# Project 1: Topic and client selection and product or system concept statement

- **Project Name:** Clinical Mobile App
- **Name of Client Organization:** Rangos School of Health Sciences, Duquesne University (Courtney Hartman, Director of Clinical Education, PA Program)
- **One-line Description of this Project Assignment:** Designing an app to support student clinical experiences
- **Team Member Names:** Alicia Segura-Pinto, Alison Wix, and Scott Copley
- **Agile UX Design Experienc**e – GDIT 716, Summer 2021

1. **Client Organization:** Rangos School of Health Sciences, Duquesne University

   **Client Contact Person:** Courtney Hartman, Director of Clinical Education - PA Program - 412.396.5916 - hartma10@duq.edu

   **Brief Description of the Client:** Courtney Hartman is the Clinical Coordinator in the Physician Assistant Department. Prior to joining the faculty in February 2014, she worked clinically as a physician assistant in orthopedic surgery and urgent care medicine. Along with duties as Clinical Coordinator, Courtney serves as an assistant and lecturer for various courses for the 4th year students. She currently teaches Clinical Medical Lab I, II, and III as well as Essentials for Clinical Practice. (https://www.duq.edu/academics/faculty/courtney-hartman)

   **Perspective this Project Represents:** created from a product perspective

2. **Product Concept Statement:**

   The proposed product is a mobile app which will support the efforts of health care students who are participating in their clinical rotations or field experiences. Several medical professions require student practitioners to document their daily clinical experiences as part of their training for both graduation and licensure.

   Current clinical documentation software exists largely in the desktop/laptop computer format, with a gap in the offering of a mobile app. O'Connor and Andrews (2018, p. 172) state that the use of mobile apps to enhance clinical education has not been explored, and these apps could benefit the acquisition of knowledge and skills in clinical settings.

   This project will be aimed at the mobile device-savvy Gen Z students as they experience the clinical environment. Pre-filled questions and multiple-choice selections will be employed when possible, with spaces available for students to briefly discuss their clinical experiences each day.

3. **Initial Meeting Description with Client:**

   It is the responsibility of the clinical students to document all clinical experiences during patient care including exam findings, diagnosis, treatment, patient education and procedures. Given the limitations in the software, students are not documenting their clinical experiences. Without proper documentation, students are not meeting learning objectives and learning outcomes for clinical rotations, which ultimately affects both graduation and licensure. The clinical team then needs to create a remediation plan for the student to ensure that all learning outcomes are met. Finding a way to facilitate easier

documentation will ensure that learning outcomes are being met without the additional remediation efforts.

**Cited Work:**

O'Connor, S., & Andrews, T. (2018, 2018/10/01/). Smartphones and mobile applications (apps) in clinical nursing education: A student perspective. *Nurse Education Today, 69*, 172-178. https://doi.org/https://doi.org/10.1016/j.nedt.2018.07.013

# Project 2: Directions. Usage Research Data Elicitation and Analysis (due May 25th)

**Product Concept Statement**

The proposed product is a mobile app which will support the efforts of health care students who are participating in their supervised clinical practice experiences (SCPEs). Several medical professions require student practitioners to document their daily clinical experiences as part of their training for both graduation and licensure.

Current clinical documentation software exists largely in the desktop/laptop computer format, with a gap in the offering of a mobile app. O'Connor and Andrews (2018, p. 172) state that the use of mobile apps to enhance clinical education has not been explored, and these apps could benefit the acquisition of knowledge and skills in clinical settings.

This project will be aimed at the mobile device-savvy Gen Z students as they experience the clinical environment. Pre-filled questions and multiple-choice selections will be employed when possible, with spaces available for students to briefly discuss their clinical experiences each day.

**Preparation for Usage Research Data Elicitation**

The team met to discuss plans for data elicitation to learn more about the work practices of both faculty and students with respect to logging patient encounters during SCPEs. As advised by Hartson & Pyla (2019, p. 124) the team researched the field of Physician Assistant Studies, the concept and rationale of SCPEs, as well as terminology used by practitioners in the field. According to Hartson & Pyla (2019), researching in advance will give the team a better understanding of the work practices as well as shorten the amount of time utilized in data elicitation.

Tactical goals (Hartson & Pyla, 2019, p. 122) for data elicitation from the School perspective are to learn:

- How clinical rotations work for the Physician Assistants Studies program *(work practice ecology, p. 122)*
- What defines a SCPE, requirements of the program, school and the accrediting bodies, and other possible licensure requirements *(work practice ecology, p. 122)*
- How SCPEs are obtained (school assigned, student arranged, etc) *(information hierarchies and work flows, p. 122)*
- Where SCPE sites are located, along with the number and types of SCPEs students must complete
- Where SCPEs are positioned within the PA curriculum *(information hierarchies and work flows, p. 122)*
- What would make clinical documentation more streamlined for faculty *(information hierarchies and work flows, p. 122)*
- What sort of documentation method for patient encounters is currently being used during SCPEs, and how can one improve upon it *(understanding market trends and forces, p. 123)*
- What are other PA programs using for documentation during SCPEs *(understanding market trends and forces, p. 123)*

Tactical goals for data elicitation from the student perspective are to learn:

- How students view the SCPE *(work practice ecology, p. 122)*
- What are some challenges to patient encounter documentation during SCPEs *(work practice ecology, p. 122)*
- How often are students expected to complete clinical documentation *(information hierarchies and work flows, p. 122)*
- If/how feedback is offered by instructors *(information hierarchies and work flows, p. 122)*
- What would make clinical documentation more user friendly and convenient for students to complete *(understanding market trends and forces, p. 123)*
- What are peers using at other institutions *(understanding market trends and forces, p. 123)*
- What documentation methods are currently being used and how could they be improved upon *(understanding market trends and forces, p. 123)*

**Client and User Interviews**

The team met with one client representative and two student users, garnering a great deal of insight and useful data to use in development of the clinical documentation mobile app.

Client Contact

- Courtney Hartman, MPA, PA-C
- Director of Clinical Education, PA Program, Duquesne University 412.396.5916
- hartma10@duq.edu

Responsibilities

- Coordination and supervision of the Clinical Phase of the PA Program.
- Prepares syllabi and learning objectives for all courses in the Clinical Phase of the program.
- Provides analysis of supervised clinical practice experiences for appropriateness of settings, patient encounters, clinical skills, diagnoses, and competencies.
- Schedule required and elective supervised clinical experiences, coordinating the distribution of students for appropriateness of clinical experiences.
- Analyzes clinical curriculum outcomes for review at committee meeting and by the Program Director.
- Provides analysis of supervised clinical practice experiences for appropriateness of settings, patient encounters, clinical skills, diagnoses, and competencies.

Student Users

- Samantha Studentowicz (year 5) currently in her Women's Health SCPE at UPMC Mercy Hospital
- Dennis DeStudent (year 5) currently in her Emergency Medicine SCPE at Allegheny General Hospital

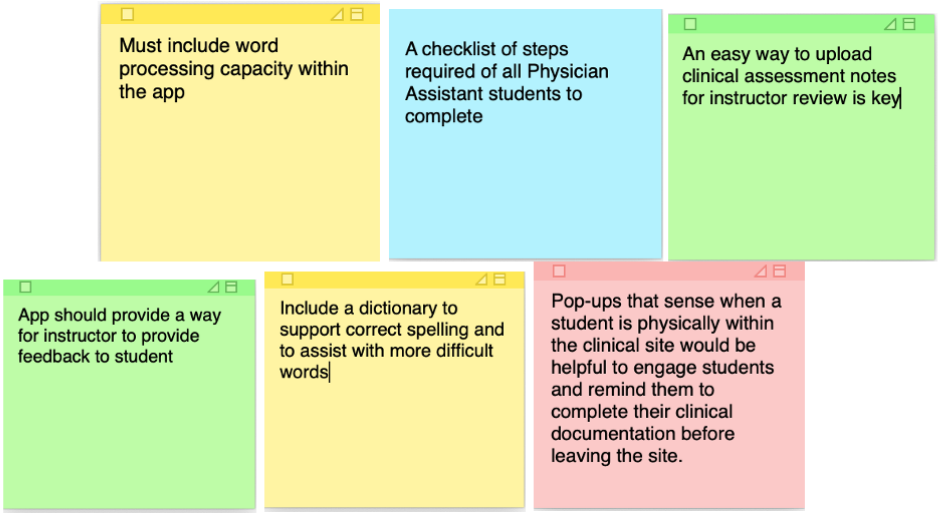
**Building the WAAD**

Taking the data learned from client and student interviews, the team began making sense of the work activity by creating a Work Activity Affinity Diagram (WAAD), as described by Hartson & Pyla (2019, p. 154) with the goal of sorting and analyzing the sample of work activity notes.

Work activity notes are typed into a laptop, since it will make the analysis process more manageable for the team and will "facilitate sharing, manipulating, and printing as needed" (p. 146).

Additionally, each work activity note is clear and specific, "retaining the original meaning and remaining true to the user's intentions" (p. 147).

Once the cards are sorted and categorized hierarchically by emerging themes, the team compiles them into a spreadsheet for further analysis. The team starts with the full set of notes that were extracted from the raw usage research data (p. 151). This step will help the team to synthesize information gained from all of the inputs, as well as their own observations, and will contribute to a better understanding of the whole concept (Hartson & Pyla, 2019, p. 176). An example of notes taken to create the WAAD is presented below:




**Defining Work Roles and User Classifications**

The team identified three user classifications. User classification 1 (UC-1) is for users with a role which requires access to all aspects of the app. UC-1 users may grant and revoke access to other users in UC-2 and UC-3. The UC-2 classification is for users that require access to most areas of the app, but not all, nor can they revoke or grant access to others. For UC-3 classification, users can interact with some data on the app and require some interaction with other users. This project focuses primarily on two work roles (faculty and student). However, the team identified other work roles (Hartson & Pyla, 2019, p. 181), which include: technology coordinator, budget manager, clinical site manager, on-site preceptor, student affairs manager, and database coordinator.

- **Clinical Coordinator** - Oversees all clinical activities, including site assignments, clinical hours, managing on-side preceptors, faculty assignments, and student schedules. (UC-1)

- **Technology Coordinator** - Makes sure the technology is updated and working as intended. The TC also fields questions regarding errors and app constraints. (UC-1)

- **Faculty** - Evaluates student notes uploaded to the app, and provides feedback when appropriate. Will grade all assignments. (UC-2)

- **Student Affairs Manager** - Uploads student data to the app, enabling students to log into the app and ensures ease of use. (UC-1)

- **On-site preceptor** - Supervises students as they conduct on-site clinical experiences. Uses the app to view rosters of students who are assigned to them. (UC-3)

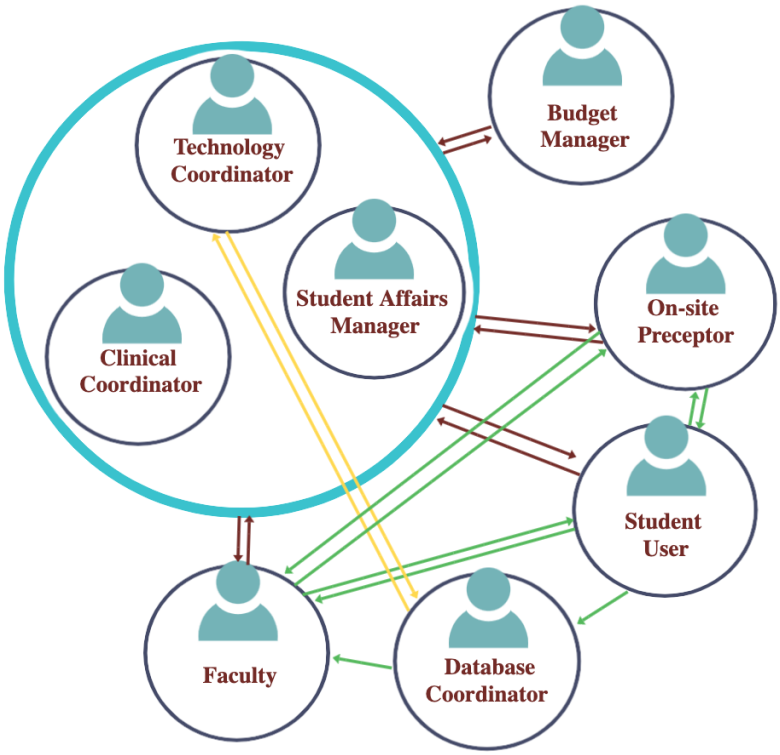
- **Budget Manager** - Pays vendors for various services related to the app. Also responsible for evaluating and remitting all on-site preceptor expenses. (UC-3)

- **Database Coordinator** - Ensures student encounter notes are being securely uploaded from app to a tracking database, enabling faculty to track student progress and patient encounters. (UC-3)

- **Student User -** Uses the app to document their clinical experiences. Interacts with faculty to obtain feedback and project grades. (UC-3)

**Flow Model**

A workflow model between user roles is presented here, where you can observe "a high level view of how users in each work role and other system entities interact and communicate to get work done" (Hartson and Pyla, 2019, p. 187)



**List of Questions for the Interviews:**

Some of the interview questions were adapted from Peng et al. (2016). These authors examine user perceptions of mobile health apps based on a qualitative study, which will help us to get a better understanding of the perceptions and types of questions related to mobile apps and the medical field.

| **Some Interview Questions are:** |
|---|
| **1.** Can you tell us about the kinds of mobile phone apps you typically use? |
| **2.** How frequently do you use them? |
| **3.** Do you have any medical apps on your phone? |
| **4.** How long ago did you download it/them? |
| **5.** How frequently do you use it/them? |
| **6.** What kind of medical/health apps do you think exist? |
| **7.** For everyone that uses medical apps – What do you like about the app? What are your favorite features? What do you dislike about the app? Is there anything you would like to change about it? |
| **8.** How has using a medical app increased your knowledge about the medical field? |
| **9.** How has using a medical app supported you in your workplace? In what ways? |
| **10.** If you don't use any medical app, how do you think a clinical mobile app will benefit the student practitioners? |

**References**


Hartson, R., & Pyla, P. (2019). *The UX Book: Agile UX design for a quality user experience*, 2nd ed. Cambridge, MA: Morgan Kaufmann.

O'Connor, S., & Andrews, T. (2018, 2018/10/01/). Smartphones and mobile applications (apps) in clinical nursing education: A student perspective. *Nurse Education Today, 69*, 172-178. https://doi.org/https://doi.org/10.1016/j.nedt.2018.07.013

Peng, W., Kanthawala, S., Yuan, S. *et al.* A qualitative study of user perceptions of mobile health apps. *BMC Public Health* 16, 1158 (2016). https://doi.org/10.1186/s12889-016-3808-0

**Project 3: Usage research data modeling (due May 31st 11:59pm)**

**Product Concept Statement**

The proposed product is a mobile app which will support the efforts of health care students who are participating in their supervised clinical practice experiences (SCPEs). Several medical professions require student practitioners to document their daily clinical experiences as part of their training for both graduation and licensure. This clinical mobile app could benefit their training process, and be helpful for the faculty as well.

Current clinical documentation software exists largely in the desktop/laptop computer format, with a gap in the offering of a mobile app. O'Connor and Andrews (2018, p. 172) state that the use of mobile apps to enhance clinical education has not been explored, and these apps could benefit the acquisition of knowledge and skills in clinical settings.

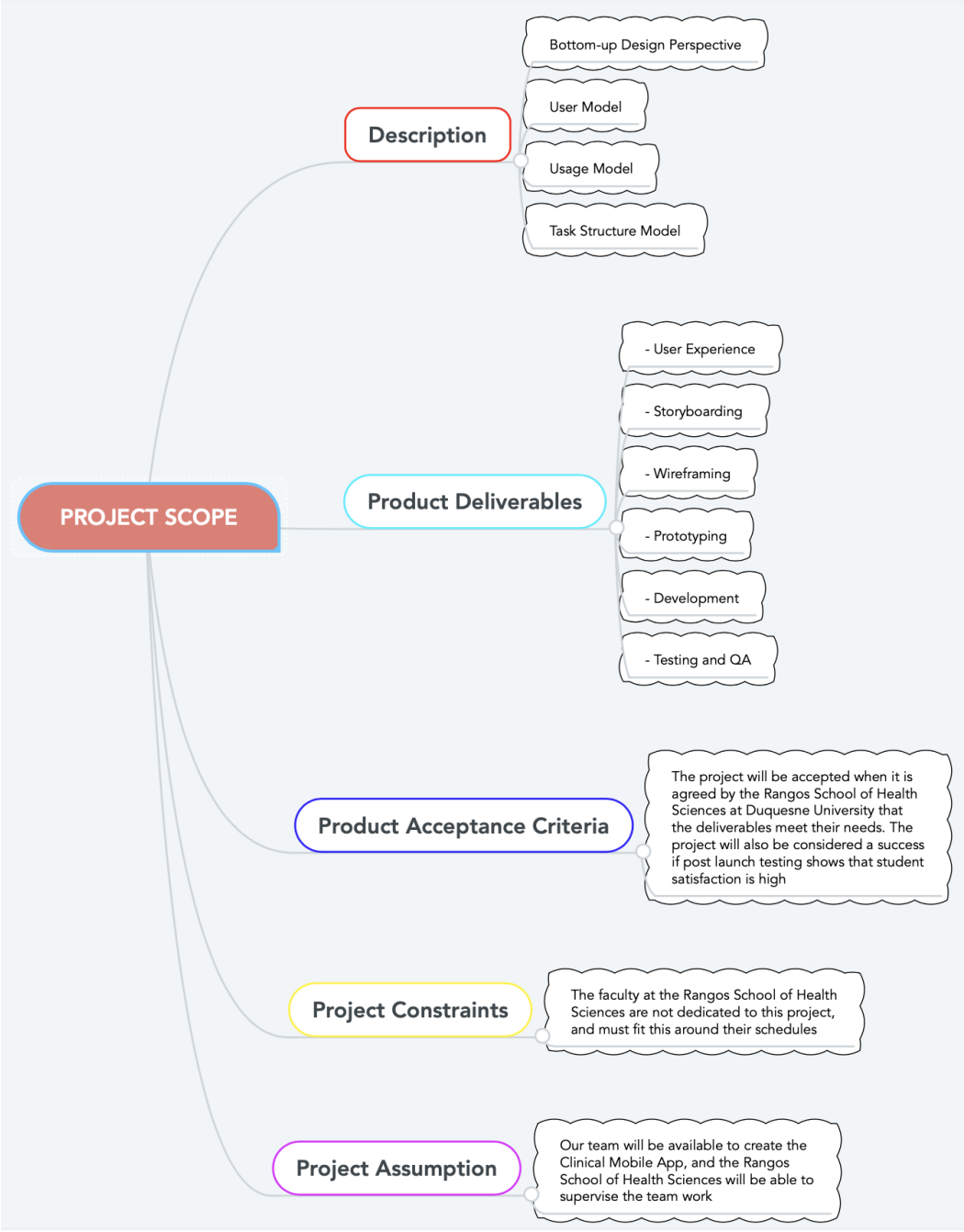
This project will be aimed at the mobile device-savvy Gen Z students as they experience the clinical environment. Pre-filled questions and multiple-choice selections will be employed when possible, with spaces available for students to briefly discuss their clinical experiences each day. The team also intends to design for the user experience of the faculty and clinical leaders who work with students at all stages of their clinical experiences.

**Scope of Project**

The team considers this project from a bottom-up design perspective (Hartson and Pyla, 2019, p. 279). Although the app being proposed for this project will be new, there exists certain familiarity with the concept of clinical experiences and documentation of those experiences. There is an existing infrastructure dedicated to clinical experiences and the fulfillment of regulatory and accreditation standards. Therefore, the team will analyze the data gathered during the data elicitation stage regarding work roles, the nature of the work, challenges and breakdowns (Hartson and Pyla, 2019, p. 279).

This project will focus on a user model (work role), usage model (flow model), as well as a task structure model. Although the team does not explicitly say that the task interaction model is used in this project, task interactions are threaded throughout the project within work role/work flow definitions. By virtue of the mobile aspects of the proposed app, working environment models were not addressed. Each user of the app will have a very different work experience, and so models describing workspace and how it impacts work practices are not addressed.

As Hartson and Pyla (2019, p. 180) mention, every project needs a user work role model, as it is "a representation of user work roles, sub roles, and associated user class characteristics, and it is essential to identify the operational user work roles as early in usage research as possible."




**Expanded Work Roles (from Project 2) and Possible Barriers**

- **<u>User Class 1</u>:** access to all parts of the app are required. Members of this user class make critical decisions regarding most (if not all) other aspects of app functionality.

    - **Clinical Coordinator** (User Class 1) Oversees all clinical activities, including site assignments, clinical hours, managing on-site preceptors, faculty assignments, and

student schedules. Possible barriers include clinical site availability and cooperation, faculty availability, and types of clinical experiences required.

- **Technology Coordinator** (User Class 1) Makes sure the technology is updated and working as intended. The TC also fields questions regarding errors and app constraints. Possible barriers include outdated technology; lack of available wifi; low comfort or familiarity with technology.

- **Student Affairs Manager** (User Class 1) Uploads student data to the app, enabling students to log into the app and ensures ease of use. Possible barriers include incomplete rosters; late student registrations; students requesting specific site locations due to approved limitations.

**User Class 2:** Users in this class are typically faculty who require access to rosters of their assigned students, along with access to view (and grade) all student assignments and notes for the clinical experience. Members of this class will have the capability to communicate with all other users within the app ecosystem (minus the students who are not assigned to them.)

- **Faculty** (User Class 2) Evaluates student notes uploaded to the app, and provides feedback when appropriate. Will grade all assignments. Possible barriers include overload with non-clinical responsibilities; too many students per faculty member; comfort with technology; certain sites may require specific skills or special knowledge of clinical subject matter.

- **Assessment Coordinator** (User Class 2) Assesses student progress throughout the clinical experience, evaluates the efficacy of each clinical site, and assesses cohort progress toward licensure.

**User Class 3:** Members of user class 3 are limited to the tasks required for their particular role, such as only working with rosters and databases, uploading reports, etc.

- **On-site preceptor** (User Class 3) Supervises students as they conduct on-site clinical experiences. Uses the app to view rosters of students who are assigned to them. Possible barriers include a lack of commitment to use school-specific software (app); too many clinical students assigned, and possibly more.

- **Budget Manager** (User Class 3) Pays vendors for various services related to the app. Also responsible for evaluating and remitting all on-site preceptor expenses. Low comfort with technology required; different sites may require specific reimbursement processes not conducive to app.

- **Database Coordinator** (User Class 3) Ensures student encounter notes are being securely uploaded from app to a tracking database, enabling faculty to track student progress and patient encounters. Low comfort level with technology; may not receive student notes in a timely manner.

- **Student User -** (User Class 3) Uses the app to document their clinical experiences. Interacts with faculty to obtain feedback and project grades. Lack of willingness to load the app onto a personal device; low compliance to note-making; early learning curve with the app may discourage use.

**Models**

The following figures show the various models that our team chose for this project (Fig, 1, Fig. 2, Fig. 3).

Our team chose a Flow Model (Fig. 1), as it is the centerpiece of immersion in our UX design studio, and it gives us "an overview of how information, artifacts, and work products flow among user work roles and parts of the product as the result of user actions (Hartson and Pyla, 2019, p. 187)

Additionally, Fig. 2 and 3 illustrate our Hierarchical Task Inventory (HTI) and Workflow Mental Models. A Hierarchical Task Inventory was selected, as it is a great way to organize the different relationships among the tasks and subtasks (Hartson and Pyla, 2019, p. 193). Additionally, this HTI model provides our team with the advantage of being able to "organize and manage user stories and serves as a guide for creating a complete set of user stories as requirements" (Hartson and Pyla, 2019, p. 193). For the development of our product, it is essential to describe user tasks and actions, and this HTI model is crucial for informing UX design, as it tells "what tasks and functionality we have to design for in the system" (Hartson and Pyla, 2019, p. 193).

**Fig. 1:** Flow Model (Hartson and Pyla, 2019, pp. 187-192)

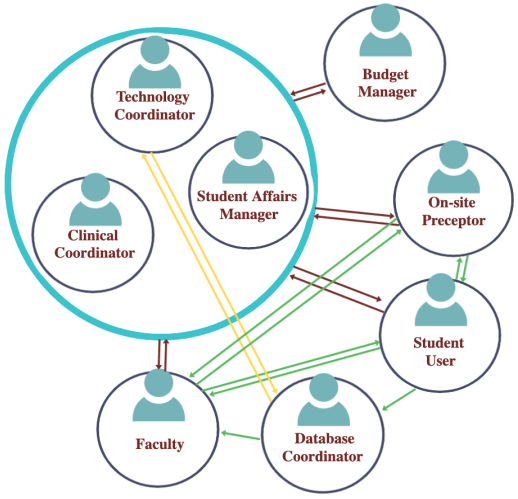


**Fig. 2:** A Hierarchical Task Inventory (Hartson and Pyla, 2019, pp. 192-196)

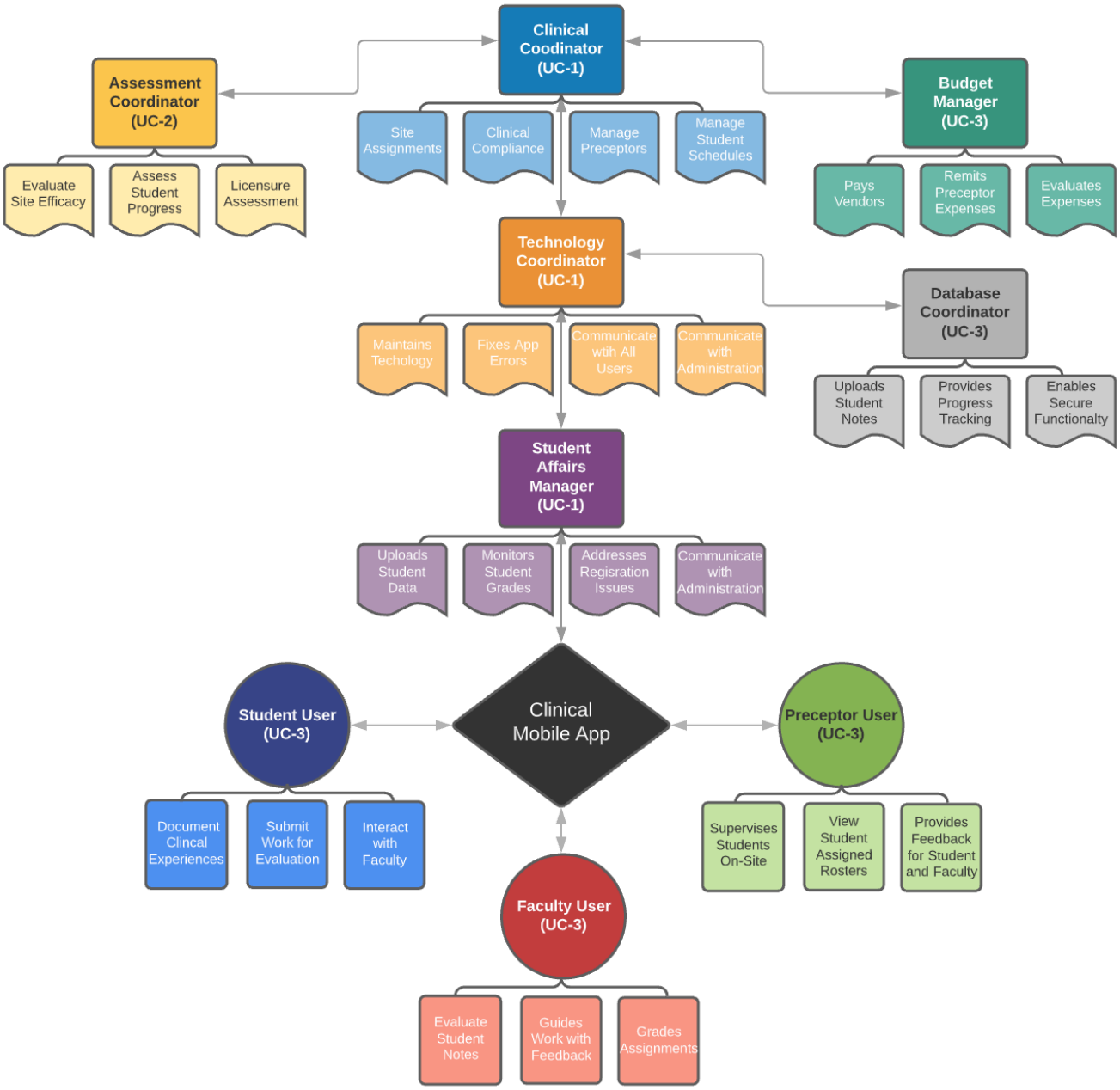
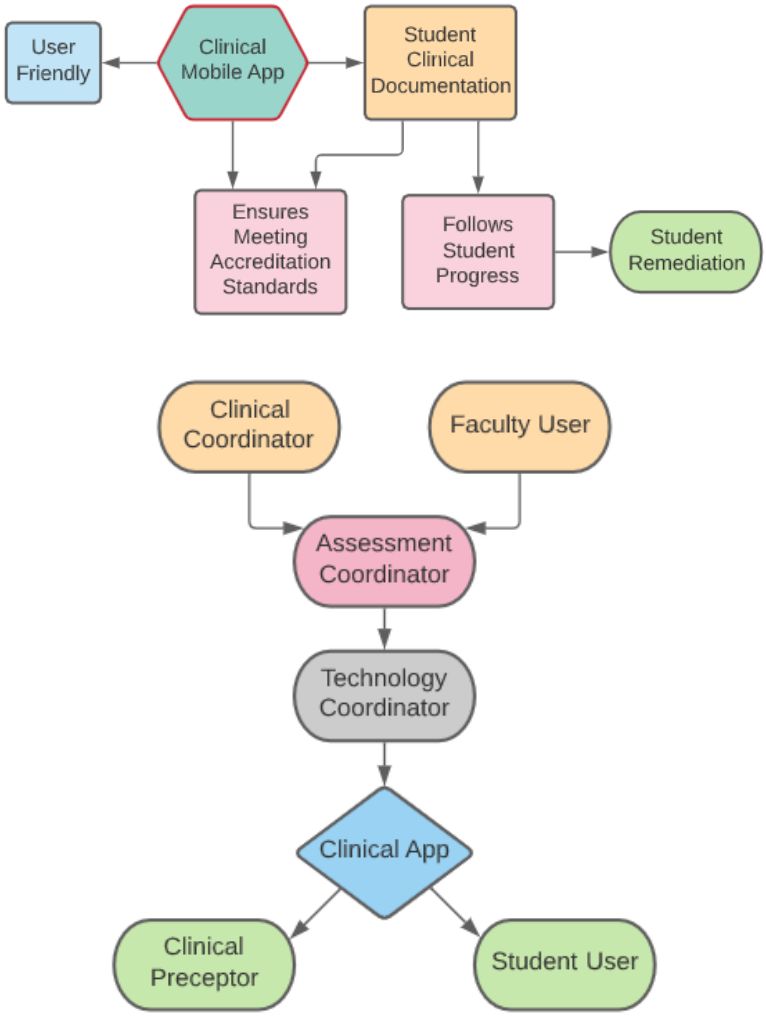


**Fig. 3:** Role workflow mental model (Hartson and Pyla, 2019, p. 195)




**References**

Hartson, R., & Pyla, P. (2019). *The UX Book: Agile UX design for a quality user experience*, 2nd ed. Cambridge, MA: Morgan Kaufmann.

O'Connor, S., & Andrews, T. (2018, 2018/10/01/). Smartphones and mobile applications (apps) in clinical nursing education: A student perspective. *Nurse Education Today, 69*, 172-178. https://doi.org/https://doi.org/10.1016/j.nedt.2018.07.013

**Project 4: Design**

- **Project Name:** Clinical Mobile App
- **Name of Client Organization:** Rangos School of Health Sciences, Duquesne University (Courtney Hartman, Director of Clinical Education, PA Program)
- **One-line Description of this Project Assignment:** Designing an app to support student clinical experiences
- **Team Member Names:** Alicia Segura-Pinto, Alison Wix, and Scott Copley
- **Agile UX Design Experienc**e – GDIT 716, Summer 2021

**Product Concept Statement**

The proposed product is a mobile app which will support the efforts of health care students who are participating in their supervised clinical practice experiences (SCPEs). Several medical professions require student practitioners to document their daily clinical experiences as part of their training for both graduation and licensure. This clinical mobile app could benefit their training process, and be helpful for the faculty as well.

Current clinical documentation software exists largely in the desktop/laptop computer format, with a gap in the offering of a mobile app. O'Connor and Andrews (2018, p. 172) state that the use of mobile apps to enhance clinical education has not been explored, and these apps could benefit the acquisition of knowledge and skills in clinical settings.

This project will be aimed at the mobile device-savvy Gen Z students as they experience the clinical environment. Pre-filled questions and multiple-choice selections will be employed when possible, with spaces available for students to briefly discuss their clinical experiences each day. The team also intends to design for the user experience of the faculty and clinical leaders who work with students at all stages of their clinical experiences.

**Tailor Activity to Project and Justification**

As stated in Project 3, our team considers this project from a bottom-up design perspective (Hartson and Pyla, 2019, p. 279). More specifically, we look for a goal-driven design whose objective is "to formulate a plan for how our product will be structured to satisfy the ecological, interaction and emotional needs of users" (Hartson and Pyla, 2019, p. 294), specifically, student users.

With the healthcare population, the creation and design of a mobile app for student practitioners could have a positive impact in their learning, as well benefit patient care. Some researchers (i.e., Payne et al., 2012, p. 8) state that "junior doctors and medical students are overwhelmingly enthusiastic to endorse organisational associated apps that help their learning and work activities." However, as Payne et al. (2012, p. 8) emphasize, "future work should focus not only on appropriate app development but also on the perceptions of health care professionals and users on the use of mobile technologies in clinical areas."

Other researchers (i.e., Deshpande et al., 2017) developed a mobile learning app in order to help graduate students during their training years to help their clinical reasoning and decision-making skills.

For our team, it is crucial to consider how users may interact with the various aspects of our app, and whether it satisfies their ecological and emotional needs, as well as to help their training as student practitioners.

**Design Persona**

The team explored various personas for the development of our clinical mobile app, as described in previous projects, and eventually determined that the user persona we would design around is the student user. While other personas were important to the success of the app, none were as crucial to the project as the student user. That is, without the student user, there would be no need for the clinical mobile app.

**Ideation and Sketching Process Used**

After the team got together to synthesize all the usage data, different inputs, and design ideas, we did some brainstorming and mind mapping, which allowed us to have a good flow of connected ideas.

Even though we did the ideation and sketching processes separately, they both come together and support each other. As Hartson and Pyla (2019, p. 296) emphasize, the description of some generative design activities that chapter 14 offers (i.e., Ideation, Sketching, Critiquing) are "inextricably intertwined and occur as a rapid iteration of tightly coupled and overlapping activities, often essentially performed simultaneously. Each of these activities supports and stimulates the others."

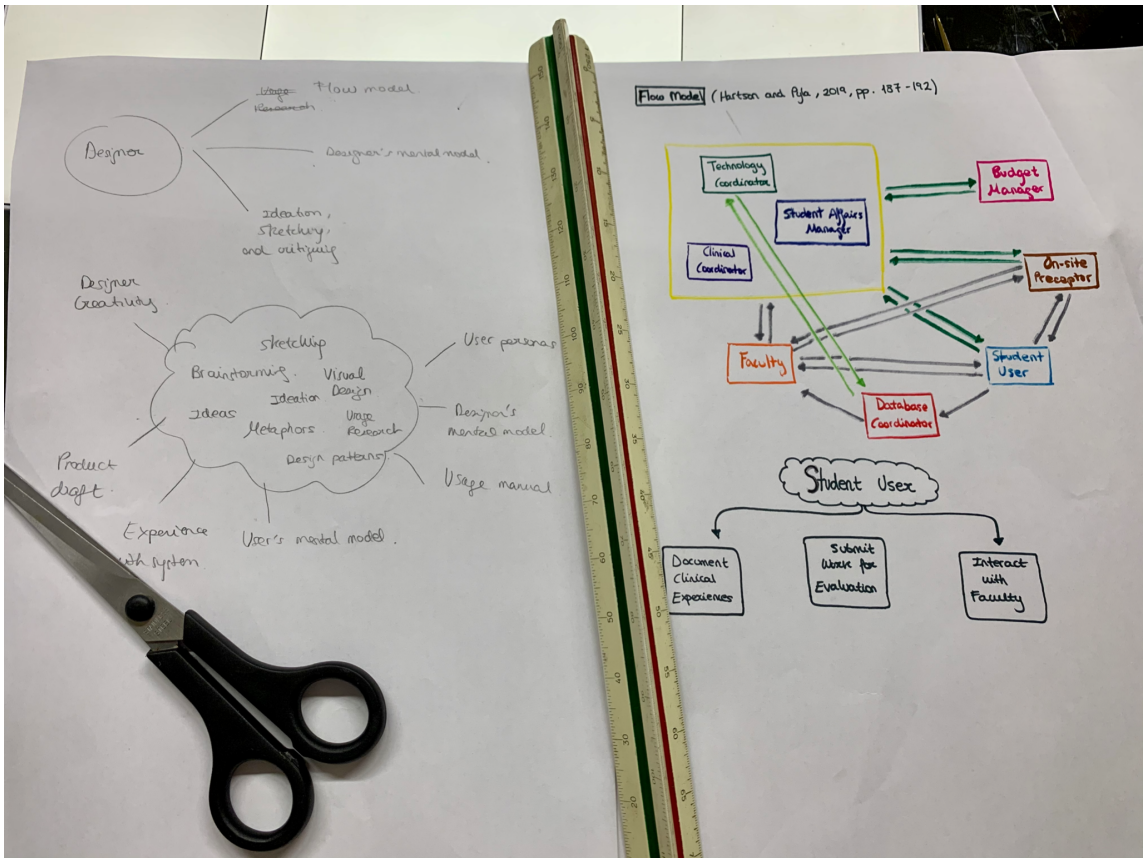
**Workspace and materials used**

The team chose various kinds of materials for the design of this project, ranging from the most traditional materials (i.e. pencils, colors, papers) to more technology-friendly ones (i.e. Canva, MindMeister, LucidApp, Sketch, among others). Since we are creating a new product, we benefited from the use of both groups of materials, as each of them is helpful in a particular way. For instance, having the possibility to draw and color the possible logo for our app on paper by hand might help us to see the ideas more clearly before we transfer the whole design using technology. Similarly, whenever the group uses technology to implement the design of our mobile app, aspects such as colors, sizes, and fonts, among others, are more realistic and closer to what our student users will be having when using it.

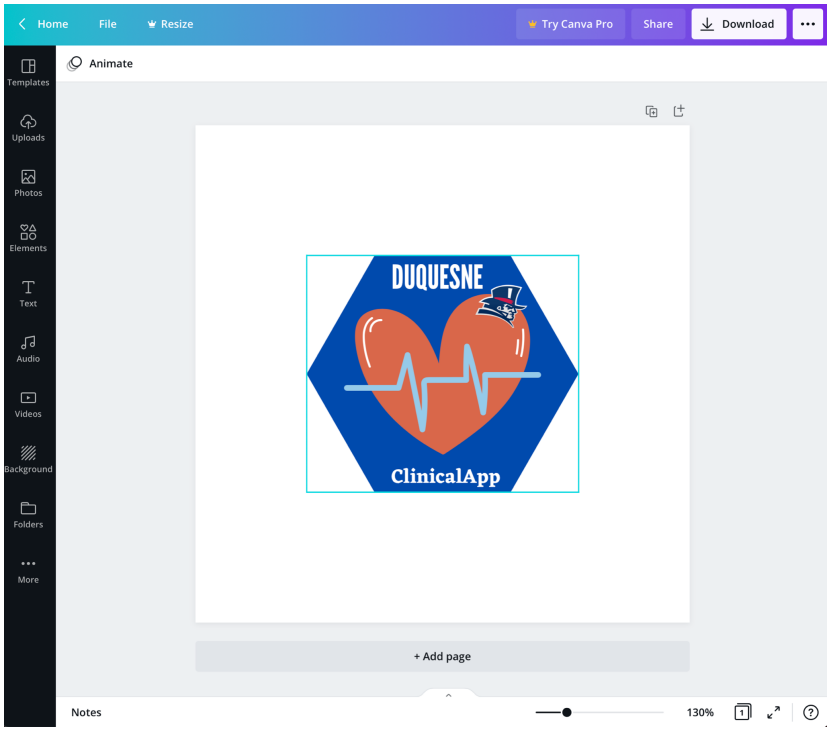
We came together with some ideas and thoughts, and did some immersion in order to find connections among the different aspects of our design. As Hartson and Pyla (2019, p. 295) suggest, for this early design process it is essential to "fill your walls, shelves, and work tables with artifacts, representations of ideas, images, props, toys, notes, posters, sketches, diagrams, mood boards, and images of other good designs."

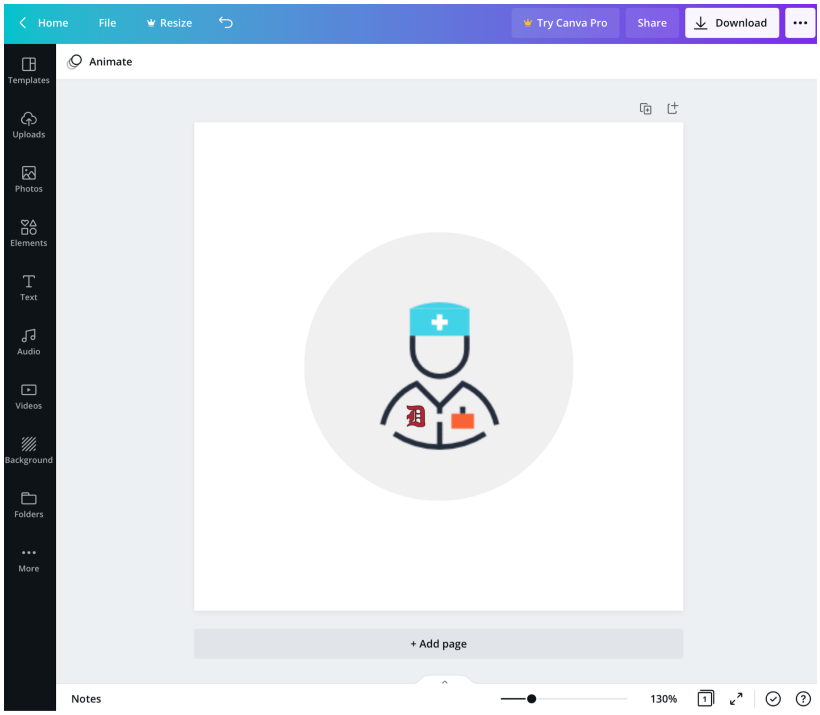
Finally, we were open-minded about the usage data, design inputs, and different ideas the team members had, and got together in order to synthesize and create “a single unified design” (Hartson and Pyla, 2019, p. 295).



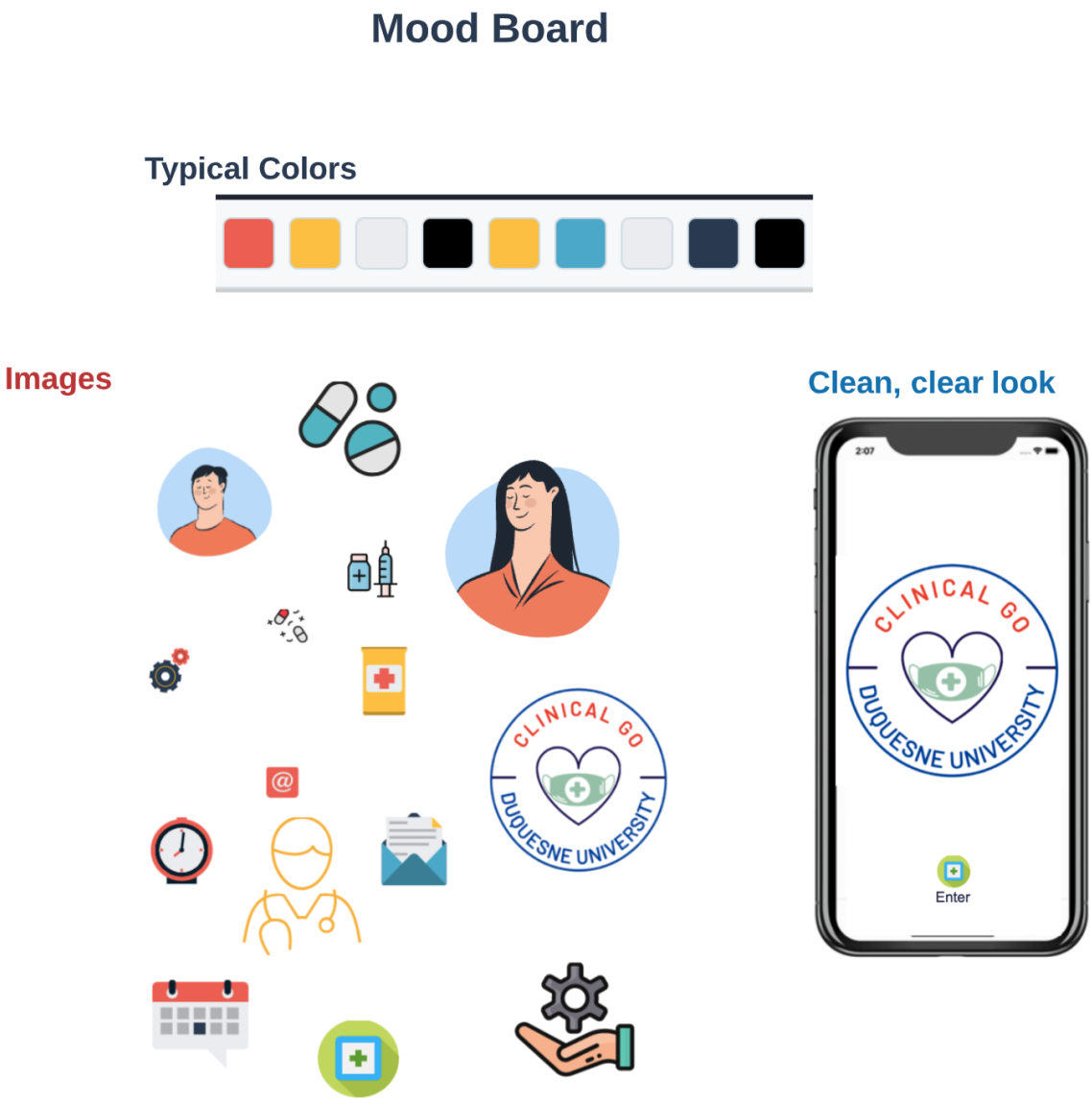


## Examples Using Canva:



**Creating Our Mood Board**

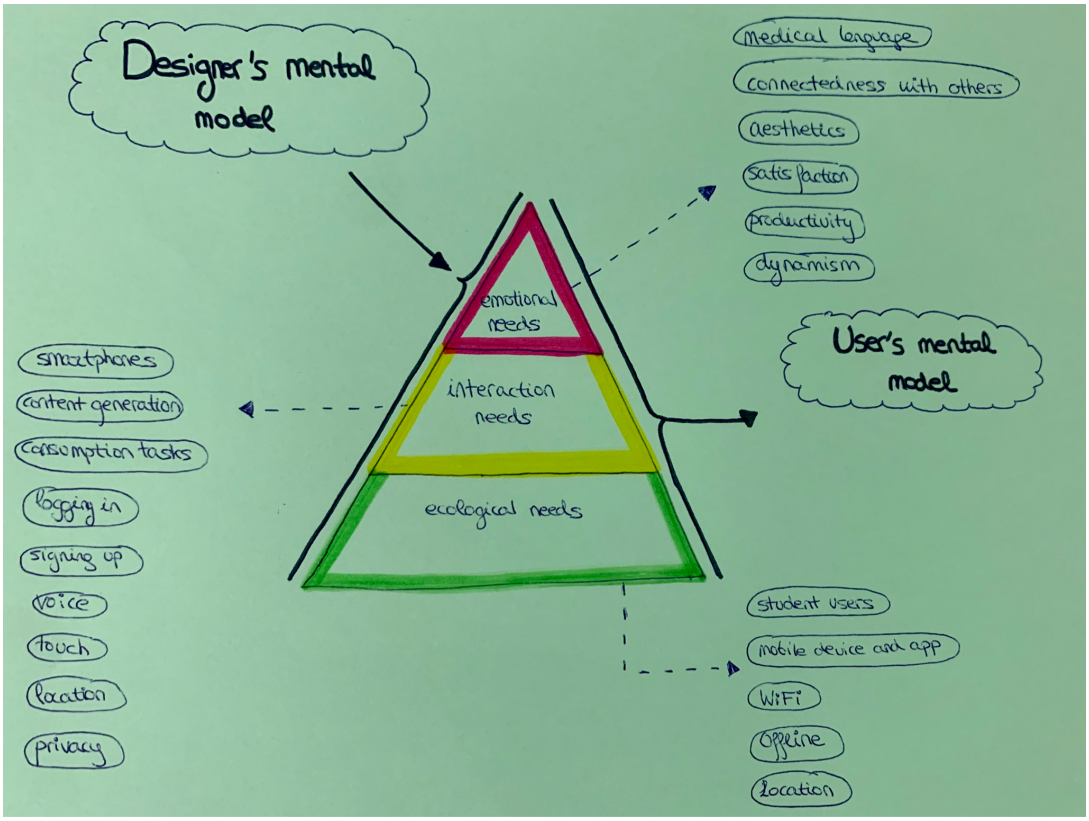


**Scans of Selected Sketches**

Below you can find some of the sketches the team made for both the logo and the look of our mobile app, “Clinical Go.”


**Designer's mental model**

As the designers of this clinical mobile app, our team focuses on the pyramid of user needs, in which the "bottom layer is for ecological needs, the middle layer for interaction needs, and the top layer as emotional needs" (Hartson and Pyla, 2019, p. 341).




**Conceptual design**

Hartson and Pyla (2019, p. 329) describe conceptual design as "a mapping of the designer's mental model to the user's mental model."

For this early phase of the design process of our mobile app, our team considered the importance of users' interactions, experiences, processes, and strategies within the app. Additionally, some key aspects our design offers is a goal-driven design, as well as keeping our platform simple, with a great readability level and flow.

Furthermore, as a starting point, our team chose a design for an iOS device, since most Gen Z students are more familiar with Apple technology. If needed, it could also be designed for Android. Considering this, it is crucial for the team to go through the various patterns that iOS has, as well as to select the right font, objects, and different buttons that an Apple device has.

Our team will follow the Human Interface Guidelines (Apple Computer, Inc., 1992) that can be found at the Apple Developer website in order to make the appropriate design for an iOS device. Apple provides information about iOS themes, App Architecture, User Interaction, System Capabilities, Visual Design, Icons and Images, Bars, Views, Controls, and Extensions.

Some of the design principles that can be found at the Human Interface Guidelines are: aesthetic integrity, consistency, direct manipulation, feedback, metaphors, and user control. Human Interface Guidelines defines it as “an app that helps people perform a serious task and can keep users focused by using subtle, unobtrusive graphics, standard controls, and predictable behaviors.”

A very interesting aspect that we will include in the design of our app is direct manipulation. The Human Interface Guidelines state that “users experience direct manipulation when they rotate the device or use gestures to affect on screen content. Through direct manipulation, they can see the immediate, visible results of their actions.”

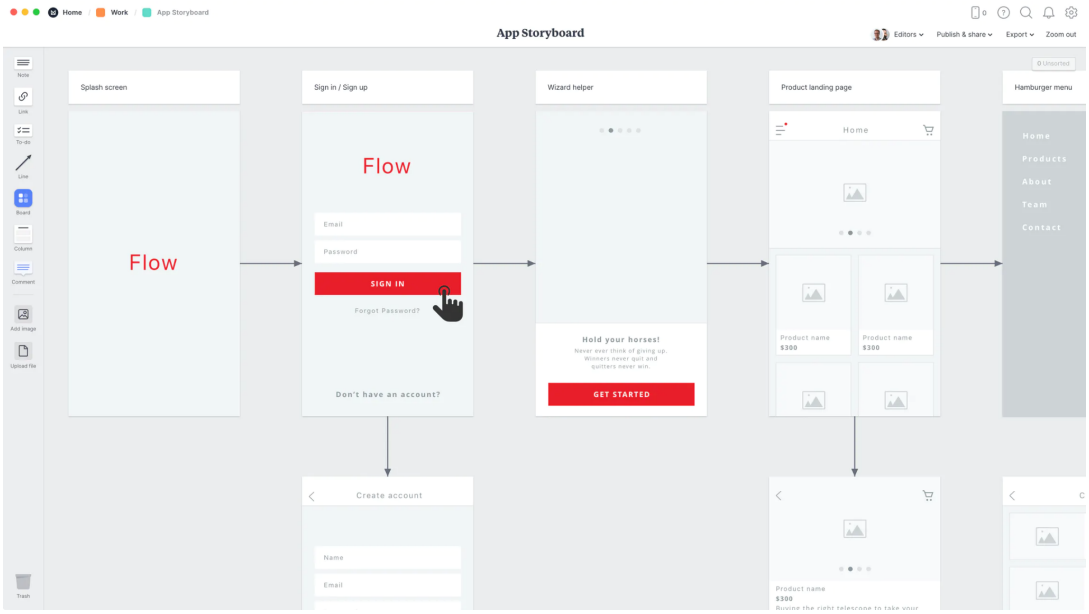
Additionally, regarding the visual design, there are different aspects that the team has to consider before we start to build the app. For instance, we have to make sure that, if we pick an iPhone as our device, our app runs on every screen size for that device. Auto Layout “is a development tool for constructing adaptive interfaces, and you can define rules that govern the content in your app” (Human Interface Guidelines).

**How your Conceptual Model Acts as Mapping from Designer to User**


Conceptual Design

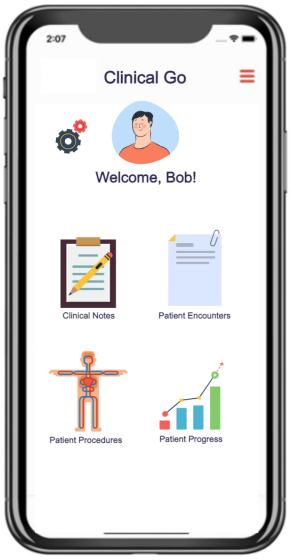
**Storyboarding and Wireframes**

As Hartson and Pyla (2019, p. 366) state, “storyboards can cover all layers of the pyramid of needs.” They can also help define the views and provide representations of each screen within the app. As pictured below, the clinical app opens with a “splash page” as an introduction for student users. It is then followed by the “sign in” page, the “wizard helper” and the “product landing page.” The “product landing page” includes direct links for clinical relevant material and technical support. These links include: clinical notes, patient encounters, patient procedures, patient progress, medication look-up, medication interactions, schedules, secure messages, student hours and technical support. With respect to wireframing, the images below depict the layout and blueprint of the app. The flow between interfaces is also demonstrated. In conclusion, each of the interfaces demonstrated through both storyboarding and wireframing include simple designs that are user friendly for the students.

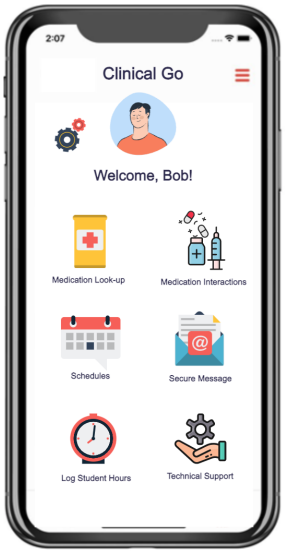



***Storyboard of App - General Summary***

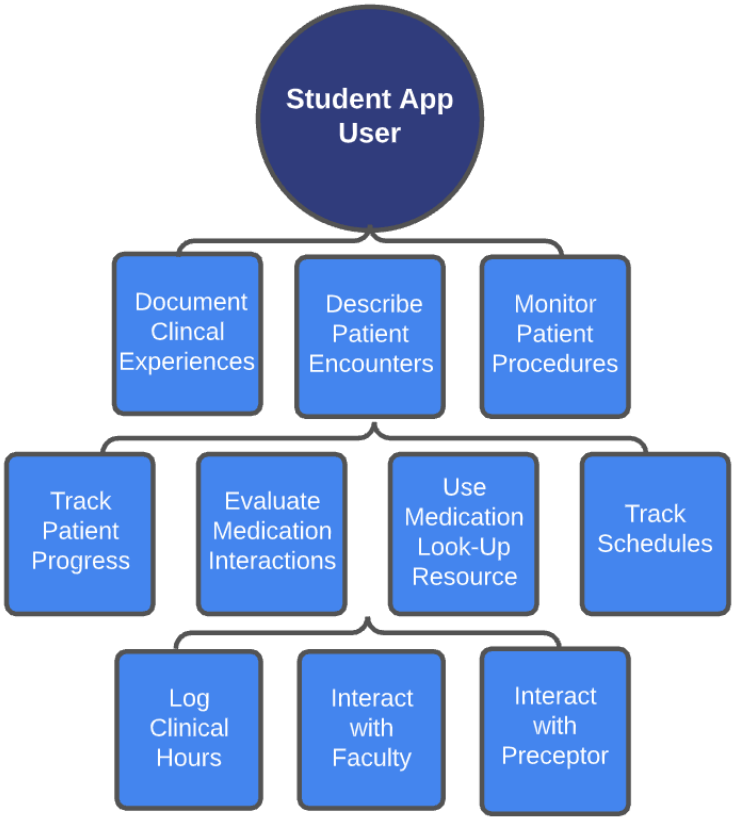

*Splash Page*




*Product Landing Page 1*




*Product Landing Page 2*



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# Project 5: Directions Prototyping

- **Project Name:** Clinical Mobile App
- **Name of Client Organization:** Rangos School of Health Sciences, Duquesne University (Courtney Hartman, Director of Clinical Education, PA Program)
- **One-line Description of this Project Assignment:** Designing an app to support student clinical experiences
- **Team Member Names:** Alicia Segura-Pinto, Alison Wix, and Scott Copley
- **Agile UX Design Experienc**e – GDIT 716, Summer 2021

**Product Concept Statement**

The proposed product is a mobile app which will support the efforts of health care students who are participating in their supervised clinical practice experiences (SCPEs). Several medical professions require student practitioners to document their daily clinical experiences as part of their training for both graduation and licensure. This clinical mobile app could benefit their training process, and be helpful for the faculty as well.

Current clinical documentation software exists largely in the desktop/laptop computer format, with a gap in the offering of a mobile app. O'Connor and Andrews (2018, p. 172) state that the use of mobile apps to enhance clinical education has not been explored, and these apps could benefit the acquisition of knowledge and skills in clinical settings. Improvements in medical education technology "are key not only to the reliability and validity of the data, but…[they will ultimately enhance] student learning [experiences]" (O'Brien, et. al, 2011).

This project will be aimed at the mobile device-savvy Gen Z students as they experience the clinical environment. Pre-filled questions and multiple-choice selections will be employed when possible, with spaces available for students to briefly discuss their clinical experiences each day. Hopefully the ease of use within the app will ensure student documentation of patient encounters. The team also intends to design for the user experience of the faculty and clinical leaders who work with students at all stages of their clinical experiences.

**Project Scope and Process**

The team will focus on the student user for this project. With our previously noted (projects 3 and 4) bottom-up design perspective, we aim to satisfy "the ecological, interaction and emotional needs of [primarily student] users" (Hartson and Pyla, 2019, p. 294). Having planned a great deal in project 4 for our initial storyboard and wireframe designs, the group will go further in designing more of the specific task descriptions for the student user. While we may touch upon other user roles, it will be in so much as those roles may relate to the student user role.

Since the Clinical Go App is a software product, customer and story-based planning was crucial to the group as we worked toward agile software engineering, or software SE (Hartson and Pyla, 2019, p. 631). Team members collected stories and analyzed data while moving through the UX design funnel. Through agile SE and an early understanding of user work

activities, the team avoided large design costs, enabling us to move through various iterations more quickly.

Additionally, an essential aspect that our team explored is how privacy affects mobile apps, and the further repercussions it may have on students' lives. Some researchers (i.e., Nan et al., 2018, p. 1) offer a new perspective of better understanding the privacy risk in mobile apps and also "highlight the importance of data protection in today's software composition."

Moreover, Blenner et al. (2016, p. 1051) emphasize the lack of research that has been done about this aspect on mobile apps, particularly on health apps, as they state: "privacy risks and the relationship between privacy disclosures and practices of health apps are understudied." As a conclusion, our team added this privacy aspect in the creation of the different wireframe prototypes and design of our mobile app Clinical Go.

**List of Key Task Descriptions for Each Role in Our Design**

As noted previously, the focus of this project will be a student user who is doing field (clinical) experiences. This app has been designed from that perspective, and should serve as a functional tool to document their experiences, a resource for obtaining new or supporting information, as well as logistics for tracking/logging clinical hours. As part of the logistical component, a calendar/schedule is also included.

According to Hartson and Pyla (2019, p. 198), it is important to provide usage scenarios as well as tasks and context of the work. Fig. 1 presents the various tasks and further descriptions including usage scenarios and different contexts are provided below.

***Fig. 1: User Tasks within Clinical Go***

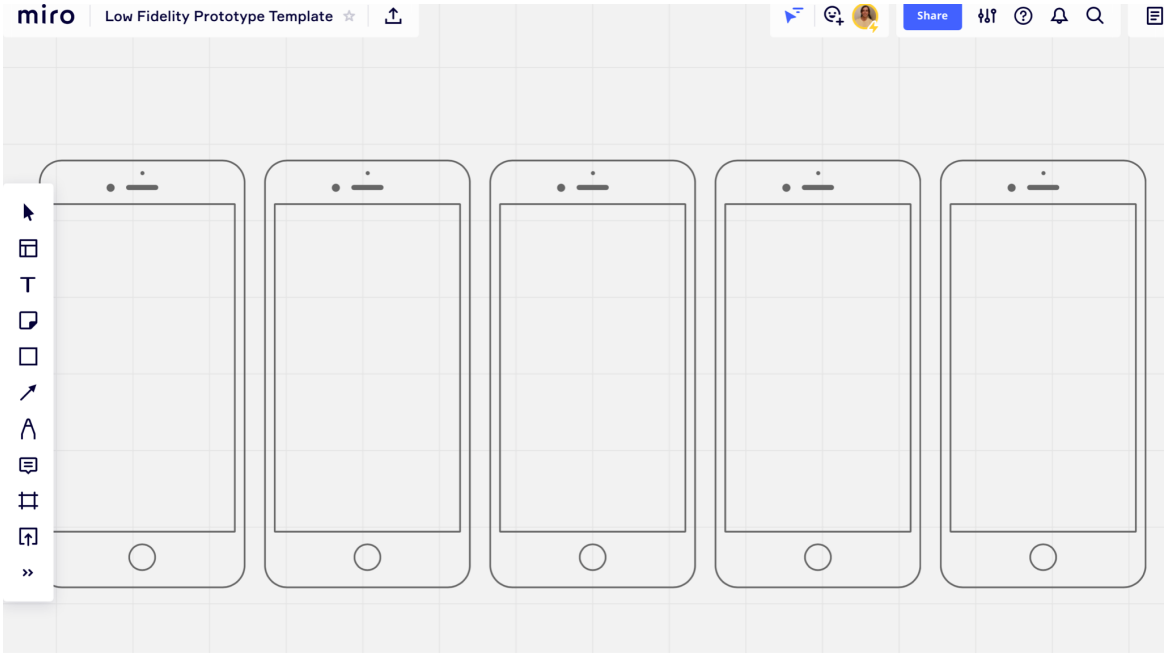
- Writing clinical notes: The student will document all pertinent notes of the clinical experience without patient identifiers to create a rolling study guide. The students will have access to commonly used phrases and conditions and the student will also be able to type text into their own words when it works best with the scenario.
- Documenting and evaluating patient procedures: The student will document patient procedures to which they have been assigned in addition to assessing the procedures themselves. Procedures may include incision and drainage of abscesses, vaccination administration, surgical scrubbing, suturing, IV access, etc.
- Tracking patient progress: Students will track and document patient progress, connecting the diagnosis to outcomes wherever possible.
- Documenting patient encounters: Similar to that of a licensed practitioner, Physician Assistant students will document patient encounters. The user can select from commonly used phrases, or write about their experiences in their own words. This documentation will include all necessary aspects of the clinical experience including patient history, physical examination, assessment and plan.
- Using resources: Students will use the app to look up medications for treatment plans and medication interactions.
- Communicating, logistics, and support: Student users will be able to communicate with preceptors and faculty, along with logging their clinical hours. Technical support is also part of this role.

Our team got together in order to discuss and choose the various tasks presented, which are essential for our pilot testing process. All discussions will be part of our UX testing, and as designers, will simulate user task performance in a pseudo-empirical approach in which we will guide users by the use of imperative sentences in what they can do, avoiding instructions on how to actually do any task within the mobile app presented.

**Wireframe Prototypes**

While developing the Clinical Go App, the team explored multiple options for creating various wireframes of the design of our mobile app. One example (fig. 2) of an excellent program is Miro, which allowed us to continue with the concept of creating interactions, looking at widget functionality, as well as the act of submitting sub-reports to the larger report to document a student's clinical experience.

***Fig. 2: An early low fidelity prototype template for developing Clinical Go***




As discussed by Hartson and Pyla (2019, p. 408), the team has selected a combination of horizontal and vertical prototypes for this project (figs. 5 and 6.), as well as wireframe prototypes (Hartson and Pyla, 2019, p. 408). Although these prototype methods do not show the step-by-step details of each student action, they demonstrate the next-level development of our product. From information gathered in the usage research data elicitation stage (Hartson and Pyla (2019, p. 119), the team developed the goals for what the Clinical Go app should include (fig. 5).

Wireframe prototypes were used and were generated by a software tool (miro and visme). As Hartson and Pyla (2019, p. 410) state: “wireframes are described as two-dimensional sketches or drawings consisting on lines, arcs, and vertices, plus some text for labels, representing the layout of an interaction design for a page or screen, as it can be appreciated on the figures below. These include elements such as headers, footers, content areas, labeling, menus, tabs, buttons, icons, messages, search fields, among others (Hartson and Pyla, 2019, p. 411).

Later, using both quantitative and qualitative usage data, the group was able to modify some of the functionality to better suit student needs, which were mentioned in project 4. Later iterations of the app move from simply documenting the student clinical experience to providing resources to the student user (fig. 6). By gaining insight from UX research, the Clinical Go App was improved to help the student user learn about possible medications to use, as well as to safeguard against potentially harmful interactions with previously prescribed medication.

***Fig. 3: Clinical Go Icons***

Based upon usage research, the team developed icons to represent functional areas of the Clinical Go App.

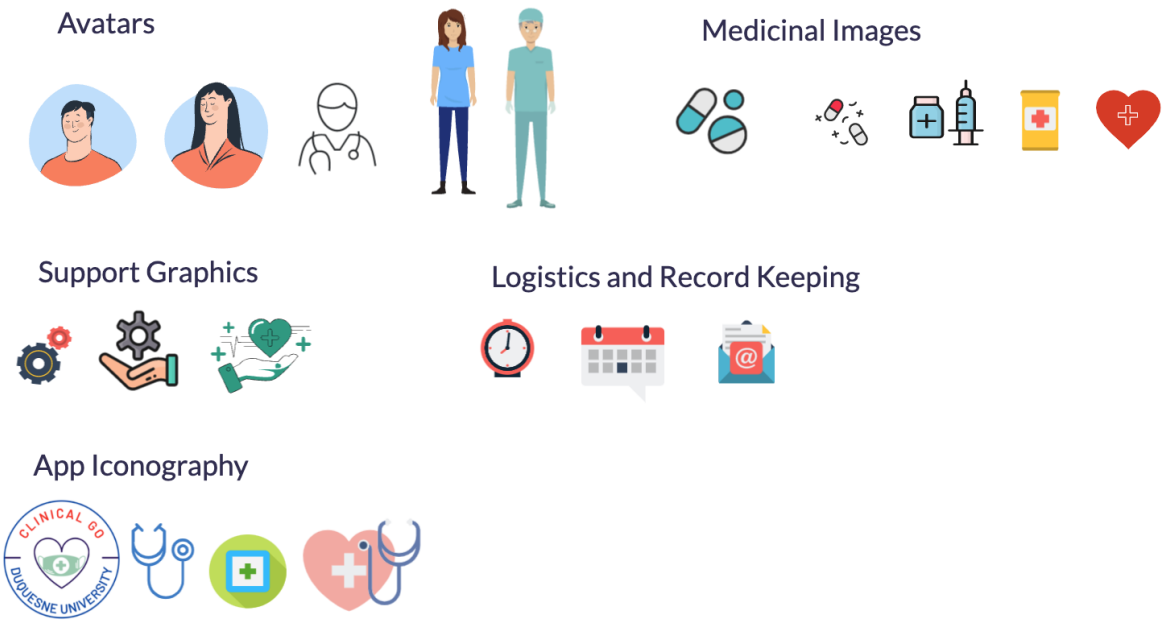
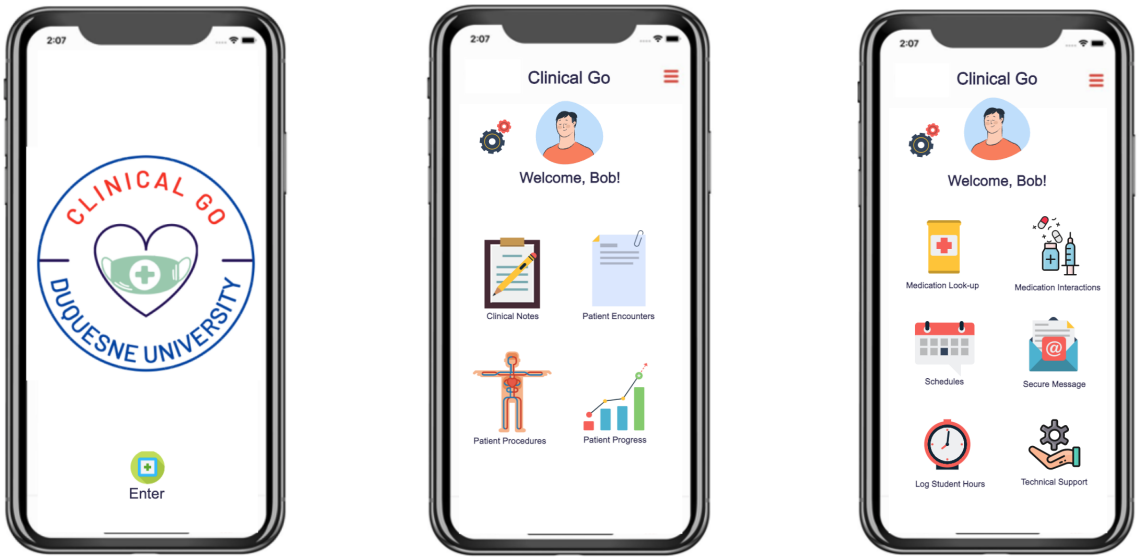


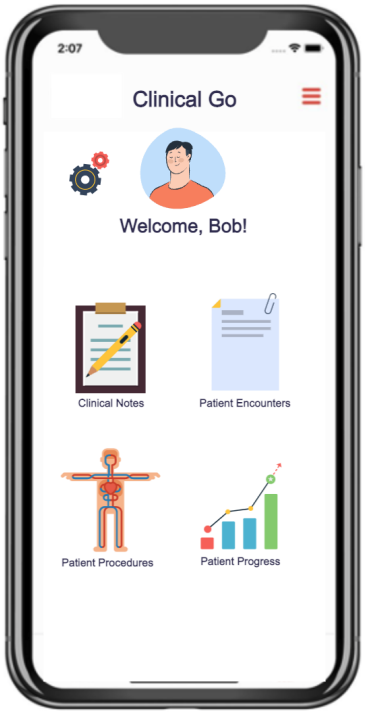

***Fig. 4: Later iterations of the Clinical Go App***

Based upon UX data analysis, the team developed widgets for clinical documentation and resources to assist the student user while they are taking part in their clinical experience.

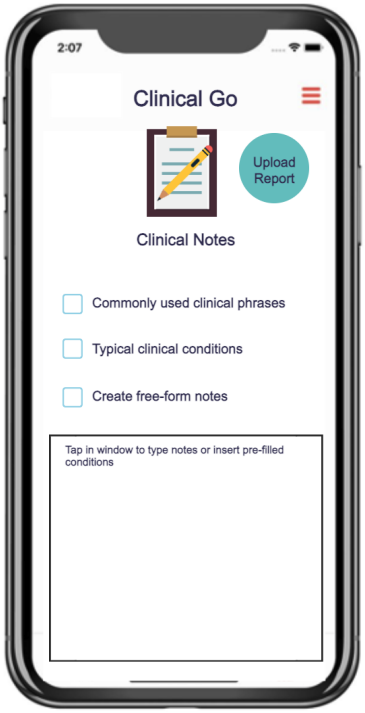



Splash Page | Product Landing Page 1 | Product Landing Page 2

*Fig. 5: An example of clinical function widgets*

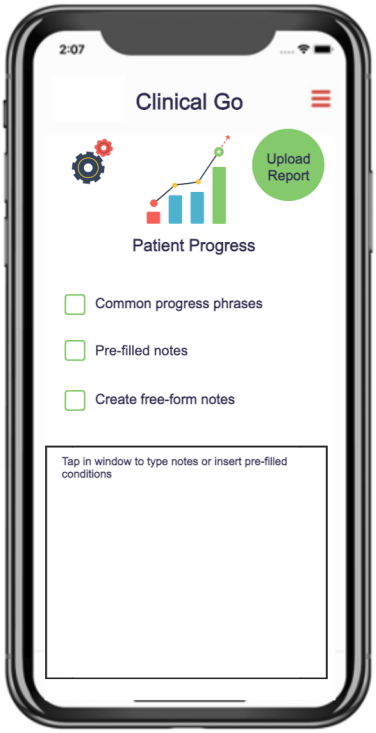



Product Landing Page 1
(Clinical Function)




Clinical Notes Widget
(Clinical Function)

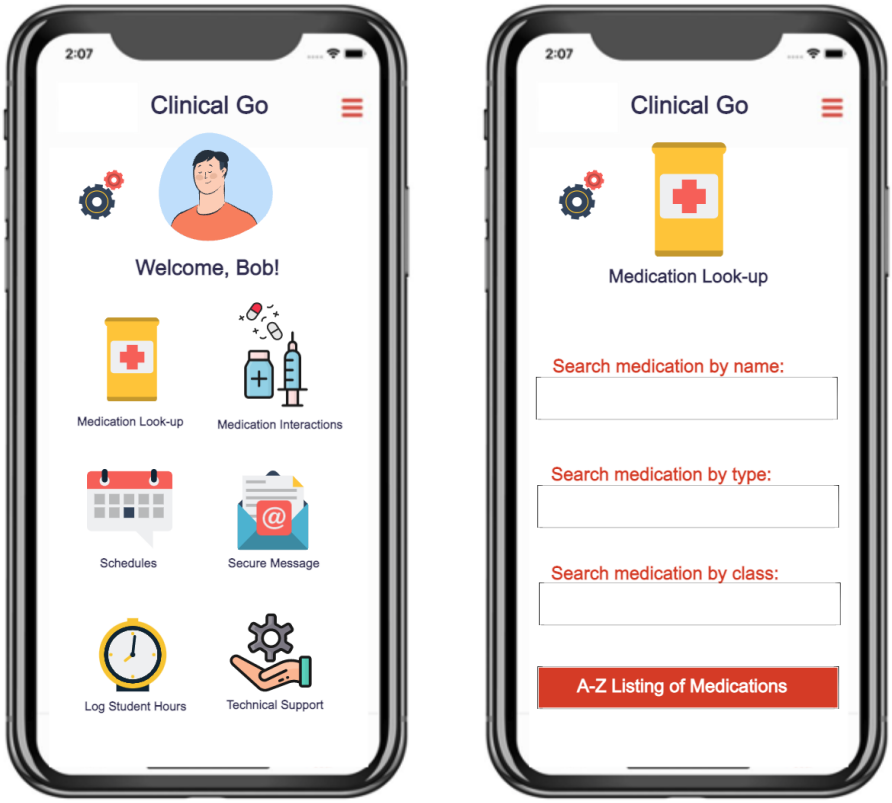

Patient Procedures Widget
(Clinical Function)




Patient Progress Widget
(Clinical Function)

Fig. 5 offers a view of how widgets will function once the student selects which option they seek to use. Within each widget, the student user will have several options. Data elicitation informed the team that students prefer a combination of commonly used terms and options, along with the ability to make notes in their own words. Once complete, the student may upload each sub-report (such as “Patient Procedures”) to their overall field notes.

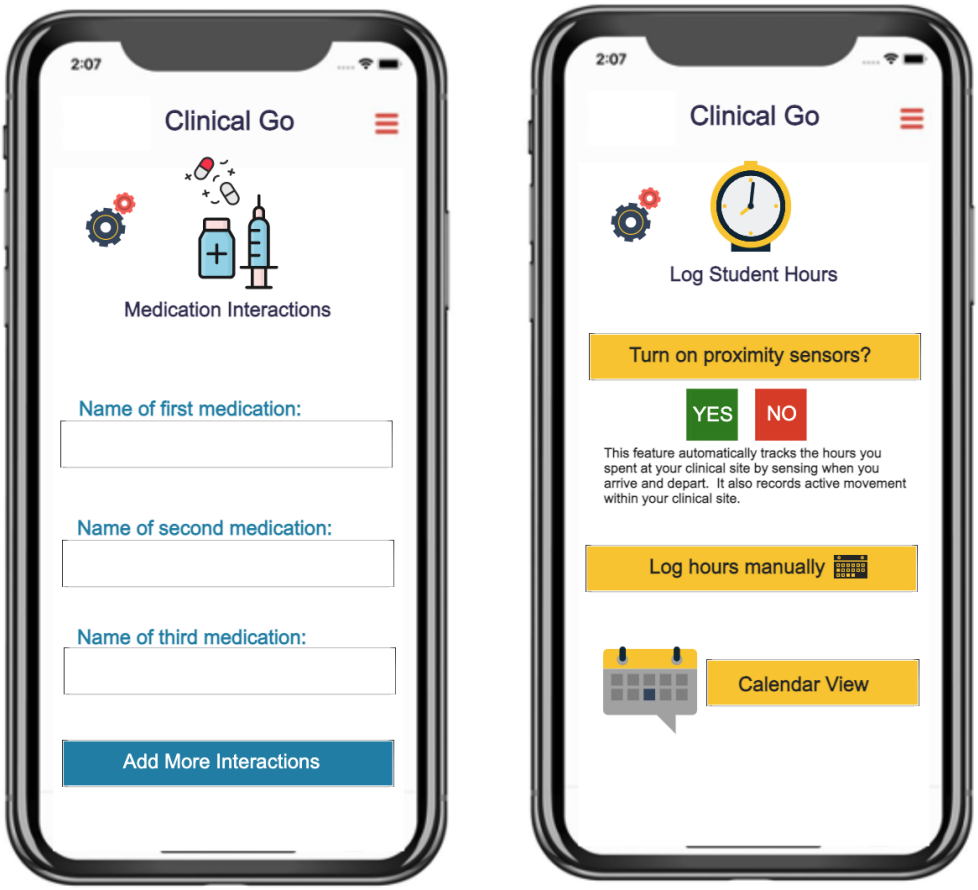
***Fig. 6: An example of the resources and logistics features of the Clinical Go App***




Product Landing Page 2
(Resources and Logistics)

Medication Look-up Widget
(Resource)

***Fig. 6: Continued...***




Medication Interactions Widget
(Resource)

Student Clinical Hours Log Widget
(Logistics)

In fig. 6, students can look up medications, look for medication interactions, log their hours, seek technical support, view calendars, as well as communicate with faculty and preceptors. Students can select whether or not they want the app to track their hours spent at the clinical site automatically by use of proximity sensors.

**The Gulf of Evaluation**

Throughout each step of the UX design process, the team remained cognizant of the gulf of evaluation (Hartson and Pyla, 2019, p. 698), recognizing that student users must receive system feedback in order to know if their clinical reports and hours are being recorded successfully. Therefore, notification sounds and pop-up notifications will accompany each action within the user interaction cycle (Hartson and Pyla, 2019, p. 699) as part of the system response and feedback.

During UX data elicitation, students believed an option to correct or amend clinical reports prior to final upload would be necessary, which has also been included in the design of our product, the Clinical Go App.

**Pilot Testing Our Prototype: Action Plan**

Our team will benefit from pilot testing our prototype in several different ways. As we are creating a new product for student usage, there are many aspects of the mobile app that could not go as planned and may be new to the designers. Therefore it is crucial to conduct several pilot tests early in the design, so that there is enough time to fix problems or holes found through the testing. Pilot testing will not only alert us to difficulties within the app, it will also help provide preliminary data for our app and the feasibility of creating this mobile app.

As we prepared our pilot testing process, the team found useful research articles that will serve as guidance and provide complementary information we could apply to the app. For instance, Licskai et al., (2013) explore the development and pilot testing of a mobile health system to support asthma self-management. As these authors (Licskai et al., 2013, p. 305) state: "We designed, developed and pilot tested a mobile eHealth application for asthma self-management that embedded a web browser-based asthma action plan SPA in a telecommunication network that delivered real-time environmental information with risk-reduction advice; received and analyzed biophysical inputs; and provided immediate asthma self-management instructions back to the subject."

Additionally, Ferenchick et al., researched patient encounter logs in a clinical setting for students. One of the areas of focus was "the accuracy of mandated log entries." The information in this study will help guide us while preparing the mobile app with one goal being aimed at the ease of use within the app to ensure documentation of all patient encounters.

Ultimately throughout several pilot tests, we will be able to assess the project, obtain preliminary data, and make necessary adjustments to improve our mobile app.

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