Content																					
Pushed Resources		User Uploaded																					
↑																							
<div style="border: 2px solid black; padding: 10px;"><table border="1"><tr><td colspan="2">Upload Content</td><td>Submit</td></tr><tr><td>Content Title:</td><td colspan="2"><input type="text"/></td></tr><tr><td>Upload Image:</td><td colspan="2"><input type="button" value="Choose from Library"/></td></tr><tr><td>Create Hyperlink:</td><td colspan="2"><input type="text"/></td></tr><tr><td>Tag Resource:</td><td colspan="2"><input type="text"/></td></tr><tr><td>Place in Folder:</td><td colspan="2"><input type="text" value="Drop-down Menu of existing folders"/></td></tr><tr><td colspan="3" style="text-align: center;"><input type="button" value="Generate New Folder"/></td></tr></table></div>			Upload Content		Submit	Content Title:	<input type="text"/>		Upload Image:	<input type="button" value="Choose from Library"/>		Create Hyperlink:	<input type="text"/>		Tag Resource:	<input type="text"/>		Place in Folder:	<input type="text" value="Drop-down Menu of existing folders"/>		<input type="button" value="Generate New Folder"/>		
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Create Hyperlink:	<input type="text"/>																						
Tag Resource:	<input type="text"/>																						
Place in Folder:	<input type="text" value="Drop-down Menu of existing folders"/>																						
<input type="button" value="Generate New Folder"/>																							
Calendar	Resources	Evaluation Response																					

Evaluation Response

Evaluation and Surveys

- This feature will allow users to electronically submit post-lesson evaluations and surveys generated by ASTEC.
- ASTEC Administrators and instructors will be able to organize this information into folders for easy access and organization

Search Features		
<p> Evaluation folder</p> <ul style="list-style-type: none"> • 11/12/14 Lesson Evaluation • 11/19/14 Lesson Evaluation • 12/3/14 Lesson Evaluation <p> Survey folder</p> <ul style="list-style-type: none"> • Patient Care Survey • Diagnosis Survey 		
Calendar	Resources	Evaluation Response

Evaluation Response

Evaluation and Surveys

- Evaluations and Surveys will open within the app or possibly through a link using a web browser.
- If used within the app, there will be a Submit button at the upper right corner of the screen.

Search Features	Submit	
<p>11/12/14 Lesson Evaluation</p> <p><i>Today's lesson was very helpful:</i></p> <p> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> </p> <p><i>Strongly Disagree</i> <i>Strongly Agree</i></p> <p>What was the most effective component of today's lesson?</p> <div style="border: 1px solid black; height: 40px; width: 100%;"></div> <p>What could we improve for the next lesson?</p> <div style="border: 1px solid black; height: 40px; width: 100%;"></div>		
Calendar	Resources	Evaluation Response