

# Clerkship Rotation Checklist

(Project from Dr. Eliza Beth Littleton)

Sebi Samuel | Shriharsha Vaidhyam | Siddhesh Shimpukade | Vishruth Reddy

## Project Description

Our team decided to work on the web app project for the Department of Surgery. First off, it fulfills a need for medical students completing their Surgery rotation. With this web app, students can monitor their progress and goals in real-time, which can help them stay on track and achieve their objectives more efficiently.

Secondly, the web app is useful for teachers, coordinators, and directors who oversee the students' progress. By having access to each student's goals and achievements, they can better evaluate their progress and provide personalized feedback and support. Additionally, the web app can help the department streamline its administrative processes by allowing better tracking and reporting on student progress.

Thirdly, privacy is crucial for medical students, and the web app's design ensures that students can maintain their privacy while still allowing them to share their progress with their teachers and coordinators. This feature provides a secure and confidential way for students to report their achievements, which can help them feel more comfortable and motivated to work towards their goals.

Lastly, the web app's feature that displays how many other students have achieved certain goals can promote healthy competition and motivate students further. This feature can help students feel more connected to their peers and foster a sense of community, even in a remote learning environment.

# Task Analysis

We had the following tasks at hand:

- Preparing the web version of a clerkship rotation checklist
  - Students should be able to see their progress in the checklist.
  - Students should be able to see their pending tasks which can be used to show the resident.
  - No student should be able to view their peer's progress.
- Have a resident's view of the web application
  - Residents should be able to view the list of procedures/tasks in the rotation process.
  - Residents should be able to track how many students have completed the particular task.
- Have a department admin's view of the application:
  - Admin should be able to get the list of how many students are allocated to all health facilities for the clerkship rotation process.
  - Admin should be able to track each student's progress during the process.
  - Admin should be able to add/remove students from the rotation list.

## Prototype – 1

We had our initial meeting with Dr. Littleton where she explained the above task analysis to our team. Initially, our focus was to make it as minimalistic as possible. We then proceeded to make the web version of a simple normal checklist. Following is the initial prototype of the given task:

# Surgery Clerkship Learning Objectives Checklist

OMED learning objectives for [learning log](#) are in red

## 1. Clinical skills : Floor Patient Management

- ☐ Hypo/hyponatremia
- ☐ Hypo/hyperkalemia
- ☐ Hypomagnesemia
- ☐ Hypophosphatemia
- ☐ NG Tube Management
- ☐ Wet-to-dry wound care
- ☐ VAC
- ☐ Nutrition (feeding tubes)

## 2. Intraoperative Skills

- ☐ Foley Placement
- ☐ Preoperative Preparation
- ☐ Suture/staple placement or removal

## 4. Patient care

- ☐ Abdominal pain consult
- ☐ Proctored H&P

## 5. Presentations

- ☐ Presentation of floor patient
- ☐ Presentation of clinic patient

## 6. Orders

- ☐ Admission orders– ADC VANDALISM
- ☐ Perioperative antibiotics
- ☐ Discharge
- ☐ Writing a prescription or inpatient order- typical meds

## 7. Surgical skills/procedures

☐ Two-handed knot

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- ☐ Subcuticular suture (simple interrupted with instrument tie)
- ☐ Subcuticular running suture
- ☐ Simple interrupted suture
- ☐ Mattress suture (vertical & horizontal)
- ☐ NG tube insertion
- ☐ Suture/staple removal

## 8. Surgical Cases

- ☐ Laparotomy
- ☐ Lap/open cholecystectomy
- ☐ Lap/open ventral/umbilical hernia Repair
- ☐ Lap/open inguinal hernia repair
- ☐ Colorectal surgery

### 9. Surgical diseases

- ☐ Fluid resuscitation
- ☐ Oliguria
- ☐ Fever
- ☐ Infections
- ☐ Wound healing
- ☐ Gallbladder disease
- ☐ Bowel obstruction
- ☐ Hernias
- ☐ GI bleed
- ☐ Diverticulitis
- ☐ Cancer
- ☐ Trauma
- ☐ Musculoskeletal injury

### 10. Imaging: [www.learningradiology.com](http://www.learningradiology.com) or Stentor

- ☐ Gallbladder U/S
- ☐ Abdominal X-ray
  - Abdominal CT Scan
- ☐ Ventral hernia
- ☐ Appendicitis
- ☐ Bowel obstruction

## Prototype –1: Feedback

We went for the first round of feedback from the client and the following is the feedback that we received:

- The prototype did not represent a web application at all, it looked like a normal document.
- It did not incorporate the resident doctor's view or the department admin's view as they are also personas who will be interacting with the application.
- It did not have the provision for the student to track their progress

# Prototype - 2

## User Study of Resident Doctor

We had a conversation with Dr. Dereck Afflu, who's a resident doctor at UPMC. We wanted to consult him to know the resident doctor's involvement with the application. Following are the insights with the resident user study:

- The resident doctor doesn't have much to deal with tracking the progress of the student in the rotation process.
- The one from the hospital having the most interest will be the clerkship director .
- The clerkship director only cares about the progress of the tasks being carried out by the students, however they are not interested in the progress of the individual student.
- The checklist needs to focus more on the usability rather than the aesthetics.

## Design

It is a single web application. Every user will be given a different view based on their roles. This can be achieved by providing a different login portal.

- Student View
  - Students will have all the tasks displayed in a checklist format.
  - They will be able to check the items that they completed and specify the location at which they completed it.
  - Students can see only their own progress and not their peers' progress.
- Resident Doctor View
  - The resident doctor will see the students' overall progress.
  - They do not have access to individual student progress.
- Admin View
  - The admin has access to all the information about the students' progress.

- They can see the quality of learning and can transfer the tasks and students to various locations.

UPMC Mercy

Shriharsha A Vaidhyam  
Student

OMED learning objectives

Search

Clinical Skills:Floor patient

☐ Hypo/hyponatremia

☒ Hypo/hyperkalemia

☐ Hypomagnesemia

☐ NG Tube Management

☐ Wet-to-dry wound care

☐ Nutrition (feeding tubes)

☐ VAC

CANCEL

OK

Search

Operations Completed:

Clinical skills

Interoperative skills

Patient care

Surgical skills

Imaging

8

2

3

3

4

Intraoperative Skills

Patient care

Presentations

Orders

Surgical skills/procedures

Surgical Cases

Surgical Cases



UPMC Mercy



Sebi Sam  
Admin



Tasks



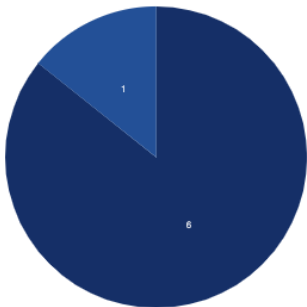
Patient care

Clinical skills  
: Floor Patient

Intraoperative  
Skills

Presentations

Abdominal pain consult    Proctored H&P



Select Hospital



UPMC Mercy

UPMC Presby

UPMC Shadyside

UPMC Waterfront



**Add new user**

User details

Username \*

Role

Select

Email \*

email@address.com

First Name

John

Last Name

Doe

☒ Send email confirmation

Add User

Cancel

Profile picture

Select image

## Prototype - 2 : Feedback

We presented this prototype as our initial design and also presented it to the client. Following is the feedback that we received:

- The pie charts could be distracting for the student because of its relative width on the screen.
- The application should have a login screen for the personas using the application.
- Still no separate list to track the pending tasks for the students.
- Admin view can be a bit more sophisticated.

## Prototype - 3

### User Study of students:

We conducted a set of user interviews with a bunch of students. We asked them about their study lifestyle and how they integrate technology with their daily studies. The following are the key insights that we got from those user studies:

- The student life is very busy , often loaded with assignments and tests throughout the semester.

- Motivation of using any external applications are very low as they don't get extra credit for using them.
- If the motive of the application is academic, the students are very less likely to look at the aesthetics of the application.
- Students prefer simple and efficient interfaces over aesthetics.
- The student doesn't like spending too much time looking to carry out a single atomic task.

## The Design

Following is the design for this prototype:

- Student's view:
  - Student can check their progress on the progress bar.
  - Student can search the particular task to be completed using the search box.
  - Student can check their pending tasks as a separate list .
  - The checklist is in the form of checkboxes thus cutting the reaction time of the students significantly.
  - No student can check the progress of their peers.
- Resident's view:
  - Resident lands to a single page.
  - They can see the progress of particular task in the health facility.
- Department Admin's view
  - Admin can see the dashboard of the individual student to check their progress.
  - Admin can add/remove a particular student from the list of students in the rotations in a particular health facility.

Common Features:

- All views have a search box which enables them to search for their target.

- The login page follows Role Based Access Control:
  - No need for a specific login page for a specific role.
  - Credentials are enough to determine what role a user has.
  - Access to the application will be dependent on the role and the amount of privilege that the role has in the application.

### Surgical Clerkship Login

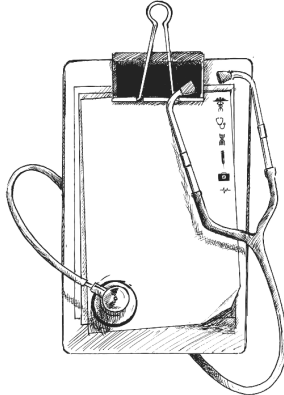
Email Address

Password

[Forgot password?](#)

Login

Did you know? The word "doctor" comes from the Latin word "docere," which means "to teach."



14 of 27

Pending Tasks

Welcome, Vishruth. [Logout](#)

UPMC Shadyside

Clinical Skills

☒ VAC  
☐ Nutrition  
☐ Wet-to-dry wound care

Intraoperative Skills

☒ Foley Placement  
☐ Preoperative Preparation  
☐ Suture

Orders

☒ Perioperative Antibiotics  
☐ Discharge  
☐ Pain Mgmt

UPMC Presbyterian

Surgical Cases

☒ Laparotomy  
☐ Colorectal Surgery  
☐ Lap/Hernia Repair

Surgical Diseases

☒ Cancer  
☒ Trauma  
☐ Hernia

Surgical Skills/Procedures

☒ NG Tube Insertion  
☐ 2 handed knot  
☐ Sub cuticular suture

UPMC Mercy

Presentations

☒ Floor Patient  
☐ Clinic Patient  
☐ OPD Presentations

Patient Care

☒ Abdominal Pain Consult  
☒ Proctored H&P  
☐ Pediatric Consult

Imaging

☒ Abdominal X-Ray  
☒ Bowel CT Scan  
☒ Ventral CT Scan

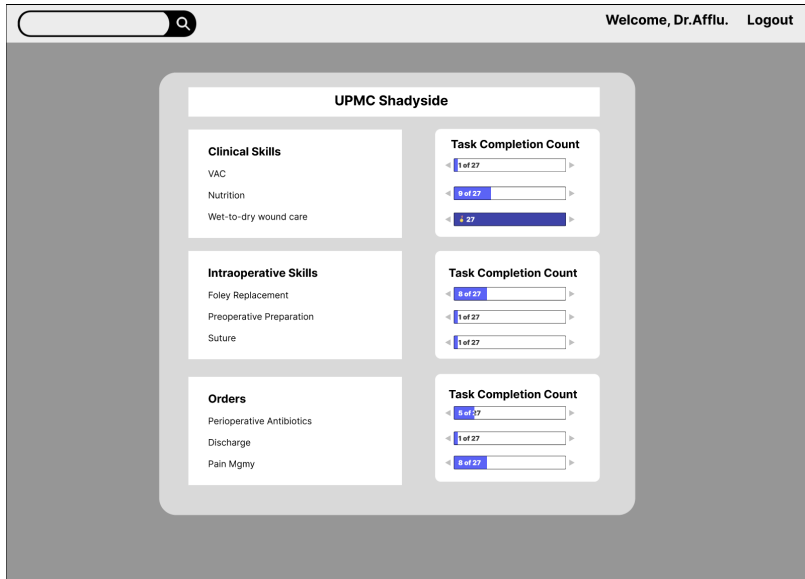
Cat

14 of 27

Pending Tasks

Welcome, Vishruth. [Logout](#)

Sorry!! Search Not Found



Q

Welcome, Dr.LittletonLogout

UPMC Shadyside

Sebi Mahesh  
Siddhesh Das  
Harsha Meenamma  
Raj Shah  
Preet Raj  
Bruce Wayne

Edit List

UPMC Presbyterian

Vishruth Reddy  
Toufik Bhai  
Ni hao Dosai  
Daniel Radcliff  
Craig St  
Bruce Lee

Edit List

UPMC Mercy

Robert Pattinson  
Brown Chris  
Chris Gayle  
Pratt Patel  
Bieber Justin  
Heisenberg Pinkman

Edit List

Q

Welcome, Dr.LittletonLogout

UPMC Shadyside

Sebi Mahesh  
Siddhesh Das  
Harsha Meenamma  
Raj Shah  
Preet Raj  
Bruce Wayne

Edit List

UPMC Presbyterian

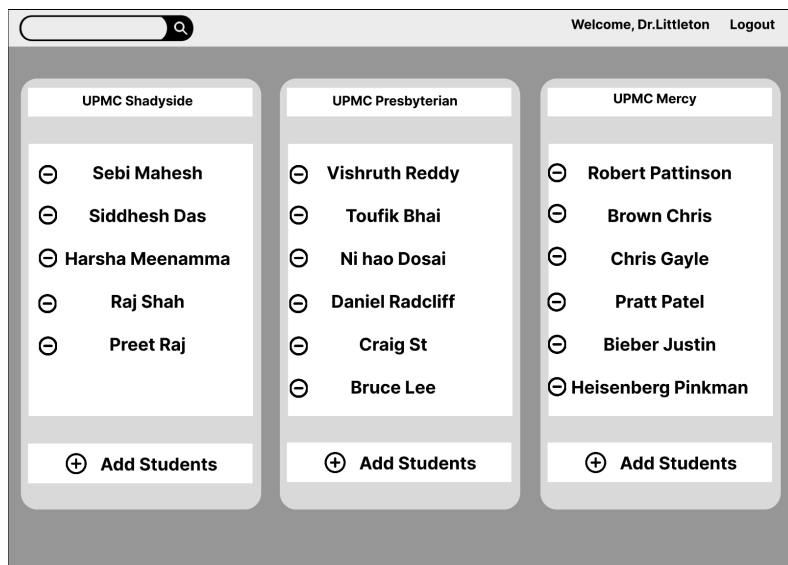
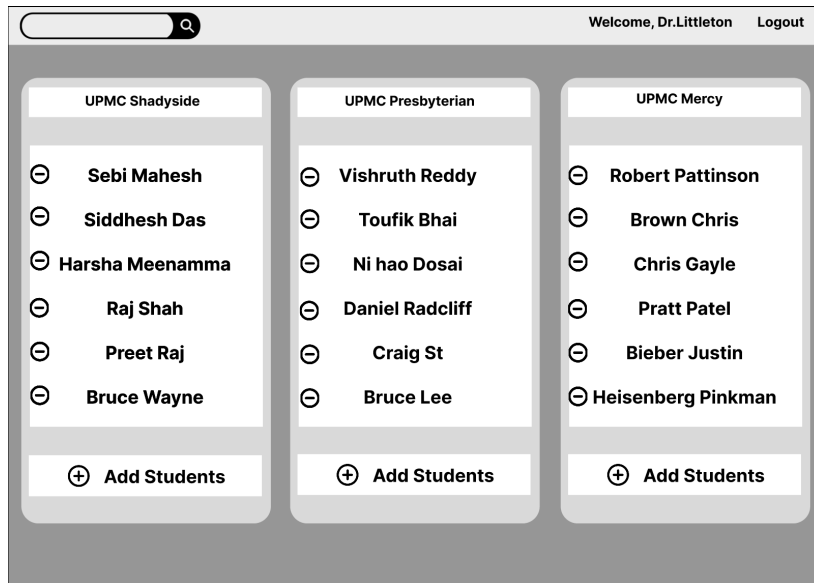
Vishruth Reddy  
Toufik Bhai  
Ni hao Dosai  
Daniel Radcliff  
Craig St  
Bruce Lee

Edit List

UPMC Mercy

Robert Pattinson  
Brown Chris  
Chris Gayle  
Pratt Patel  
Bieber Justin  
Heisenberg Pinkman

Edit List



Welcome, Dr.LittletonLogout

UPMC Shadyside

⊖ Sebi Mahesh

⊖ Siddhesh Das

⊖ Harsha Meenamma

⊖ Raj Shah

⊖ Preet Raj

⊕ Rully Hendrawan

UPMC Presbyterian

⊖ Vishruth Reddy

⊖ Toufik Bhai

⊖ Ni hao Dosai

⊖ Daniel Radcliff

⊖ Craig St

⊖ Bruce Lee

⊕ Add Students

UPMC Mercy

⊖ Robert Pattinson

⊖ Brown Chris

⊖ Chris Gayle

⊖ Pratt Patel

⊖ Bieber Justin

⊖ Heisenberg Pinkman

⊕ Add Students

Welcome, Dr.LittletonLogout

UPMC Shadyside

⊖ Sebi Mahesh

⊖ Siddhesh Das

⊖ Harsha Meenamma

⊖ Raj Shah

⊖ Preet Raj

⊖ Rully Hendrawan

⊕ Add Students

UPMC Presbyterian

⊖ Vishruth Reddy

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⊖ Daniel Radcliff

⊖ Craig St

⊖ Bruce Lee

⊕ Add Students

UPMC Mercy

⊖ Robert Pattinson

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⊖ Chris Gayle

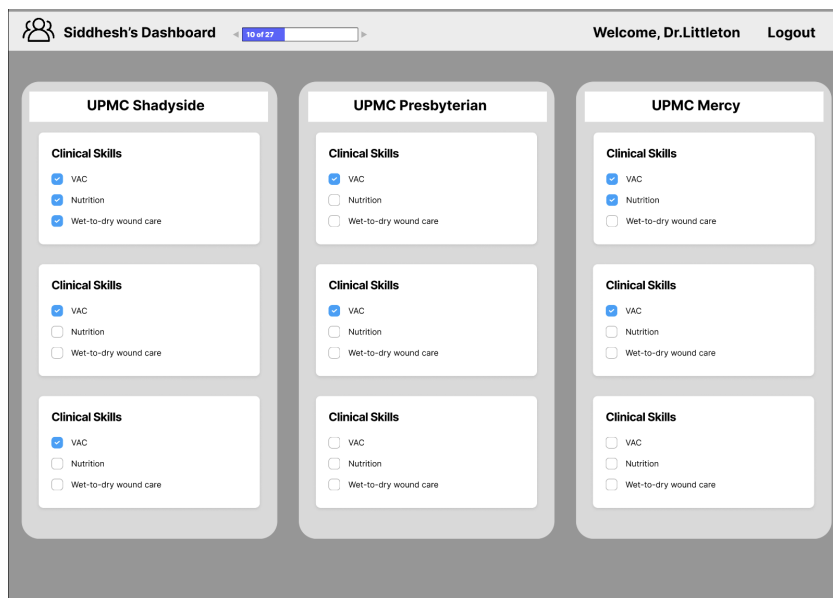
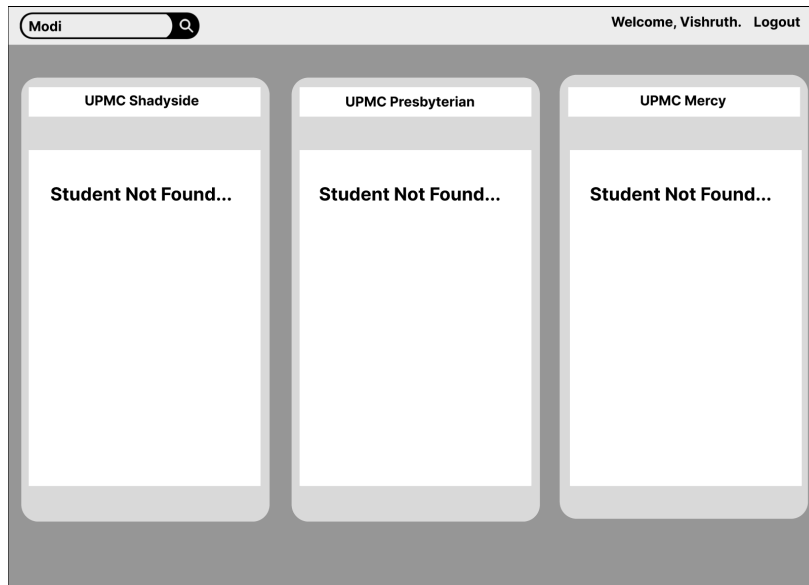
⊖ Pratt Patel

⊖ Bieber Justin

⊖ Heisenberg Pinkman

⊕ Add Students





These are just a few snippets of the final prototype. For the full prototype, please refer to this link:

<https://www.figma.com/file/EkUzofwKeg5f9UHMvzVQxV/ISD-Project-P-rototype?node-id=0%3A1&t=uCEAEZ64Ftur8W92-1>

# Implementation

Youtube Link for Demo : <https://youtu.be/nDI983qaos8>

## Limitations

Throughout the implementations of the project, we had the following limitations:

- The RBAC model for login was extremely difficult to integrate from scratch.
- We Intended to integrate the application with Canvas, but the process turned out to be too complicated to be completed in the given timeframe.
- The actual product didn't turn out to be as great as the final prototype:
  - The usability aspect was able to be performed except the dashboard and the RBAC login model.
  - The visual aspect couldn't be done according to the prototype.
- The final product is in short, a very lightweight version of the final prototype.

## Contributions

Name	Contribution
Sebi Samuel	<ul style="list-style-type: none"><li>● Client communication</li><li>● Presentation</li><li>● Demo recording</li><li>● Documentation of report of 1st and 3rd iteration.</li><li>● Conducting 3 user studies</li><li>● Minor tunings to 3rd prototype</li></ul>

Shriharsha Vaidhyam	<ul style="list-style-type: none"> <li>• Conducted 1 user study</li> <li>• Complete design for second prototype</li> <li>• Presentation of 2nd prototype</li> </ul>
Siddhesh Shimpukade	<ul style="list-style-type: none"> <li>• Documentation of final report</li> <li>• Design for first prototype</li> <li>• Note taking during client meetings and user interviews</li> </ul>
Vishruth Reddy	<ul style="list-style-type: none"> <li>• Conducting 3 user interviews</li> <li>• Intermediate evaluations during iterations</li> <li>• Design and implementation of final prototype</li> <li>• Coded the entire interface(final product)</li> <li>• Documentation of 1st and 2nd iteration.</li> </ul>